

THE EFFECT OF REDUNDANCY ON THE VISUAL RECOGNITION
OF FREQUENTLY EMPLOYED SPOKEN WORDS

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Karen M. Nielsen

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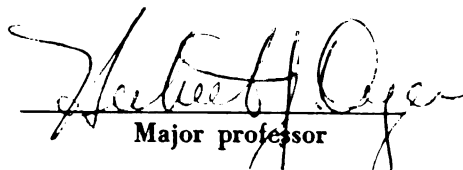
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By

Karen M. Nielsen

AN ABSTRACT OF A THESIS

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ABSTRACT

THE EFFECT OF REDUNDANCY ON THE VISUAL RECOGNITION OF FREQUENTLY EMPLOYED SPOKEN WORDS

by Karen M. Nielsen

The speech and hearing clinician is often called upon to help an aurally handicapped individual learn to develop the ability to perceive speech through lipreading. For the student to succeed, he must first learn to recognize the visible movements of the vocal organs which occur as various sounds and syllables are produced. The methods by which this recognition is taught are varied, but the ultimate goal is for this recognition to become so automatic that the lipreader may concentrate on the thought of the message, supplying with the mind the parts which the eye is unable to see or recognize.

There is much which is not yet understood concerning lipreading ability. Research into the various factors involved in lipreading is a continuing necessity. One of the important areas for research concerns the stimuli utilized in the teaching of lipreading.

This study is concerned with individual words as lipreading stimuli. It has been the purpose of this study to determine if the immediate repetition of a word will improve the visual intelligibility of that word.

A list of 45 frequently employed spoken words was randomized into 15 separate lists. Three speakers were filmed, each saying five of the word lists. For each speaker, list 1 contained one utterance of each word, list 2 contained two successive utterances of each word, and so on through five successive utterances of each word. The resultant 15 films were viewed by 15 groups of 10 subjects each. These viewer subjects were students enrolled in speech classes at Michigan

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State University. While each list was viewed by a different group of subjects, some of the groups were exposed to three of the films, presented in varying orders. This allowed for study of a learning, or carry-over, effect resulting from several exposures to each word.

The results of this study indicate that repetition of the stimulus word does not result in statistically significant improvement in visual intelligibility. The mean scores for the three speakers combined were as follows: 1 utterance - 30.6%, 2 successive utterances - 29.4%, 3 successive utterances - 33.3%, 4 successive utterances - 31.3%, and 5 successive utterances - 31.8%. The effect of the repetitions varies among speakers, and there may be a slight trend toward improvement in recognition of the stimuli as the number of successive utterances increases up to a point. There appears to be a point at which further utterances become confusing to the viewer, this point differing from one speaker to another. The results further indicate that significant learning or carry-over does not take place from one list to another, although there appears to be a slight trend toward better recognition of a single word when it has been preceded by several successive utterances. In combining scores for the three speakers, the mean score for 1 utterance of each word, with no previous presentation of the words, was 31.3%. The mean score for 1 utterance of each word preceded by 8 previous utterances of each word was 35.5%.

These results led to three major conclusions:

1. The mean scores of groups of subjects viewing frequently employed spoken words do not differ significantly regardless of the number of times the words are uttered successively.
2. The effect of successive utterances of words on visual intelligibility

Karen M. Nielsen

differs from one speaker to another.

3. Repeated unreinforced exposure to spoken words does not result in improved ability to recognize the words as they are presented singly.

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CHAPTER I

STATEMENT OF THE PROBLEM

Introduction

The area of speech and hearing science concerns itself basically with the receptive and expressive aspects of language, and more specifically, of speech. In some instances, interest is centered in both of these aspects; in other instances either one or the other takes a dominant role of importance. In the area of hearing the greatest concern centers around the receptive aspects of speech, and study is made of both auditory and visual reception. In the measurement of hearing, one deals with auditory reception. If a hearing loss exists to the extent that the individual does not receive enough auditory cues to make the reception of speech through the auditory sense useful, another channel through which to receive speech must be employed. "Speech has visual components that the deaf and hard-of-hearing may employ in the understanding of speech through lipreading, and that may contribute to normal communication."¹ Lipreading becomes a substitute communication channel, since it is possible to attribute to the eye in the instance of lipreading some of the properties assigned to the ear in hearing.² It is with lipreading that this study is concerned.

¹John J. O'Neill, "Contributions of the Visual Components of Oral Symbols to Speech Comprehension," Journal of Speech and Hearing Disorders, 19 (1954), pp. 429-439.

²Ibid.

