THE INTELLIGIBILITY EFFECTS OF THREE METHODS OF TEACHING ENGLISH PRONUNCIATION TO CHINESE SPEAKERS

Thesis for the Degree of M. A.
MICHIGAN STATE UNIVERSITY

Patricia Heiland

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THE INTELLIGIBILITY EFFECTS OF THREE METHODS OF TEACHING ENGLISH PRONUNCIATION TO CHINESE SPEAKERS

By

Patricia Heiland

AN ABSTRACT

Submitted to
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in partial fulfillment of the requirements
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ABSTRACT

THE INTELLIGIBILITY EFFECTS OF THREE METHODS OF TEACHING ENGLISH PRONUNCIATION TO CHINESE SPEAKERS

by Patricia Heiland

This study attempts to determine whether printed words as spelled out in English letters, a specially prepared orthography, or auditory stimulation is most effective in assisting three Chinese students to pronounce English words intelligibly.

In order to determine which of the three methods was most successful in helping the three Chinese foreign students to pronounce the words most effectively, twelve graduate students majoring in Speech and Hearing Science at Michigan State University were employed as a listening panel and wrote down the words pronounced by the Chinese. The words were presented to the listeners from a tape recording made of the Chinese speakers. The intelligibility of the words served as the criterion measure for judging the effectiveness of the three methods of teaching English pronunciation.

The findings of this study indicate that teaching Method I (printed words as spelled out in English letters) and Method III (auditory stimulation) were equally helpful as measured by the resulting intelligibility scores. Method II (tailored orthography) was consistently less effective than the other two methods. The "t" scores

calculated, showed no significant difference between the results of teaching Method I (printed words as spelled out in English letters) and Method III, (auditory stimulation). There was a significant difference between Method I (printed words as spelled out in English letters) and Method II (tailored orthography), and between Methods II (tailored orthography) and III (auditory stimulation).

Within the framework of this investigation, the following conclusions appear to be in order: There are several methods one can employ with varying degrees of success, in teaching American pronunciation to Chinese foreign students. For Chinese speakers, printed words as spelled out in English letters and auditory stimulation appear to be equally effective. Intelligibility scores associated with pronunciation stimulated by the Chinese tailored orthography method as a means of eliciting correct pronunciation were consistantly lower than those associated with the printed English word method, or the auditory stimulation method.

Approved by:

THE INTELLIGIBILITY EFFECTS OF THREE METHODS OF TEACHING ENGLISH PRONUNCIATION TO CHINESE SPEAKERS

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Patricia Heiland

A THESIS

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

As recorded by Saint Mark, Chapter 12, the Second Commandment of all importance according to Jesus, "and the second is like, namely this, Thou shalt love thy neighbor as thyself. There is none other Commandment greater than these."[1] To really love thy neighbor we must know him, and understand him, in other words, have good communication with him. In this jet age, everyone is our neighbor. It takes only a few hours by airplane to travel to any place in the world. We trade with our neighbors of the world, enjoy each others cultures, and deal with each other in many ways, and yet, all nations feel this frightening closeness which could threaten our security, unless we can maintain peace, love, and understanding among nations.

The United States govenment feels the need for accurate and adequate communication among nations, and

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[1]Mark 12:31, The Holy Bible, Authorized King James Version (New York: The World Publishing Company).

spends thousands of dollars each year on improving communications and bettering our relationships with the nations of the world. In the program for improvement of communications, the U. S. Government spends money on teaching its citizens foreign languages, and also in teaching foreign nationals, English. They also sponsor research, language institutes, and other activities in order to improve oral language communication.

According to the authors of Principles of Speaking, "It is the individuals' ability to express himself that determines the success or failure of the work of the society as a whole, for this work is dependent on the level of communication among the members of the society."[1] Being able to express oneself in ones own language and also in the language of the nation in which one is trying to communicate, is of great importance.

Incorrect pronunciation of a secondary language can cause communication breakdown, because of inadequate intelligibility. The present research was undertaken due to the lack of research in methodologies for teaching pronunciation of secondary languages, and the great stress on the improvement of communications among peoples of the world.

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[1]Kenneth G. Hance, David C. Ralph, and Milton J. Wiksell, Principles of Speaking (Belmont, California: Wadsworth Publishing Company, Inc., 1962), p. 4.

Statement of the Problem and Purpose of the Study

This study attempts to determine whether printed words as spelled out in English letters, tailored orthography, or auditory stimulation is most effective in assisting three Chinese students at Michigan State University to pronounce English words intelligibly. The purpose of this study is to analyze the results of twelve American listeners, to see which method suceeded in helping the Chinese to pronounce the test words most intelligibly. From the analysis it is hoped that the following question will be answered: (1) Is there a difference in the effectiveness of the three teaching methods in regard to intelligibility scores?

Hypotheses

The following null hypotheses have been proposed:

1. There is no significant difference in the intelligibility scores of the Chinese students as they read from a printed word list (Method I) and as they read from a specially prepared orthography (Method II).

2. There is no significant difference in the intelligibility scores of the Chinese students as they read from a printed word list (Method I) and as they repeat the words from auditory stimulation (Method III).

3. There is no significant difference in the intelligibility scores of the Chinese students as they

read from a specially prepared orthography (Method II) and as they repeat the words from auditory stimulation (Method III).

Importance of Study

Evidence as to effective and ineffective methods of teaching pronunciation of a secondary language could be helpful to many concerned with oral communications.

This experiment is an attempt to assess the best of three methods of teaching American pronunciation of English. If a particular method or combination of methods proves to be outstanding in terms of the intelligibility scores derived, it might be recommended as a procedure to be followed by those who work daily with the problem of English pronunciation by foreign speakers.

As far as the investigator could determine, there has been little research on the teaching methods of pronunciation for secondary languages, therefore the importance of the present research is amplified.

Definition of Terms

The terms used in this study are defined in the following manner:

Method I--The Printed Word as Spelled Out in English Letters. The Chinese student subject pronounces the word by sight. He looks at the English word and from only the visual clue, he sounds out and repeats the the word as accurately as possible.

Method II--Tailored Orthography. The English words have been translated as accurately as possible, into the subject's native language utilizing their orthography. An example of this is as follows: (kach) for the word catch. The present example uses English orthography; however, in Appendix C the reader will note the words spelled in Chinese. The Chinese configurations are not truly Chinese words, but when spoken aloud, result in an English word. This system was utilized in 1959 by a U.S.A. Air Force Research Group.[1]

Method III--Auditory Stimulation. The words are recorded in the secondary language (in this case English), and presented to the foreign student subjects (Chinese) via tape recordings and head sets. The Chinese subject hears the English word, and repeats it in English, and approximates what he hears as accurately as possible. Their responses are then recorded.

