

PERCEPTUAL FOREIGN ACCENT AND L2 PRODUCTION

Robert McAllister

Department of Linguistics, University of Stockholm, Stockholm, Sweden

ABSTRACT

This paper is a report on research activity dealing with the acquisition and use of the phonetics and phonology of a second language. The research work presented here is concerned with the ability of second language (L2) users to understand spoken L2 and a comparison of this comprehension to mastery of production. A test battery was administered to assess some abilities relevant to the comprehension of L2. These test results are compared to an assessment of L2 speech production and some background factors are discussed.

INTRODUCTION

This paper presents some results of experiments with the assessment of second language (L2) perception, a comparison of these results with an assessment of L2 production and a discussion of some background factors which may influence the success of learners' efforts to master L2 phonetics and phonology.

The first issue dealt with here concerns L2 users' global ability to understand an L2. The investigation and description of language comprehension has been approached from several different points of view within the framework of the phonological and phonetic aspects of the comprehension process. The important and probably related question of how L2 speakers' speech is understood by native listeners is not considered here, though it has received considerable attention both in research on L2 acquisition and in the practical pedagogical context of what is usually called "foreign accent". (For a review see [2]). The concept of "foreign accent" has always attracted considerable attention in the study of L2 learning and use. A more modern linguistic view of this

general term has opened up in the past decade and there is an ever growing interest in various aspects of that which is today known as "the acquisition of L2 speech". An excellent review of recent work in this field has been written by Leather and James[3]. Our point of departure is that the L2 user's non-native mastery of L2 phonetics/phonology is reflected not only by this deviant production which is usually easily identified as foreign accent by most native speakers, but also by perceptual difficulties or "perceptual foreign accent". In some previous work the idea of "perceptual foreign accent" was introduced and some arguments and data to specify this concept were presented [4] [5]. The question of the nature of this perceptual foreign accent and the factors which contribute to its behavioral profile would seem to be of some interest in the study of L2 learning and use.

The second issue dealt with in this report is the relationship between perception and production of an L2. There is a common assumption both in the theoretical discussion of first language (L1) acquisition and L2 and foreign language acquisition that successful speech production is preceded by a perceptual mastery of the phonology and phonetics of the language to be learned [1]. We would expect to find a positive correlation between the degree of perceptual foreign accent and the success of an L2 user's production.

A third issue addressed in the work reported here concerns the relationship between the success of the learner in mastering the phonetics and phonology of an L2 and some background factors which could influence this success. A number of social and personal factors have been

proposed in recent research as possible constraints in a learner's progress toward acquisition of L2 speech. It has been argued by several researchers that social motivation, social acceptance and social distance as well as personality variables play an important role in the learning of L2 pronunciation [3]. In our ongoing investigation we are attempting to make a preliminary assessment of the global effect of several background factors which may influence the learning of L2 phonetics and phonology. Since this investigation is not yet complete we will, in this paper, confine our efforts to a few of the more general aspects of duration of L2 use and age at which L2 learning was undertaken, and of some background factors that have to do with language preference and everyday L2 use.

A summary of our hypotheses as to these issues is first, that L2 speech comprehension ability can be explicitly described by the results of a test battery, second, that the comprehension ability has a relationship to the measured production ability so as to support the assumption that successful perception is a prerequisite to successful production, and third that the background factors mentioned above have an influence on an L2 learner's success in learning the phonetics and phonology of the L2.

METHODS

L2 comprehension tests

A test battery designed to explicitly measure L2 comprehension was administered to thirteen native north american speakers of English and nine native south american speakers of Spanish. These subjects had a similar educational background with at least one year of post secondary education. All subjects were tested with standard pure tone audiometry to establish normal hearing.

The test battery consisted of the following tests:

1. **Psychoacoustic sub battery** - This sub-battery is composed of three computerized tests: frequency discrimination, temporal resolution (gap detection), and signal type

discrimination. These tests applied an adaptive procedure for finding a discrimination threshold for each test.

2. **L2 word recognition in noise.** The word material for this test was selected with regard to frequency in Swedish texts, familiarity (55 native swedish judges) and was phonetically balanced. The words were presented in noise and an adaptive procedure was used to find a signal to noise ratio which represented a 50% comprehension threshold which was the test result. A unique feature of this test is the use of phonological distance metrics for the evaluation of the subjects' wrong responses.

3. **"Top-down" test:** This test was designed as a measure of the subject's ability to use signal independent information in the speech comprehension process. The phoneme monitoring paradigm was used in which probability of phoneme occurrence in sentence contexts was systematically varied and phoneme recognition time was the test result.