While some authorities consider lipreading to be a form of learned, linguistic behavior, others believe that it cannot be taught.¹ Whatever the actual status of lipreading, we do try to teach it, and the teachers of lipreading are continually looking for better and more effective teaching methods. O'Neill and Oyer suggest that "analysis of the stimulus materials used in lipreading is a very profitable research area."² Such an analysis requires a means of measuring lipreading ability.

"The measurement of any sensory process involves the establishment of relations between the responses of individuals and the stimuli that give rise to such responses. It is generally agreed that we can measure both the dimensions of the physical stimulus that is presented to an observer and the responses of the observer. We can specify relations between two such measurable quantities."³

In order to determine which types of stimulus material should be analyzed, it is desirable to understand something of the various accepted methods of teaching lipreading. While there are many differences among the leading methods, there are even more similarities. All emphasize synthesis. The four leading methods stress the use of individual words, sentences, and stories, and some also stress the use of syllables.⁴ This study is concerned with individual words. Since most leading methods of teaching lipreading stress emphasis upon word recognition at some point in the learning process, it is of value to know as

¹John J. O'Neill and Herbert J. Oyer, Visual Communication for the Hard of Hearing. (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961), p. 3.

²Ibid., p. 47.

³Ira J. Hirsch, "Sensation and Measurement," Readings in Perception, ed. David C. Beardslee and Michael Wertheimer, (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1958), p. 47.

⁴O'Neill and Oyer, Op. Cit., p. 100.

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much about the visual intelligibility of words as is possible. Individual words, then, are one type of visual stimuli which should be analyzed in all possible dimensions.

Some lipreading researchers have studied the visibility of single words under various conditions. The individual sounds that make up these words have also been studied in terms of relative visibility. In practical situations, however, the movement from one word to another is rapid, and word recognition must be instantaneous. Nitchie points out that the eye must overcome two main difficulties: the obscurity of many of the movements, and the rapidity of their formation.¹ "From one-twelfth to one-thirteenth of a second is the average time per movement in ordinary speech. . . Some movements are of course slower, while others, particularly those for unaccented syllables, are much quicker."²

With this in mind, it seems reasonable to suggest that individual words might well be taught by means of repetition or redundancy. Speech is too rapid and many speech sounds are too obscure for it to be possible for the eyes to see everything that is said.³ Successive utterances of the same word would conceivably allow the eye to pick up what is missed at first glance and perhaps eventually lead to recognition of a series of movements as a specific word.

Statement of Problem and Purpose of Study

This study is concerned with the repetition of words and the effect of this repetition on visual intelligibility. Words are made up of many different sounds, each of these sounds appearing on the speaker's

¹Elizabeth Helm Nitchie, New Lessons in Lip Reading. (New York and Philadelphia: J. B. Lippincott Company, 1950), p. 26.

²Ibid., p. 27.

³Ibid., p. 39.

lips for only a fraction of a second. As we view a word spoken once we are faced with the problem of instantaneously synthesizing many rapid lip movements and translating them into the correct word. If the word is repeated immediately we may view the same movements a second time.

It is the purpose of this study to determine if the immediate repetition of a word will improve the visual intelligibility of that word. In considering this problem, the following questions were asked: (1) What effect do successive utterances of a word have on the visual intelligibility of that word? (2) If successive utterances of a word succeed in increasing visual intelligibility, how many repetitions are necessary before a plateau is reached? (3) Does the viewing of numerous utterances of a word create a learning effect which influences subsequent recognition of that word when it is viewed only once? (4) Does the effect of repetitions differ from one speaker to another?

Hypotheses

In the consideration of the above questions, the following null hypotheses have been proposed:

1. The mean scores of groups of subjects viewing frequently employed spoken words are identical regardless of the number of times each word is uttered.

If this null hypothesis is rejected, the following secondary hypotheses will be tested:

- a. The mean scores for one and two utterances are identical.
- b. The mean scores for one and three utterances are identical.
- c. The mean scores for one and four utterances are identical.

- d. The mean scores for one and five utterances are identical.
 - e. The mean scores for two and three utterances are identical.
 - f. The mean scores for two and four utterances are identical.
 - g. The mean scores for two and five utterances are identical.
 - h. The mean scores for three and four utterances are identical.
 - i. The mean scores for three and five utterances are identical.
 - j. The mean scores for four and five utterances are identical.
- 2. The mean scores of groups of subjects viewing frequently employed words spoken by different speakers are identical.
 - 3. The mean scores of groups of subjects viewing frequently employed spoken words uttered only once are identical regardless of the number of times the subjects have previously viewed the words.