Foreign Nationals--In the case of this study, there are three Chinese foreign students studying at

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[1]Henry M. Moser, Herbert J. Oyer and Wallace C. Fotheringham, Orthographic Representations of English Pronunciation as an Aid in Teaching ILA, Technical Report 56, RF Project 882, A Report to the Operational Applications Laboratory, Air Force Cambridge Research Center, Bedford, Massachusetts, December, 1959, Prepared by the Ohio State University Research Foundation (Columbus, Ohio: 1959), p. 1.

Michigan State University. These students are the subjects for this study, their native tongue is Chinese and they are speaking English only as a secondary language.

Organization of the Thesis

The first chapter has contained the statement of the problem that resulted in this study. It has included an introduction to the study and the purpose of the study. The hypotheses of the study have been stated in detail, the importance of the study discussed and the questionable terms are explained and defined.

The second chapter will contain a review of the literature available on the topic of the present research.

In the third chapter is discussed the speaker subjects, listening panel, materials, equipment and testing procedures utilized.

The fourth chapter presents the results, the analysis, and a discussion of findings.

The fifth and final chapter consists of a summary statement and the conclusions drawn from the study.

CHAPTER II

REVIEW OF THE LITERATURE

The Need for Teaching Pronunciation of a Second Language to Foreign Students

When one is interested in learning a skill whether in sports, playing an instrument, or speaking, it usually takes painstaking devotion and practice. We must develop the muscles needed for proficiency in this new skill. Although the situation is not completely analogous it also usually demands long hours of practice in learning a second language.

Learning pronunciation of a second language means learning new speech habits. It often means training the ear to hear, and the mind to give meaning to new sounds that never had meaning in the learner's own native language.[1]

The growing usefulness of foreign languages in American life stems from several circumstances, but chiefly from the improved conditions of travel, communication and interchange with parts of the world that were relatively unknown to us a few years ago.[2]

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[1]Anne Cochran and Lin Yü K'eng, English Pronunciation for Chinese Students (Taiwan: The Book World Company), p. 1.

[2]N. C. Johnson, "Developments in Teaching Foreign Languages," School Life, 36 (May, 1954), p. 115.

The Universities and Colleges in the United States are enrolling a larger number of foreign students for study every year. Foreign students are faced with many problems while attending a University in a foreign country. Acceptance is important to everyone and the foreign student will experience more complete acceptance if he is understood. In order to be understood the student is constantly confronted with problems of pronunciation.

The increasing importance of adequate communication between our citizens, and those of other nations, has spurred interest in methods for improving the teaching of foreign languages in our schools and Universities.[1]

Charles C. Fries states the importance of teaching pronunciation of a secondary language to foreign students: When a student of a foreign language who had some instruction according to the usual methods first hears the spoken language, he often fails to understand what has been said. He usually claims that the vocabulary of the speaker is too difficult for him. When a written text is placed before him, he can many times, interpret the same material correctly and react accordingly. It is not only a lack of knowledge

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[1]Charles Van Riper, An Investigation of Differential Binaural Stimulation in Teaching of Foreign Languages, A Report to the United States Office of Education Department of Health, Education, and Welfare, October, 1960, Prepared at Western Michigan University, Kalamazoo, Michigan, Cooperative Research Project No. 739, p. 1.

of vocabulary items which causes the trouble. It is the inability of the student to recognize the sounds of the language.[1]

This points out the necessity for teaching good pronunciation to foreign students.

Materials Used in Teaching English Pronunciation

There are many texts and drill books available that are designed to teach American English as a second language and help the foreign student improve English pronunciation.

An example of the contents of several of these books follows:

M. Elizabeth Clarey's book, Pronunciation Exercises in English is a workbook designed for (1) The foreign-born student, (2) The American student who wishes to eliminate certain defective sounds from his speech, and (3) Teachers working with those suffering from disorders of speech, such as stuttering.

This book is designed as a workbook rather than a text, and each lesson deals with one sound and includes the following:

1. Production of the sound--A simple explanation tells how to produce the sound, with 18 words containing the sound in the initial, medial and final positions.

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[1]Robert Lado and Charles Fries, English Pronunciation (Ann Arbor: The University of Michigan Press, 1961), p. ii.

2. Comparison--(a) With sounds often confused, (b) With contrasting words and phrases.

3. Practice Sentences--With frequent repetition of the sound.

4. Intonation Drill--As part of every lesson, there is an exercise dealing particularly with intonation. This exercise gives valuable practice in this important phase of speech.

5. Review Paragraph--This section contains the sound in varied forms of connected speech. The student may use this paragraph as a final test of his grasp of the correct sound, or as a handy review device.[1]

The author cautions the student of any spoken language to work with an experienced person who can correct his mistakes immediately, so that incorrect speech habits will not develop.[2]

All the authors stress the importance of the foreign student working with a person or persons whose native language is the secondary language the student is trying to learn.

American Speech for Foreign Students, by John W. Black, is a recent publication designed for the foreign student who is advanced in his study of English and is using English as a second language.

The doing of the exercises (under supervision) contained in this book, is intended to help the foreign

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[1]M. Elizabeth Clarey and Robert J. Dixon, Pronunciation Exercises in English (New York: Regents Publishing Company, Inc., 1947), p. 1.

[2]Ibid., p. 8.

student to achieve intelligibility and aural comprehension. The author states that the student may not be able to discuss speech in the language of rhetoric, linguistics, or phonetics. "The accompanying text is in the form of direct discourse, a one-way conversation directed toward the person who holds our interest: the foreign student, advanced in his study of English."[1]

The book is divided into two parts: Discussion and Exercises in Speaking, and Exercises in Listening.

The author stresses that the objectives of the student should be realistic. They are stated as: (a) to understand the words of normal American speech as they are spoken and to grasp the thought immediately, (b) to express your thoughts to American listeners with ease and rate of slow American talkers, (c) to be comfortable in an American academic society.[2]

The author feels these objectives can be achieved in one school year and in less time if the student can avoid most of the time consuming psychological problems connected with learning to pronounce a secondary language well.

In its program of English for foreign students, Michigan State University uses the Lado and Fries book,

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[1]John W. Black, American Speech for Foreign Students (Springfield, Illinois: Charles Thomas Publishing Company, 1963), p. vii.

[2]Ibid., p. 1.

