

COMPARATIVE VISIBILITY OF FOUR SPOKEN LANGUAGES

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INTRODUCTION

Casual observation of persons speaking different languages reveals that some languages are more highly visible than others. This observation is not only of academic interest to the linguist but also of interest to the rehabilitative audiologist who wishes to add to his store of information concerning the effects of "code" upon the lipreadability of certain languages. The authors are quite cognizant of the fact, however, that there is variability within languages vis-a-vis visibility, as a function of individual speaker differences, and also as a function of the language units spoken. Through the use of an appropriate experimental design and careful administration of an experiment, it is possible to obtain data concerning visibility of languages that lend themselves to treatment which provide a base for making reasoned generalizations about the relative visibility of languages.

Purpose of Study. The purpose of the present study was to determine the relative visibility of English and three Indian languages. The determination of relative visibility was made by a panel of viewers who utilized a rating scale upon which they recorded their judgments. Specifically the following questions were posed: (1) Are there significant differences in judged visibility between *English* and *Hindi*, *Tamil*, and *Malayalam*?, (2) Are there significant differences in judged visibility between *Hindi* and *Tamil*, and *Hindi* and *Malayalam*?, (3) Are there significant differences in judged visibility between *Tamil* and *Malayalam*? (4) If there are differences in visibility of the languages, are these differences significant statistically?, and (5) Are panel judges reliable in the task of rating?

METHODS AND PROCEDURES

The following paragraph presents in summary fashion the selection of materials read, the selection of speakers and viewers, the orientation training of speakers and viewers, and the administration of the task.

Selection of Materials Used. The passages read by speakers were selected from the front pages of four newspapers, each of which was printed in one of the four languages under study.

INDIAN EXPRESS - Madras Edition - English
DINAMANI - Tamil
THE MATHRUBHUMI - Malayalam
NAVBHARATH TIMES - Hindi

* *This study was completed in the Hearing and Speech Center, Christian Medical Hospital, Vellore, India.*

Six passages were selected from each paper. Since there were eight columns in each paper, six columns were selected using the random sampling procedure. The length of the column was measured in inches and the place at which the passage was to be selected was also determined by the same random sampling procedure.

The following criteria were employed in the selection of the 40 word passage:

- (1) Proper names not included
- (2) Foreign words not included
- (3) Headings and sub-headings not included
- (4) All numerical figures written as words

The 40 word passage was divided into *four groups* of words. Each group consisting of 10 words was used as one stimulus. In each passage one of the randomly selected group of words was repeated. Thus, each passage consisted of five stimuli.

Three passages were read by a male speaker and the other three by a female speaker.

Training of Subjects

1. Speakers:

Eight subjects, two from each language, were selected as speakers. Training materials, consisting of words and sentences from all the four languages, were prepared from newspapers for training these subjects.

All the speakers were requested to come for orientation and training two days before the actual test day. The objectives of the study and the methods to be employed were explained to them and they were given a written description of their task, from which discussion and questions evolved.

Orientation to the 'Speakers'

You are going to take part in the study of the relative visibility of four languages, viz., English, Tamil, Malayalam, and Hindi. For each language there are two speakers - you are one of them.

You will be given a few words and a few sentences consisting of 10 words to read in front of a group of eight viewers. There will be a glass partition between you and the viewers to prevent your voice reaching the viewers. All these words and the sentences are numbered serially.

Somebody will be showing the cards containing the numbers one by one serially at every five seconds. All you have to do is to read the word or the sentence which has the number shown. It is very important that you read in your natural voice. Your voice should not be too loud or too low. Hold the reading material in such a position that will not hide your face.

They were then given practice in reading the stimuli.

2. Viewers:

There were seven viewers; one English male and one of each sex in the other three languages. Viewers were also asked to come for training a day before the actual test day. They were given a written description of their task from which discussion and questions evolved.

Orientation to 'Viewers'

You are going to take part in the study of relative visibility of four languages, viz., English, Tamil, Malayalam, and Hindi. Some words and sentences from each language will be read in front of you by some speakers. You cannot hear their voice because they will be reading behind a glass screen.

We all know that in each language we have to open our mouth, and move the lips up and down to utter some words. Even the teeth are visible while uttering some words. Some of the words can be spoken without moving the lips too much. We can therefore say that some words are 'visible' and some are not visible.

All you have to do is to watch carefully the face of the speaker, especially the movements of the lips and the opening of the mouth, and rate each word or sentence with any of the five following ratings:

1. Highly visible
2. Moderately visible
3. Partially visible
4. Only slightly visible
5. Not visible

All the words and sentences are numbered serially. A scoring sheet will be given to you. The serial number of the stimulus and the grades are given on that sheet. The serial number of the stimulus given will be called out to you at the time it is given. After watching the speaker for each word or sentence you are then to make the rating by putting an X in the appropriate place. Please remember that you need not try to guess what the word is. You will now be given some examples.