Importance of the Study

A review of the more well-accepted methods of teaching lip-reading indicates that repetitive procedures are often utilized in word practice. There appears to be no research, however, which verifies the usefulness of these repetitions. While this study does not propose specifically to make such verification, it is hoped that it will throw some light on the nature of responses to repeated visual stimuli. If one is to use repetitions in the teaching of lipreading, it is

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important to have insight into the effect of repetitions on word recognition. One must know how many successive utterances are needed to be effective. One must also know if too many successive utterances lead to confusion or fail to enhance recognition.

It must be emphasized that this study is not directly related to the teaching of lipreading, although it is attempting to analyze a function used in such teaching. The subjects have not been specifically taught; they simply have been asked to respond to certain stimuli presented to them without training or practice. The study is important in that it analyzes yet another aspect of visually received spoken words, just as similar studies have analyzed the same aspect of spoken words as they are received auditorially. Any practical use of the results would be subject to further experimentation, in terms of actual teaching procedures.

Definition of Terms

For the purpose of this study, the terms used are defined in the following manner:

Lipreading. - "The correct identification of thoughts transmitted via the visual components of oral discourse."¹

Visual Intelligibility. - The properties of a spoken stimulus which enable it to be recognized by a viewer.

Visual Recognition. - Correct responses to spoken stimuli received visually.

Utterance. - One oral presentation of a word. One utterance of a word indicates that the word is spoken once.

Successive Utterances. - A word uttered successively more

¹O'Neill and Oyer, Op. Cit., p. 2.

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than once. "Two successive utterances of a word" indicates that the word is spoken twice in succession.

Word Group. - A stimulus made up of a specific number of utterances of a word.

Redundancy. - The repetition of stimuli.

Order of Presentation. - This refers to the order in which lists of words are presented to the subjects. In this study, three orders of presentation are used. With order 1, the subjects view list 1, consisting of 1 utterance of each word, then list 3, consisting of three successive utterances of each word, and finally list 5, consisting of five successive utterances of each word. With order 2, the subjects view list 3, then list 5, and finally list 1. With order 3, the subjects view list 5, then list 1, and finally list 3.

Homophenous Words. - Words which look alike to the viewer when spoken.

Positive Reinforcement. - Correction of error responses or approval of correct responses to stimuli.

Organization of the Thesis

Chapter I contains the statement of the problem that led to this study. It has included an introduction to the topic, an outline of the purpose of the study. It has put forth the hypotheses to be considered in this study, discussed the importance of the study, and defined the terms which will be used throughout the study.

Chapter II reviews the literature which is pertinent to this topic.

Chapter III consists of a discussion of the subjects, equipment, and testing procedures utilized in the study.

Chapter IV presents a discussion of the results of the study.

Chapter V contains a summary and conclusions of the study.

CHAPTER II

REVIEW OF THE LITERATURE

Perception

The organism does not mirror externality; rather it builds a world of its own from the physical reality that the physicist calls energy.¹ "Perception is the gateway through which the organism receives its information and searches for new data and new ways and means in order to make its adjustments."² Perception does not imitate anything. Perceived objects do not exist as entities in the outside world, having the characteristics which we experience in them. Therefore, to understand perception one must study what it is that the organism experiences, not what the physical world contains.³

Experimentation in perception strongly suggests that it is never an absolute revelation of 'what is'. Instead, what one experiences is a prediction, giving one the best possible bet for carrying out purposeful action. The greater the amount of relevant and consistent experience one can relate to stimulus patterns, the greater the

¹S. Howard Bartley, Principles of Perception, (New York: Harper and Brothers, 1958), p. 22.

²Harry Helson, "The Theory of Adaptation-Level," Readings in Perception, ed. David C. Beardslee and Michael Wertheimer, (Princeton, New Jersey: D. Van Nostrand Company, Inc., 1958), p. 350.

³Bartley, Op. Cit., p. 22.

probability of successful predictions, and the greater is one's confidence in his actions.¹

Perception has been defined more scientifically in the following manner:

"Perception is the overall activity of the organism that immediately follows or accompanies energistic impingements upon the sense organs. The sensory apparatus mediates between the more internal ongoing activities of the organism and the events outside it. Mediation is a fore-runner of utilization. Taken together, these consist in (1) the detection of impinging external energies, be they mechanical, chemical, photic, thermal, or otherwise; (2) transforming the quantitative relations of these energies into a set of quantity relations expressive of the organism (groupings of nerve impulses); and (3) relating the specific impingement patterns to 'traces' of previous ones in terms of a code or system peculiar to the organism as a species and the particular organism receiving the impingement."²

If immediate behavior is to be called "perception," it must be discriminatory. This distinguishes it from the simple physical and chemical interaction between the body and its environment.³ Discrimination involves making a choice reaction in which context plays a deciding role. Since the cerebral cortex is the best example of a system that discriminates, we may arbitrarily class as discriminatory any behavior that involves cerebral cortical participation.⁴ Since perception must be discriminatory, one can see that it involves the cerebral cortex.