English Pronunciation. This book is divided into thirty-five lessons of pronunciation and it is the desire of the authors that upon completion of the lessons the student should have acquired a basic knowledge of the sound system in English, including intonation and rhythm patterns. Knowledge of the system, however, does not mean that the student can produce the sounds, intonation and rhythm of English with complete accuracy. It is continuously urged that the students practice on all the points of contrast in the system of English and also on those points which contrast with the native language of the student. By using the specific drills and exercises contained in all of the lessons the student will finally be able to produce the language accurately and with ease.[1]

The authors feel it necessary to have some consistent representation of the language, therefore the phonemic alphabet is employed. The symbol thereby becomes a memory clue for the student and helps him remember the intonation of English which he hears orally in class so that he can have a clearer understanding of the distinctive sounds which exist in the language.[2]

There are many books designed for teaching English to foreign students. There is a great stress on the

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[1]Lado, op.cit., p. vii.

[2]Ibid., p. ii.

importance of good pronunciation of the secondary language but very little research has been done to analyze and compare teaching methods to find successful ways to teach pronunciation of a secondary language.

The Chinese Students Difficulties with American Pronunciation

Since Chinese students are employed in this study it is appropriate to consider their difficulties with English. The Chinese student studying in the United States may represent one of many dialects spoken in his country, although the National Chinese language is Mandarin.

There are thirty-eight separate single phonemes in English. Of these thirty-eight, only eighteen correspond to phonemes in Mandarin Chinese, sixteen to the phonemes in central Chinese dialects, and only ten to the phonemes in Taiwanese. Therefore, it is certainly the first task of a Chinese speaker learning to pronounce English to learn to hear a difference in these twenty to twenty-eight phonemes which he does not have in his own language.[1]

The word phoneme should be described here as it is used in learning to pronounce a foreign language. According to Cochran, "a phoneme is (1) a single speech sound which (2) makes a meaning difference between two words in a (3) given language."[2]

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[1]Cochran, op.cit., p. 5. [2]Ibid., p. 3.

In comparing the Chinese student's difficulties with the difficulties of other foreign students, the sounds (s, l, r, n, ng, j, w, ʌ , and əʊ) are the most characteristic sounds that cause problems in pronunciation of English. Although other phonemes may actually cause more difficulty, they will not so definitely identify the foreign pronunciation as Chinese pronunciation.[1]

Since different languages have different structures, the problems of a Spanish speaker learning English will not be the same as those of a Japanese or a Chinese speaker, or of the speakers of some other language. It would be most desirable to have different materials for each native language background when teaching English pronunciation to foreign students. Using different materials does not mean that the instructions must be in the student's native language. The particular contrasts and patterns to be emphasized will vary as will the order of presentation.[2]

Teaching Methods for Pronunciation of a Secondary Language

The United States Government has taken an interest in improving teaching methods of American pronunciation.

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[1]C. K. Thomas, "Chinese Difficulties with English Pronunciation," Journal of Speech Disorders, IV (September, 1939), p. 259.

[2]Robert Lado, "Linguistic Interpretation of Speech Problems of Foreign Students," Quarterly Journal of Speech, 46 (1960), p. 174.

Cooperative studies between the United States Government and research foundations at Universities provide the only research evidence available to the writer on the study of various methodologies for improving teaching methods of pronunciation of a secondary language.

A cooperative investigation was made between the Department of Health, Education, and Welfare, and Western Michigan University. The study stated that one approach to the problem of improving pronunciation of a foreign language is that of the development of the language laboratory. The advantages are as follows: (1) it is economical of staff time, (2) it insures that students get sufficient exposure to the foreign language, and (3) it permits the use of materials prepared by native speakers.[1]

The Western Michigan experiment was designed to determine whether or not dichotic stimulation (using the simultaneous hearing of the instructor's voice in one ear and the subject's own voice in the other) was more effective than binaural hearing of the instructor's voice in both ears in the learning of foreign language pronunciation.[2] This study was concerned with the reliability and validity of college instructors' evaluations of student adequacy in Spanish pronunciation and

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[1]Van Riper, op.cit., p. 2. [2]Ibid., p. 18.

the effectiveness of dichotic stimulation as opposed to binaural stimulation in language laboratory experience.[1]

The Western Michigan researchers concluded that dichotic stimulation has no advantage over binaural stimulation in the teaching of Spanish pronunciation as measured in this experiment, due to the shortcoming in reliability and validity of judgements by the panel of experts. It was recommended that objective tests of pronunciation adequacy be devised as soon as possible.[2]

A cooperative study between the Ohio State University Research Foundation and the United States Air Force investigated The Effect of Auditory Stimulation on the Pronunciation of English Words by Non-Native Speakers.

Fifty words commonly employed in air traffic control were spoken by eight foreign college students before and after pronunciation of the word by a native American speaker. Two experienced listeners rated the intelligibility of the pre and post pronunciations and sixteen panels (from 16 to 30 listeners) wrote down what they thought the word to be. The post-stimulated speech proved to be superior by both the rating scale method and the objective intelligibility score method.[3]

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[1]Ibid., p. 27.

[2]Ibid., p. 32.

[3]Henry M. Moser and Herbert J. Oyer, et al., The Effects of Auditory Stimulation on the Pronunciation of

Some of the same investigators carried on another study concerned with teaching pronunciation of a secondary language.[1]

The method employed in the second study involved using a specially structured orthography to assist the foreign national to approximate American pronunciation. The method may have practical application in the teaching of English for use in International Air Traffic Control.

The purpose of the research was to present phonic orthographies that would assist persons of a foreign country to approximate more readily the American pronunciation of selected English words that frequently occur in radio-telephonic air traffic communications.

Five hundred common aviation words and twenty-five aeronautical phrases have been completed in Chinese, Dutch, French, German, Italian, Japanese, Korean, Spanish, and Thai. Three of these orthographies are examined in this

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English Words by Non-Native Speakers, Technical Report 54, RF Project 882, A Report to the Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C., September, 1959, Prepared by the Ohio State University Research Foundation (Columbus, Ohio: 1959), p. 7.

[1]Henry M. Moser, Herbert J. Oyer and Wallace C. Fotheringham, Orthographic Representations of English Pronunciation as an Aid in Teaching ILA, Technical Report 56, RF Project 882, A Report to the Operational Applications Laboratory, Air Force Cambridge Research Center, Bedford, Massachusetts, December, 1959, Prepared by the Ohio State University Research Foundation (Columbus, Ohio: 1959), p. 1.

study using subjects whose training in the English language has been chiefly in their native country. German, Japanese, and Spanish subjects and orthographies were employed.

Testing procedures consisted of three conditions--First the printed word was read, second the subjects read from a printed list which also included the special orthography, and the third condition was the same as the first two, but in addition, before recording, each subject listened to the correct recorded pronunciations, given three times by a native American speaker.