4. **QAR-test (question and response).** This test was designed as a global measurement of speech comprehension. Considerable care was taken with regard to validity criteria in the construction of this test. It is composed of twenty five short texts all of which have a similar syntactic and semantic structure. Following the presentation to the subject of a pre recorded text presented in noise at a predetermined signal to noise ratio, five short yes-no questions on the content of the short text were also presented in noise. According to the adaptive procedure used also in other tests in this battery, the subject's correct or incorrect responses determined the signal to noise ratio of the next text. The test result was a signal to noise ratio at which a 50% comprehension level could be observed. An important assumption of this investigation is that the QAR test is the measurement baseline for test comparisons that are made later in the paper.

5. **The Modified Hearing Measurement Scale.** is a self assessment test designed to measure the L2 users' own estimation of their comprehension ability in various hypothetical listening situations. This test

was originally designed for hard of hearing patients and modified for use with L2 learners.

The subjects also completed a written questionnaire which consisted of a number of questions about their preferred language and everyday language use.

The experimental session also included the recording of a short segment of spontaneous speech elicited by asking the subjects to describe a short cartoon story. This material was to be used in the later assessment of L2 production ability.

Judgement of L2 production

Approximately thirty seconds of each the L2 subjects Swedish speech was judged by thirty three native users of Swedish by means of visual analogue scales [6]. The endpoints on this scale were "barely intelligible" Swedish and "very close to or indistinguishable from native Swedish".

Statistical analysis

The test scores for all subjects were subjected to a simple statistical analysis. Spearman pair wise rank order correlations were performed between all possible pairs of tests including the questionnaire and the L2 production scores from the listening test.

RESULTS

Of the seventy eight pair wise rank correlations computed, those which have some relevance for the issues stated above in the introduction and have a ten percent significance level or better will be presented. This significance level can be motivated by the low number of subjects and by the fact that we are attempting to test several hypotheses.

Table 1. The tests and factors which showed a significant correlation to the QAR-test. This test is assumed to represent the baseline measurement of L2 comprehension.

| test or factor | Spearman corr. coefficient | significance level |
|----------------|----------------------------|--------------------|
| word test | .45 | .03 |
| top down test | .41 | .03 |
| signal type | .43 | .03 |
| MHMS | .53 | .03 |
| years | .53 | .008 |

Table 2. Tests and factors which showed a significant correlation to the degree of foreign accent which consisted of the mean score from the listening test for each individual L2 user

| test or factor | Spearman corr. coefficient | significance level |
|----------------|----------------------------|--------------------|
| age@start | .52 | .01 |
| word test | .48 | .025 |
| QAR test | .40 | .03 |
| MHMS | .75 | .00 |
| years | .40 | .03 |

The scores for degree of foreign accent were means of the 33 judgements made for each L2 user's speech. These 33 judgements show a high degree of reliability with a Chronbach's alpha of .8625.

Further results show that the score on the questionnaire dealing with the background factors that have to do with language preference and everyday use correlated significantly with only two tests: the word test (.36, sig. .10) and the MHMS (.55, sig. .039).

DISCUSSION and CONCLUSIONS

The first issue in this report deals with the question of which of the factors tested correlate with degree of L2 comprehension or the so called perceptual foreign accent. As has been stated earlier, the QAR test is assumed here to be a valid baseline global measurement of L2 comprehension. Table 1 indicates that several expected factors appear to contribute to the QAR test result. Word recognition ability, ability to use signal independent information in the

comprehension process and years of L2 use are factors which significantly correlate with the QAR test result. Somewhat surprising in terms of general expectations might be that of the psychoacoustic abilities tested, only signal type discrimination correlates significantly with the QAR test result. Frequency discrimination and temporal resolution might have been expected to play a more important role in global L2 comprehension than these results indicate. The significant correlation between the MHMS and the QAR test would lend support to our arguments that this L2 comprehension test has a high degree of validity. These results seem to support our hypothesis that this test battery presents the opportunity to explicitly measure L2 comprehension.

The second hypothesis dealt with in this report regards the relationship between comprehension ability and native listeners judgements of the production of L2 or that which is usually referred to as degree of foreign accent. We find a significant correlation between the QAR test and degree of foreign accent lending support to the general assumption that the acquisition of L2 perception may be a prerequisite to successful production.

The third issue concerns the influence of some background factors in the learning of L2 phonetics and phonology. The data discussed here is incomplete with respect to the age distribution of the subjects. Therefore, while we will be able to relate age to L2 performance in the near future, we can now only refer to a general tendency seen in the significant correlations in table 1 and 2 between years of L2 use and both the QAR test result and the degree of foreign accent. Degree of foreign accent correlated also significantly with age at which L2 learning started.

Future work in the investigation of perceptual foreign accent must include a further specification of not only the phonetic and phonological factors which influence L2 learning but also the social and personal constraints involved in this process.

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