

Correlation Between Defective Articulation and Nasality in Cleft Palate Speech

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The basic purpose was to obtain evidence useful for answering the question of whether there is a tendency for degree of nasality to vary with defectiveness of articulation in the speech of children with cleft palate.

Results of previous researcher (3) are quite contradictory, with Pearson r s for measuring the relationship varying from very small values with no evidence of any relationship between these two aspects of speech of persons with cleft palate to fairly large values which are highly significant. The Pearson r for estimating the relationship between two particular variables may, of course, differ considerably from one experiment to another depending upon the selection of subjects, especially when the range of the variables, in this case nasality and defective articulation, differs from one experiment to another. Nevertheless, in view of the very wide range of previously reported r s, with reference to an answer for the question under consideration, additional evidence appears to be needed.

That incompetence of velopharyngeal closure is causally related to defective articulation in the speech of individuals with cleft palate appears to be a reasonable assumption, and evidence to support such an assumption has been reported (4). Another widely accepted and reasonable assumption is that incompetence of velopharyngeal closure is causally related to nasality in the speech of these same individuals (4). The relationship between degree of incompetence and degree of nasality, however, according to recent research evidence (1), cannot be assumed to be necessarily close, although, at the same time, such an assumption would appear to be the most reasonable one; a more adequate measure of incompetence of velopharyngeal closure might be expected to provide the means for obtaining evidence to support a conclusion that degree of nasality in the speech of persons with cleft palate is highly dependent upon degree of incompetence of velopharyngeal closure.

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If incompetence of velopharyngeal closure is causally related to defective articulation and also to nasality, then a tendency for these two speech deviations to be functionally related is likely.

Since not all articulation deviations are caused by incompetent closure, and since nasality is not necessarily accompanied by articulation deviations, a moderate rather than a high relationship between these two aspects of speech of individuals with cleft palate is to be expected.

A moderate correlation of .42 for the relationship between nasality and articulation defectiveness with a wide range of each of these two variables has been reported (9) for tape-recorded samples from the speech of 154 children with cleft palate. These samples were available for re-evaluation for purposes of the present experiment. The specific purpose was to answer the question of whether approximately the same correlation would exist between measures of nasality and measures of articulation defectiveness for portions selected from the same 154 samples and obtained with a different method of psychological scaling. Approximately the same value for r for the present experiment would provide additional and fairly strong evidence that there is, indeed, a moderate tendency for common variance, that is, a moderate tendency for increasing degrees of articulation defectiveness to accompany increasing degrees of nasality.

Procedure

EXPERIMENTAL SPEECH SAMPLES. The experimental speech samples were the first five seconds from each of the 154 speech samples mentioned previously. That speech samples of this length can be reliably scaled for defectiveness of articulation has been demonstrated (8); much shorter samples, that is, isolated vowels and nonsense syllables, have been reliably scaled for degree of nasality (2). It has been demonstrated also that psychological scale values of defectiveness of articulation for five-second portions of longer samples will correlate closely with those for the longer samples (7).

The original 154 speech samples each consisted of the same set of 13 sentences; the order of these sentences, however, was randomized for each of the 154 subjects. The shorter samples for the present experiment, the first five seconds of the original longer samples, thus varied in content.

PSYCHOLOGICAL SCALING METHOD. The method of psychological scaling was that of equal-appearing intervals, which was applied as described in another report (6) on the experimentation with the 154 five-second speech samples. This method of scaling is quite different from the method of direct magnitude-estimation which was used for the original experimentation with the longer, 13-sentence samples. Observers for the original experimentation were presented with a standard sample of

medium severity for the deviant aspect of speech to be rated. The standard sample was arbitrarily assigned a value of 100 and each of the 154 samples was given by each observer a value relative to the value of 100 for the standard. The scale value for any one sample was then computed by finding the mean of the values assigned by the observers.

LISTENING SESSIONS. The 154 tape-recorded five-second speech samples were presented to 37 sophisticated listeners, all of whom were majors in the Department of Speech Pathology and Audiology, University of Iowa. All were advanced students and had had experience with articulation and voice problems. They were instructed to use a seven-point equal-appearing-intervals scale, and articulation defectiveness and nasality were rated separately in two sessions with articulation defectiveness rated in the first session (6). The purpose of this order of rating the two types of deviations was to minimize the possibility of irrelevant influence of nasality upon the ratings of articulation. Irrelevant influence of defectiveness of articulation upon the nasality ratings was avoided by playing the tapes backward (5).

Results

Two sets of equal-appearing-intervals psychological scale values were obtained for a set of 154 five-second samples from the speech of 154 children with cleft palate; one set of scale values was computed for measures of degree of nasality, and the other set was computed for measures of articulation defectiveness. The correlation between these two sets of measures is .34. The difference between this value of Pearson r and the Pearson r of .42 of another experiment with speech samples from the same children and for the same variables is .08.

Although some unreliability in scale values obtained by a psychological scaling method is to be expected, the difference of .08 between the two correlations of degree of nasality with articulation defectiveness is small. This is in spite of the fact that the two coefficients are for data obtained by two methods of psychological scaling and with two different groups of observers; for data obtained for two lengths of speech samples with the shorter samples consisting of five-second portions from the longer samples, the longer samples being somewhat variable in duration; and for data obtained for two sets of samples not equally variable in content, the longer samples each consisting of the same sentences and the shorter samples consisting of somewhat variable content. The evidence thus provides strong support for the conclusion that there is a definite, although moderate, tendency for defectiveness of articulation and nasality to be functionally related in the speech of children with cleft palate.

Summary

Psychological scale values were obtained by the method of equal-appearing intervals for 154 tape-recorded five-second samples from the speech of 154 children with cleft palate for the two variables of defectiveness of articulation and nasality. The relationship between the two sets of measures was evaluated by the Pearson r procedure, which resulted in an r of .34. This value of r is close to the r of .42 obtained for the same two variables in speech samples from the same children in another experiment for which the data were obtained a) by a different psychological scaling method, the method of direct magnitude-estimation; b) for speech samples which were longer in duration and less variable in content than those of the present experiment; and c) from responses of a different group of listeners.

The data were interpreted as strong evidence to support the conclusion that there is a moderate tendency for degree of nasality to be related to degree of articulation defectiveness in the speech of children with cleft palate.

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