The intelligibility was rated by a panel of American listeners. The following four-point rating scale was employed.

Highly intelligible no distortion

Intelligible

Distorted, but intelligible

Not intelligible[1]

Of the six conclusions drawn in the study, one is cited as being most relevant to the present study. It is as follows:

1. All speakers improved their word intelligibilities with the aid of either orthography or auditory stimulations.

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[1]Ibid., p. 4.

The present research is an outgrowth of the above study completed at the Ohio State University. The present study utilizes the Chinese tailored orthography, and matching English word list from the Ohio State University study.

CHAPTER III

SPEAKER SUBJECTS, LISTENING PANEL, MATERIALS, EQUIPMENT, AND PROCEDURES

Speaker Subjects

Three Michigan State University, Chinese foreign students participated as subjects for this study. A description of the subjects follows:

1. They were all born on the mainland of China, and speak the National Chinese Language (Mandarin). In addition each student also knows several dialects according to various Provinces where they have lived.
2. The three subjects moved to Formosa to live because of the Communistic crisis. Prior to coming to the United States of America to study they were speaking the same dialect.
3. This is the first visit to the United States for all three students, and they arrived here approximately at the same time, about four months before the actual testing began.
4. Each student received six years instruction in the English language. This instruction began

in the seventh grade. In addition they took four months of English lessons at a center in Formosa before their departure for the U.S.A. All of their formal English training was received in their own country prior to coming to the United States of America.

5. The speaker subjects have all had approximately the same educational opportunities and are working toward the M.A. degree at Michigan State University in the areas of Engineering, Horticulture, and Forestry. They all plan to return to Formosa after one full year of study is completed.

The three student subjects had been at Michigan State University six weeks when asked to participate in this study. The subjects were not quite at the same level of proficiency in speaking English and therefore two of the three subjects were enrolled in English classes for foreign students at the University.

Listening Panel

Twelve persons were employed as a listening panel. They were all graduate students majoring in Speech and Hearing Science at Michigan State University. Nine of them had majored in Speech and Hearing Science as undergraduates in addition to their graduate training. Two of the panel had majored in English and general Speech as undergraduates and transferred to Speech and Hearing

Science for graduate training. Only one listener had not started the graduate major in Speech and Hearing Science at the time the tests were given but, had majored in English and Speech as an undergraduate. The twelve listeners were chosen for their similarity in background and relative sophistication in problems of oral language communication. The only requirements of the listeners were that they have normal hearing within the speech range, (500 cps through 2,000 cps), and be born in the U.S.A. with English as their primary language.

Materials

Word Lists.--Twenty-five monosyllabic and twenty-five polysyllabic words were selected from a list of 500 words used in the Air Force Language project.[1] There was a ready made orthography for each word. These fifty words were selected to represent the frequency of sounds as they are used in the English language. The chart on "Relative Frequency of Occurrence of English Phonemes" by Dewey (Appendix C) was employed to select the words desired from the list, according to their sounds in order of frequency.[2]

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[1]Moser, op.cit., Appendix A.

[2]George Miller, Language and Communication (New York: McGraw-Hill Book Company, 1951) p. 86.

Cards.--Each word was printed on a 3" by 3" white cardboard card to be used for presenting the words to the Chinese subjects for Method I (printed words as spelled out in English letters). The Chinese orthography was also cut out and pasted on the cards for Method II. A set of cards in a random order was made for each student and also each method.

Equipment

1. Recording Tape--(3M Scotch #311 Tenzar 1/4" magnetic recording tape.)
2. Tape Recorders--(for speaker subjects)--(Ampex Recorder, Model 601. Serial #2204, and a Wollensak Type T-1500, Serial #164400.)--(for listening panel)--(Ampex Recorder, Model 601-2, Serial #1396.)
3. Earphones--(12 TDH--39.300Z Telephonic head sets.)

Procedure

Recording.--For Method I (printed words as spelled out in English letters) the examiner had the fifty words printed on the individual cards. The subject was shown one card at a time and asked to nod when he was ready to record. Fifteen seconds were allowed between each word.

The second method (tailored orthography) was handled mechanically exactly like Method I. The orthographic

representation of each word was pasted on individual cards. The words were in a different random order for each subject and each method; one word was presented at a time.

The third method was auditory stimulation. The Chinese subjects were asked to put on head sets and listen for a word to be said orally. In response of the oral stimuli, they were asked to repeat exactly what they heard. Their responses were recorded with fifteen seconds alotted between each word. All three subjects were recorded on the same day, under the same conditions for each method. Each subject was recorded individually, one method at a time. Each list was in a random order and one week spaced between each recording to minimize learning of the words.

Intelligibility Testing.--The twelve listeners wrote down the words they heard on nine sheets of paper, each sheet numbered from one to fifty, thereby allowing for recording of responses of one subject tested on one methodology for each sheet. The following instructions were given:

> You are going to hear 450 words during this test. The test will last 114 minutes, and after 57 minutes of writing you will have a fifteen minute break. Be sure to write down the words you hear. If you are not sure, guess. Be sure to keep track of each number and write the proper word on the proper line. In order that you might understand what I am attempting to do I shall explain briefly the nature of this task. I am

> attempting to test three methods of teaching pronunciation to foreign students. In this case we are working with English pronunciation and three Chinese foreign students. This study could possibly be used in teaching pronunciation of any language. Your responses as listeners will indicate which teaching method is most effective and helpful to you. Please write as legibly as possible.

The stimuli were presented to the listening panel in the following order: Method I (printed words as spelled ou in English letters) speaker subject 1, 2, and 3, Method II (tailored orthography) speaker subjects 1, 2, and 3, Method III (auditory stimulation) speaker subjects 1, 2, and 3.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The data derived from scoring the intelligibility tests are presented with reference to measures of central tendency and differences as expressed by "t" scores. At the outset of this research, three hypotheses were formulated. They were: (1) There is no significant difference in the intelligibility scores of the Chinese students as they read from a printed word list (Method I) and as they read from a specially prepared orthography (Method II). (2) There is no significant difference in the intelligibility scores of the Chinese students as they read from a printed word list (Method I) and as they repeat the words from auditory stimulation (Method III). (3) There is no significant difference in the intelligibility scores of the Chinese students as they read from a specially prepared orthography (Method II) and as they repeat the words from auditory stimulation (Method III).