They were then given a rating sheet and asked to rate words and sentences from all of the four languages which had previously been rated and fully agreed upon by the experimenters. Their ratings were compared with those ratings agreed upon by the experimenters. Training continued until each viewer achieved 85% correct performance.*

* *In order to establish a training criterion for performance, a correct score was equal to, or one numerical rating more or less than, those agreed upon by the experimenters.*

Administration of the Task. All of the seven viewers (one viewer came late and took part in rating only six passages) were seated about 4 feet from the speaker. A glass partition separated the eight speakers and the viewers and was about one foot from the face of the speaker. The speaker's room was well lighted. All of the lights in the viewer's room were turned off. The light passing through the glass partition from the speaker's room provided enough illumination for viewers to make their ratings. Care was taken to see that the viewer did not have any other distractions.

All stimuli were serially numbered from 1 to 15 and given to the speaker. These numbers were written on the 5-point rating scale. (Number 1 on the scale stood for "High Visibility"; Number 2 "Moderately Visible"; Number 3 "Partially Visible"; Number 4 "Slightly Visible"; and Number 5 "Not Visible".) At the beginning of the task, viewers were presented some stimuli for warm-up material. During the actual task, the serial numbers of the stimuli were called out by an assistant in the viewer's room who held up a card containing the number that was shown to the speaker. As soon as the speaker saw the number he/she was given the stimulus with that number. All the stimuli were administered in serial order. Interstimulus interval time was 5 seconds during which viewers made their ratings.

The order in which stimuli of the different languages were given, was not predetermined.

A five-minute break was given after the fourth speaker.

RESULTS

Reliability

To test the reliability of the ratings of viewers, repetition of some stimuli were included in the test material. Out of the 15 stimuli given by each speaker, 2 stimuli were repeated. The ratings of these stimuli were analyzed to find out the reliability of the viewer. The results are given in Table 1.

Table 1. Analysis of reliability.

Viewer No.	Total questions used for reliability	No. of coincidences	No. with differences	Percentage of reliability
1	24	22	2	91.7
2	24	16	8	66.7
3	6	5	1	83.4
4	24	22	2	91.7
5	24	22	2	91.7
6	24	24	0	100.0
7	24	22	2	91.7

Testing for the equality of proportions revealed that Viewer No. 2 departed markedly in reliability from the other viewers. Therefore the ratings of Viewer No. 2 were not included in the remaining analyses of the results of the tests.

Visibility test grading

The rating scores (in percent) of the viewers are given in Table 2, classified according to the language and sex of the speaker. From this table we find that not a single stimulus was rated as not visible. From this we may infer that in any of these languages a continuous 10 word sentence will not go unnoticed. A Chi Square test was applied to find out if the rating varied according to the language. It was found that the difference in the visibility rating was significant ($p < 0.001$) among the languages, which means that visibility of all the four languages are not the same.

Table 2. Visibility scaling of the languages.

Language	Ratings					Total
	1 (Highly visible)	2 (Moderately visible)	3 (Partially visible)	4 (Only slightly visible)	5 (Not visible)	
English	58.4%	33.3%	7.5%	0.8%	0	100%
Tamil	38.6%	38.6%	18.2%	4.6%	0	100%
Malayalam	38.3%	46.7%	12.5%	2.5%	0	100%
Hindi	25.8%	35.6%	34.1%	4.6%	0	100%

Table 3 presents the means, range, and standard deviation of ratings for each language. A low mean value indicates higher visibility range.

Table 3. Mean and standard deviation of the scaling of the languages.

Language	Mean	Standard Deviation	Range
English	1.51	0.67	1 - 4
Malayalam	1.79	0.75	1 - 4
Tamil	1.89	0.86	1 - 4
Hindi	2.17	0.87	1 - 4

As can be observed in Table 3, English was rated most highly visible, followed by Tamil and Malayalam. Hindi was rated least visible of the four.

Chi Square tests for differences between visibility ratings of the languages were performed. There was a significant difference between English, Tamil, English-Malayalam, and English-Hindi at the 0.01 level of probability. No significant difference was observable between Tamil

and Tamil and Malayalam, but a significant difference at the 0.05 level of probability between Tamil and Hindi. Between Malayalam and Hindi the difference was significant at the 0.01 level of probability.

SUMMARY

The present study was an attempt to determine the judged visibility of four languages, English, Malayalam, Tamil, and Hindi. In order of most to least visible, they ranked as follows: (1) English, (2) Malayalam, (3) Tamil, and (4) Hindi. It must be recalled that these were subjective ratings made by observers as to the relative visibility of languages. Although it was not a study of the "lipreadability" of the languages, it might be inferred that the *less visible* the language, the *more difficult* it would be to lipread it. However, before any definitive statements could be made concerning "lipreadability" of a language, a carefully controlled study of lipreading would have to be made. If one day rehabilitative audiologists desire greater precision in predicting the effects of their rehabilitative techniques which include lipreading training, studies of the lipreadability of languages would be in order.