

A SIMPLE SEPARATOR OF THE NASAL COMPONENT OF SPEECH

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ABSTRACT

This paper describes a simple device for indicating the degree of nasalization of a speech sound and for recording the nasal and oral components of speech on separate tracks of a tape recorder. It is simple to construct and operate, and is easy for linguists to transport and use in the field.

KEYTERMS: nasalization (measurement of), acoustic phonetics, linguistic research.

[This paper was typed only once for publication, directly onto a Datapoint 2200 word processing cassette. The camera ready copy was produced from this on a HYTYPE II printer, controlled by a Datapoint 2200 word processor.]

0. INTRODUCTION

The basic idea for this device came from a "nose trumpet" constructed at the Speech and Language Research Centre, Macquarie University, Sydney, and described by Bernard, Clarke and Purvis (Bernard et al, 1975). It has also been described in the journal "Nature". (Hyde, 1968) The "nose trumpet" achieves a better separation of the nasal and oral components of speech than this separator does, but it is not easily portable, and it requires an electronic mixer, not normally found in the field linguist's kit. This simple separator requires only a stereo tape recorder with two separate microphones. The "nose trumpet" achieves 20 db. separation, this simple separator about 15 db.

At Macquarie University, the recording of the oral and nasal components of speech (on separate tracks) is analysed by a computer program, and the percentage of nasalization is calculated and printed out. The program can be instructed to calculate the degree of nasalization for the whole tape, for a given stretch of speech or for an individual vowel. Its main use so far has been in studying nasality in Australian English. (Clarke, 1975 and Mackiewicz-Krassowska, 1976) I envisage the main use for this simple nasal separator to be in determining the degree of nasalization of vowels in environments where it is difficult to hear whether the vowel is nasalized or not, such as next to a nasal continuant.

1. DESCRIPTION

Figure 1 shows the separator in use.

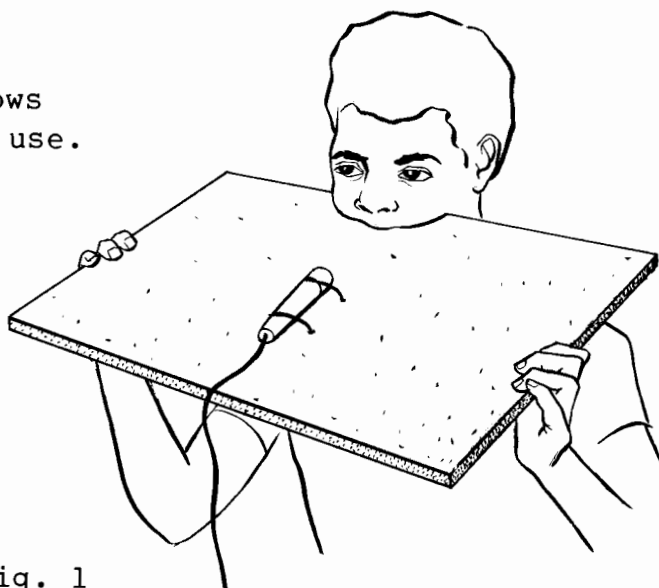


Fig. 1

The separator is made from a piece of half-inch (12.5 mm.) light weight composition board (Canite) about 16" (40 cm.) square or larger. (Mine is 23" by 18" (58 cm. by 46 cm.) to fit inside a suitcase.) A V-shaped cut-away is made in one edge and shaped to fit the face as shown above. Two microphones are attached to the board, one each side. They are fastened with rubber bands to nails driven into the board. The microphones are plugged into the left and right channels of a stereo tape recorder. The lower microphone records the oral component of the speech, and the upper one records the nasal component.

Calibration recordings indicate that about 15 db. separation is achieved between the oral and nasal components of the recording.

2. HOW TO USE THE SEPARATOR

First, attach the microphones to the separator and plug them into the stereo recorder.

Second, equalize the recording levels. To do this, hold the separator against your face, but vertically, so sound from your mouth is directed equally to both microphones. Set the recorder in the RECORD mode, sing a long note and adjust the levels until both meters read the same. Then test the overall levels by holding the separator against your face in the normal way and saying some of the test words to be recorded. The recording level may need to be lowered. If so, repeat the equalizing procedure above, but with both levels at lower settings and check again.

To record the test material, demonstrate the use of the separator to the test subject, and explain its function. Get him to hold it in position against his face and read the test material while you record it on tape. If the subject cannot read, you can prompt him verbally, using the pause control on the recorder to prevent any unwanted material from being recorded on the tape. (If individual vowel qualities are to be studied rather than the degree of nasality of the whole tape, the item number or the cue can be recorded on the tape to identify each item.)

3. HOW TO ASSESS THE DEGREE OF NASALIZATION OF A VOWEL

The easiest way would be to use a computer program such as the one described in Bernard et al, 1975, if you have access to one.

Failing that, parallel traces of the loudness of the two tracks on the recording produced by a mingograph would let you measure the loudness of each component for a vowel and calculate the percentage of nasalization.

Rough indications of nasality can be gained in the field by watching the level meters on the recorder, or even by using a mono recorder with the microphone on the nasal side of the separator. The nasalization can also be heard more easily when separated, either by listening to the tape with stereo headphones, or by standing close to the test subject with one ear close to one edge of the separator, on the upper side.

4. PREPARING THE LIST OF TEST ITEMS

These remarks are directed to the situation where nasalization is phonemic in the language under study, but it is difficult to hear in some environments, such as adjacent to a nasal continuant.

The first items on the list should be minimal pairs for nasalization, in environments where the contrast is easy to hear. After about five such pairs, words containing the troublesome environment can be introduced. A total of 20 or 30 words is probably enough. Each word should be spoken twice, with pairs being presented in the order A-B-B-A. Three or four people should be used as subjects, each one recording the same list, to cover more of the variation that is to be expected in speech.

If this analysis shows nasalization to be contrastive in the troublesome environment as well, then all other words containing this environment can be tested the same way if necessary.

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