In order to test for differences among the intelligibility scores associated with each of the three methods

utilized for eliciting responses from the Chinese speakers, tests of "t" were made. The following formula was applied:[1]

$$t = \frac{\Sigma D}{\sqrt{\frac{N\Sigma D^2 - (\Sigma D)^2}{N-1}}} \qquad df = N-1$$

As will be noted from the data presented in Table 1 there is a significant difference between mean intelligibility scores for Methods I (printed words as spelled out in English letters) and II (tailored orthography). There is also a significant difference between Methods II (tailored orthography) and III (auditory stimulation). Therefore on the basis of the findings it is possible to reject the hypotheses 1 and 3. It is not possible to reject hypothesis 2.

Figure 1 presents graphically the distribution of the intelligibility scores relative to methods employed in eliciting English pronunciation.

In order to achieve a comparative view of the various measures of central tendency among the methods and the deviation that characterized the three distributions, the mean, median, mode, range and standard deviations were computed. These values are presented in Table 2. It is of interest to note that the means, median and modal values within each distribution are

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[1]Helen M. Walker and Joseph Lev, Statistical Influence (New York: Holt, Rinehart and Winston, Inc., 1953) p. 153.

TABLE 1

"t" SCORES BETWEEN MEANS OF INTELLIGIBILITY SCORES RELATIVE TO METHODS UTILIZED IN ELICITING ENGLISH PRONUNCIATION

Methods	Means	Degrees of Freedom	"t" Scores	Significance Level
Method I	37.61	35	18.29	.01
Method II	26.97			
Method I	37.61	35	.852	.01
Method III	37.22			
Method II	26.97	35	15.20	.01
Method III	37.22			

TABLE 2
MEASURES OF RANGE, CENTRAL TENDENCY AND STANDARD DEVIATION OF INTELLIGIBILITY SCORES RELATIVE TO METHODS EMPLOYED IN ELICITING ENGLISH PRONUNCIATION

	Method I (Printed Words as Spelled Out in English Letters)	Method II (Tailored Orthography)	Method III (Auditory Stimulation)
Mean	37.61	26.97	37.22
Median	38	28	37
Mode	39	30	36
Standard Deviation*	2.358	4.053	2.392
Range	42 - 29	33 - 18	42 - 32

$$\sigma = \sqrt{\frac{N\Sigma X - (\Sigma X)^2}{N(N-1)}}$$

*Source: Helen M. Walker and Joseph Lev, Statistical Influence (New York: Holt, Rinehart, and Winston, Inc., 1953), p. 116.

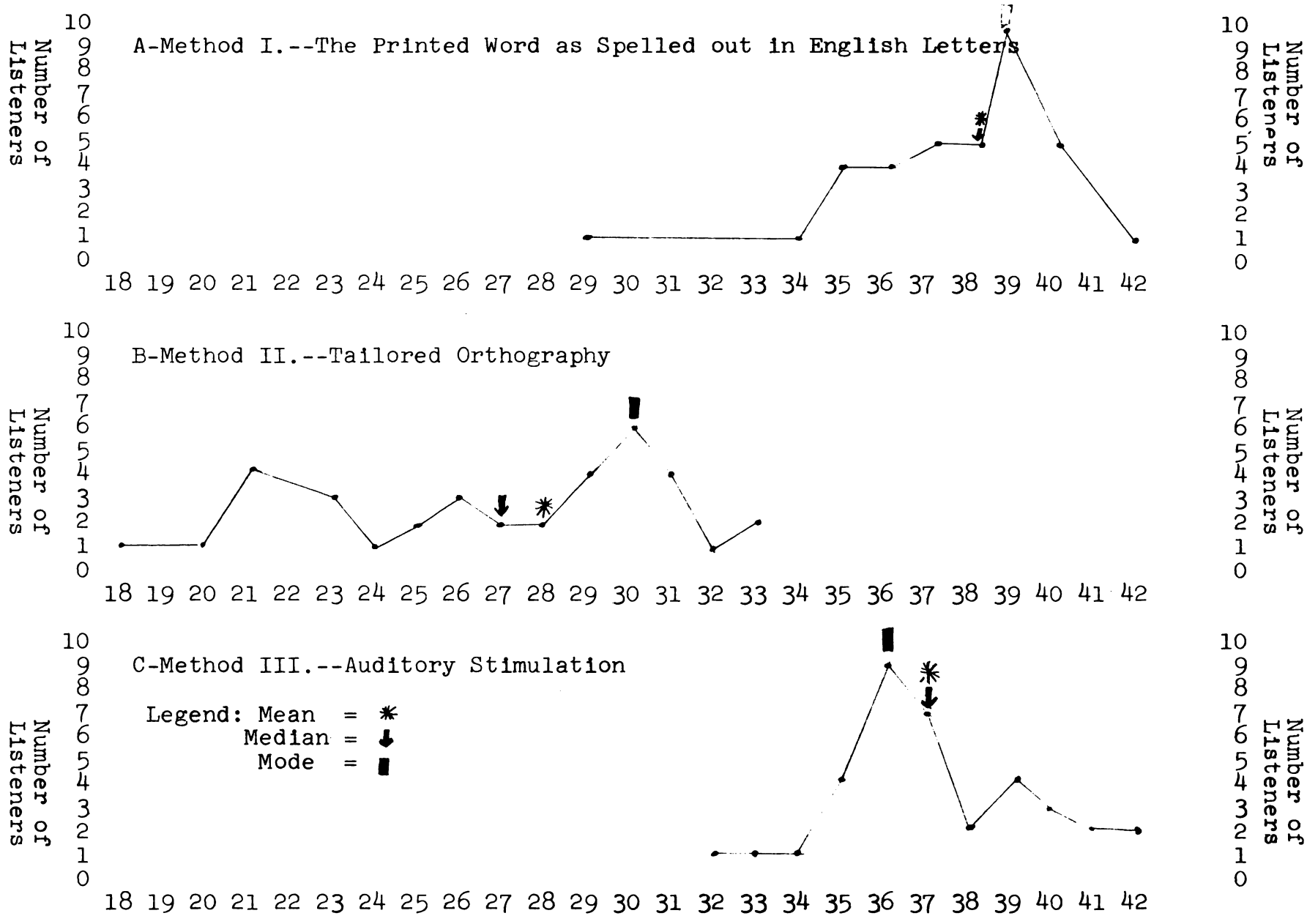

Fig. 1. A-B-C--Distribution of Intelligibility Scores by Methods

quite close, thus indicating a somewhat normal distribution of intelligibility scores associated with each method employed in getting the Chinese to pronounce the words.

Figure 2 presents a percentage comparison of intelligibility scores associated with the three methods.

Discussion

Teaching Method I (printed words as spelled out in English letters) and Teaching Method III (auditory stimulation) produce essentially similar results, while Teaching Method II (tailored orthography) produces intelligibility scores substantially lower than either of the other two teaching methods. As suggested earlier the null hypothesis between Methodologies I (printed words as spelled out in English letters) and II (tailored orthography), and Method II (tailored orthography) and III (auditory stimulation) can be rejected whereas it is not possible to reject the null hypothesis between Method I (printed words as spelled out in English letters) and III (auditory stimulation).

The reasons for these results can only be hypothesized. Several factors that might be important are fatigue, and learning on the part of the listeners. It may well be that the specially prepared orthography (Method II) was relatively less effective because in Chinese there are no letters of the alphabet as such, but the printed orthography consists of words. Therefore

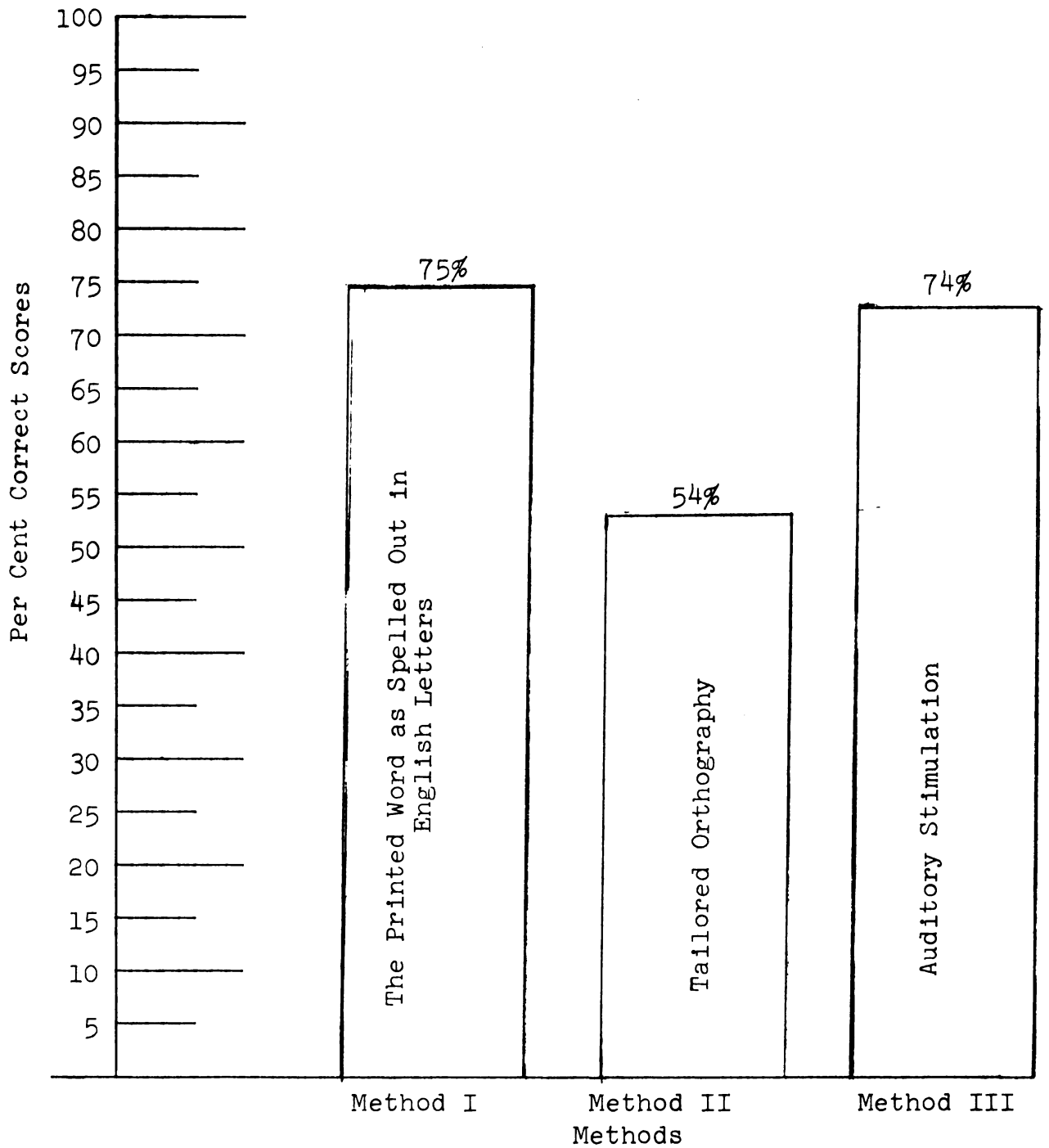

Fig. 2. A Percentage Comparison of the Intelligibility Scores Associated With Three Methods of Teaching English Pronunciation to Three Chinese Students

in order to produce the acoustic component representing an English word, one or more Chinese words had to be uttered. This is quite a different situation from that which would exist if one were attempting to utilize this method with the French where, for example, the English word "get" could easily be spelled out for the French speaker who would read "ghet".

Therefore even though Method II (tailored orthography) showed up as being least effective for Chinese it might well have merit, as measured by intelligibility tests, when used with other language groups.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

There is a need for research that investigates methods of teaching pronunciation of a secondary language as there is little evidence at hand that reveals which of several methods is most effective. This study is an attempt to assess the efficacy of three approaches in stimulating Chinese speakers to pronounce English words most efficiently. The methods employed were as follows: (I) Stimulating the Chinese with printed words spelled out in English letters, (II) Stimulating the Chinese with a specially prepared orthography the utterance of which would hopefully result in an English word, and (III) Stimulating the Chinese with oral presentation of the words.

In order to determine which of the three methods was most successful in helping the Chinese to pronounce the words most effectively, a panel of twelve listeners wrote down the words pronounced by the Chinese. The words were presented to the listeners from a tape

recording made of the Chinese speakers. The intelligibility of the words served as the words served as the criterion measure for judging the effectiveness of the three methods of teaching pronunciation.

The findings of this study indicate that teaching Method I, (printed words as spelled out in English letters) and Method III, (auditory stimulation) were equally helpful as measured by the resulting intelligibility scores. Method II, (tailored orthography) was consistently less effective than the other two methods. The means and standard deviations for Methods I (printed word as spelled out in English letters), and III (auditory stimulation) are similar, whereas the mean correct score for Method II (tailored orthography) is substantially lower than the means for Methods I and III, but the standard deviation is greater. The greater standard deviation indicates that there was greater variance in the listening scores on Method II (tailored orthography), and the lower mean indicates that the total number of correct answers were less than either for Method I (the printed word as spelled out in English letters) or III (auditory stimulation).

The "t" scores calculated, showed no significant difference between the results of teaching Method I (printed words as spelled out in English letters), and Method III (auditory stimulation), but that there was a significant difference between Method I and Method II

(tailored orthography), and between Methods II (tailored orthography) and III (auditory stimulation).

Conclusions

Within the framework of this investigation, the following conclusions appear to be in order:

1. There are several methods one can employ with varying degrees of success, in teaching American pronunciation to Chinese foreign students.
2. For Chinese speakers, printed words as spelled out in English letters, and auditory stimulation appear to be equally effective.
3. Intelligibility scores associated with the Chinese tailored orthography method as a means of eliciting correct pronunciation were consistantly lower than those associated with the printed word as spelled out in English letters method or the auditory stimulation method.

Implications for Future Research

1. It may prove valuable to construct several specially prepared Chinese orthographies and determine which is most effective. It is recognized by the examiner that the one utilized in this investigation was the product of one person's efforts.

2. It may prove valuable to carry out a research with Chinese speakers that would employ the the three methods utilized in this study, in various combinations.
3. It may prove valuable to assess the intelligibility scores associated with the three teaching methods of pronunciation, utilizing various language groups.

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APPENDICES

APPENDIX A

RAW INTELLIGIBILITY SCORES ACHIEVED BY LISTENERS AS THEY WERE PRESENTED THE ENGLISH WORDS OF THE THREE CHINESE SPEAKERS

	Method I (Printed Words Spelled Out in English Letters)				Method II (Tailored Orthography)				Method III (Auditory Stimulation)				Listener	
Listener	S1	S2	Se	T	S1	S2	S3	T	S1	S2	S3	T	Σ	$\bar{X}$
1	37	40	36	113	23	31	29	83	37	40	35	112	308	34.2
2	37	38	40	115	21	30	30	81	36	41	36	113	309	34.3
3	39	40	39	118	27	33	30	90	37	39	37	113	321	35.7
4	36	38	29	103	18	31	21	70	34	38	36	108	281	31.2
5	39	42	37	118	21	29	28	78	33	40	35	108	304	33.8
6	36	38	38	112	20	26	29	75	39	42	36	117	304	33.8
7	39	37	34	110	23	29	25	77	37	37	36	110	297	33.0
8	35	39	36	110	25	30	30	85	35	37	32	104	299	33.2
9	35	39	40	114	23	30	31	84	40	41	36	117	315	35.0
10	37	39	35	111	21	27	26	74	37	39	36	112	297	33.0
11	35	39	38	112	26	33	31	90	36	39	35	110	312	34.7
12	39	39	40	118	24	32	28	84	36	42	38	116	318	35.3

Total possible correct for each listener was 50.

APPENDIX B

RELATIVE FREQUENCY OF OCCURRENCE OF ENGLISH PHONEMES[1]

Vowels and Diphthongs				Consonants			
ɪ	8.53%	aɪ	1.59%	n	7.24%	p	2.04%
ə	4.63	oʊ	1.30	t	7.13	f	1.84
æ	3.95	ɔ	1.26	r	6.88	h	1.81
ɛ	3.44	ʊ	0.69	s	4.55	b	1.81
ɒ	2.81	aʊ	0.59	d	4.31	ŋ	0.96
ʌ	2.33	ɑ	0.49	l	3.74	ʃ	0.82
i	2.12	ɔ	0.33	ʒ	3.43	s	0.74
eɪ	1.84	ju	0.31	z	2.97	j	0.60
u	1.60	ɔɪ	0.09	m	2.78	tʃ	0.52
				k	2.71	dʒ	0.44
				v	2.28	θ	0.37
				w	2.08	ʒ	0.05
Total - 38%				Total - 62%			

[1]Data derived by G. Dewey as cited in George A. Miller, Language and Communication (New York: McGraw-Hill Book Company, Inc., 1951), p. 86.

APPENDIX C

PRINTED WORD LIST AND CORRESPONDING CHINESE TAILORED ORTHOGRAPHY

1.	guard	疙 得
2.	like	賴 克
3.	now	開
4.	red	入 哀 得
5.	yet	葉 (特)
6.	speed	斯 皮 得
7.	all	奧 兜
8.	beach	避 去
9.	dash	呆 序
10.	move	暮 付
11.	just	假 斯 (特)
12.	plan	普 瀾
13.	rain	潤
14.	mile	麥 兜
15.	green	格 潤
16.	as	阿 斯
17.	put	普 (特)
18.	hold	伙 兜 得
19.	cut	卡 (特)
20.	down	當
21.	good	估 得
22.	read	瑞 得

APPENDIX C--Continued

23.	or	奥 兜
24.	gusts	卡 斯 次
25.	cleared.	可 利 兜 得
26.	nautical	闹′ 梯 冠
27.	pressure	普′ 瑞 修 兜
28.	separate	撒′ 泊 瑞 (特)
29.	northeast	闹′ 而 斯 意′ 斯 (特)
30.	intermittent . . .	尹 特 米′ 探 (特)
31.	dispersal	迪 斯 泊′ 所
32.	present.	迫′ (兜) 申 (特)
33.	repeat	瑞 皮′ (得)
34.	overcast	欧′ 卧兜 卡′ 斯 (特)
35.	zero	贼′ 褥
36.	transmission . . .	川 斯 密′ 寻
37.	avoiding	阿 离′ 哀 丁
38.	interception . . .	尹′ 特 塞′ 普 寻
39.	rudder	入 阿′ 得 (兜)
40.	milibars	米′ 粒 巴 斯
41.	satisfactory . . .	撒′ 它 斯 菲埃 克 脱瑞
42.	resume	瑞 袖′ 姆
43.	bearing.	碑′ 潤
44.	hurricanes. . . .	哈′ 瑞 堪 斯
45.	ceiling.	思衣′ 淋
46.	perform.	泊 (兜) 否′ 姆
47.	readability . . .	瑞′ 第 阿 比′ 利 剌
48.	ok	啊 克′
49.	scattered	斯 措′ 特 得
50.	possible	怕′ 塞 博

APPENDIX D

TEST FORM FOR LISTENER RESPONSES

Test 1. Subject 1. List 1.

Name of Judge:_____ Phone _____

Position _____ Date of Birth _____

City _____ State _____

1. _____	18. _____	35. _____
2. _____	19. _____	36. _____
3. _____	20. _____	37. _____
4. _____	21. _____	38. _____
5. _____	22. _____	39. _____
6. _____	23. _____	40. _____
7. _____	24. _____	41. _____
8. _____	25. _____	42. _____
9. _____	26. _____	43. _____
10. _____	27. _____	44. _____
11. _____	28. _____	45. _____
12. _____	29. _____	46. _____
13. _____	30. _____	47. _____
14. _____	31. _____	48. _____
15. _____	32. _____	49. _____
16. _____	33. _____	50. _____
17. _____	34. _____	

APPENDIX E

ORDER IN WHICH THE VOCABULARY WAS SPOKEN BY THE CHINESE SPEAKERS

APPENDIX E

Test 1. Subject 1. List 1.

1. guard
2. all
3. as
4. present
5. hurricanes
6. put
7. cleared
8. cut
9. now
10. transmission
11. or
12. plan
13. avoiding
14. bearing
15. rain
16. separate
17. gusts
18. read
19. yet
20. intermittent
21. beach
22. speed
23. green
24. readability
25. dash
26. hold
27. dispersal
28. ceiling
29. good
30. red
31. overcast
32. milibars
33. interception
34. just
35. perform
36. possible
37. like
38. scattered
39. ok
40. repeat
41. move
42. down
43. rudder
44. northeast
45. nautical
46. satisfactory
47. mile
48. zero
49. resume
50. pressure

APPENDIX E Continued

Test I. Subject 2. List 2.

1. beach
2. cleared
3. milibars
4. speed
5. satisfactory
6. as
7. rain
8. read
9. good
10. intermittent
11. overcast
12. bearing
13. nautical
14. mile
15. red
16. resume
17. repeat
18. interception
19. readability
20. guard
21. scattered
22. dispersal
23. separate
24. all
25. hold
26. dash
27. green
28. hurricanes
29. ok
30. avoiding
31. northeast
32. gusts
33. present
34. yet
35. move
36. like
37. ceiling
38. put
39. possible
40. perform
41. transmission
42. plan
43. pressure
44. cut
45. zero
46. now
47. rudder
48. just
49. down
50. or

APPENDIX E Continued

Test I. Subject 3. List 3.

1. milibars
2. ok
3. all
4. as
5. yet
6. speed
7. present
8. hold
9. possible
10. intermittent
11. plan
12. now
13. cleared
14. separate
15. good
16. dispersal
17. satisfactory
18. cut
19. overcast
20. down
21. mile
22. zero
23. beach
24. hurricanes
25. green
26. transmission
27. nautical
28. like
29. rain
30. put
31. read
32. ceiling
33. or
34. resume
35. scattered
36. dash
37. readability
38. gusts
39. repeat
40. bearing
41. avoiding
42. guard
43. northeast
44. red
45. perform
46. interception
47. move
48. gusts
49. just
50. pressure

APPENDIX E Continued

Test II. Subject 1. List 4.

1. move
2. cleared
3. milibars
4. or
5. rain
6. like
7. pressure
8. down
9. read
10. interception
11. green
12. separate
13. readability
14. hold
15. intermittent
16. good
17. all
18. gusts
19. dispersal
20. overcast
21. avoiding
22. transmission
23. present
24. beach
25. as
26. scattered
27. mile
28. red
29. just
30. hurricanes
31. repeat
32. possible
33. yet
34. cut
35. guard
36. bearing
37. perform
38. ceiling
39. dash
40. northeast
41. resume
42. speed
43. put
44. satisfactory
45. now
46. rudder
47. ok
48. nautical
49. plan
50. zero

APPENDIX E Continued

Test II. Subject 2. List 5.

1. cleared
2. ok
3. green
4. mile
5. transmission
6. hold
7. ceiling
8. northeast
9. yet
10. dispersal
11. perform
12. speed
13. overcast
14. avoiding
15. interception
16. read
17. scattered
18. zero
19. readability
20. like
21. dash
22. hurricanes
23. now
24. or
25. satisfactory
26. all
27. move
28. cut
29. milibars
30. pressure
31. repeat
32. possible
33. good
34. nautical
35. plan
36. resume
37. bearing
38. beach
39. intermittent
40. guard
41. gusts
42. down
43. rain
44. separate
45. rudder
46. just
47. present
48. as
49. put
50. red

APPENDIX E Continued

Test II. Subject 3. List 6.

1. transmission
2. as
3. resume
4. interception
5. separate
6. now
7. ok
8. like
9. all
10. down
11. present
12. move
13. guard
14. possible
15. rain
16. cut
17. hold
18. milibars
19. overcast
20. dispersal
21. perform
22. zero
23. hurricanes
24. repeat
25. yet
26. dash
27. or
28. nautical
29. intermittent
30. avoiding
31. green
32. speed
33. red
34. northeast
35. cleared
36. beach
37. scattered
38. mile
39. bearing
40. plan
41. rudder
42. readability
43. read
44. put
45. just
46. ceiling
47. satisfactory
48. gusts
49. pressure
50. good

APPENDIX E Continued

Test III. Subject 1. List 7.

1. dispersal
2. interception
3. milibars
4. cleared
5. move
6. rain
7. rudder
8. red
9. just
10. perform
11. mile
12. down
13. nautical
14. separate
15. northeast
16. dash
17. as
18. repeat
19. intermittent
20. cut
21. resume
22. hurricanes
23. guard
24. gusts
25. readability
26. hold
27. present
28. pressure
29. avoiding
30. ok
31. or
32. satisfactory
33. ceiling
34. bearing
35. green
36. speed
37. put
38. plan
39. like
40. possible
41. zero
42. scattered
43. read
44. now
45. overcast
46. yet
47. transmission
48. beach
49. good
50. all

APPENDIX E Continued

Test III. Subject 2. List 8.

1. satisfactory
2. interception
3. nautical
4. guard
5. hold
6. green
7. just
8. gusts
9. cleared
10. separate
11. hurricanes
12. red
13. yet
14. northeast
15. present
16. plan
17. bearing
18. read
19. scattered
20. put
21. beach
22. down
23. or
24. resume
25. readability
26. zero
27. move
28. good
29. speed
30. mile
31. overcast
32. intermittent
33. ceiling
34. as
35. milibars
36. cut
37. now
38. avoiding
39. dispersal
40. rudder
41. ok
42. repeat
43. dash
44. pressure
45. perform
46. all
47. like
48. transmission
49. possible
50. rain

APPENDIX E Continued

Test III. Subject 3. List 9.

1. transmission
2. perform
3. red
4. as
5. milibars
6. bearing
7. dispersal
8. hurricanes
9. avoiding
10. all
11. cleared
12. cut
13. just
14. put
15. repeat
16. hold
17. move
18. nautical
19. northeast
20. satisfactory
21. present
22. possible
23. beach
24. zero
25. intermittent
26. readability
27. plan
28. guard
29. or
30. gusts
31. now
32. separate
33. speed
34. read
35. yet
36. resume
37. like
38. rain
39. down
40. scattered
41. green
42. mile
43. dash
44. rudder
45. ceiling
46. ok
47. good
48. interception
49. pressure
50. overcast