Perception is symbolic. It is behavior which manifests an abstract relation between the organism and its environment. Since the physical energies convey to the organism something that is not literally

¹William H. Ittelson and Franklin P. Kilpatrick, "Experiments in Perception," Readings in Perception, ed. David C. Beardslee and Michael Wertheimer, (New Jersey: D. Van Nostrand Company, Inc., 1958), p. 443.

²Bartley, Op. Cit., P. 22.

³Ibid.

⁴Ibid., p. 26.

inherent in them, the reaction of the organism is a symbolic one.¹

Since the observer is confronted with alternatives, perception appears to be prognostic. "It is as though it were a bet on the nature of externality with reference to possible consequences of action."² The perceptive property also represents the process of interpretation.³

All behavior depends upon a lawfulness in the relations between the organism and its environment. The organism must be able to rely upon repetition of the same outside circumstances to provide for the same end results; and repetition of the same responses must yield the same end results each time they are performed, as long as the response is to the same set of circumstances.⁴ Perception, then, consists in developing a signal value for each encounter. The organism builds a "language" out of its encounters with its environment.⁵

Perception is a cross section of the learning process. Each perception is a guide for subsequent action.

"To learn, the organism must be sensitive to the various conditions involved in the situation in question. The more factors in the situation which the individual is sensitive to, the greater the kinds of learning there can be. Encounters with situations help the organism to discover what it is in nature that goes together to make up constellations to which it can react. Repeated encounters with a given constellation or configuration of items leave their mark on the organism. They manipulate expectancies."⁶

¹Ibid., p. 33.

²Ibid., p. 35.

³Ibid.

⁴Ibid., p. 44.

⁵Ibid.

⁶Ibid., p. 45.

The repeated encounters with a given constellation of items ultimately allows the organism to make judgments about the items. Judgments are not identical to perceptions; they are the end result of a 'problem-solving' task in which perceptions are only one of several ingredients.¹ A judgment is an integration of several perceptions, and of certain concepts and certain memories.²

Perception involves all the human senses. We perceive happenings in our environment through sight, hearing, touch, smell, taste. Certain pathways connecting the various areas of the brain, such as the auditory and visual areas, provide a reason for expecting that facilitating and inhibiting reactions between the two exist. This idea of intersensory facilitation is based upon interpretations of physiological studies.³

This close neural connection between the sense modalities also allows for associative imagery. All normal incidents elicit imagery from sense modalities not directly stimulated at the time. We seldom hear a sound, for example, without imagining to some degree in visual terms what the sound source is. It is a natural part of the hearing of sounds to identify their sources, and this identification includes visual imagery.⁴

Summary: Perception, then, is necessary for the organism to receive information. One ordinarily receives spoken information through

¹Ibid., p. 387.

²Ibid., p. 24.

³Ibid., pp. 63-64.

⁴Ibid., pp. 60-61.

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auditory perception. It is possible, however, to receive the same information visually. One person listening to another speak in a noisy environment will notice that he "hears" much better if he watches the lips of the speaker. He is not actually hearing better; rather, he is adding to the information he receives auditorially by use of visual perception of the spoken words. When a person, through deafness or a marked loss of hearing, is unable to function adequately through auditory perception alone, he may learn to make extremely good use of visual perception. This use of vision as a substitute for hearing is called lipreading, or speechreading.

What is Lipreading?

If one watches the mouth of a speaker, many clearly defined movements of the lips, perhaps even of the tongue, can be seen. The person trained to associate certain movements with certain sounds can interpret these movements into words and sentences.¹ The understanding of spoken language through observation of the movements of the visible vocal organs is called lipreading.² Lipreading is based on the movements that represent sounds of consonants, vowels, and diphthongs which go together to make up oral language.³ The lipreader must be able to recognize instantly all the visible movements, and to fill in those that are invisible.⁴

¹Edward B. Nitchie, Lip-Reading Principles and Practice, (rev. Elizabeth Helm Nitchie and Gertrude Torrey, Philadelphia and New York: Frederick A. Stokes Company, 1930), p. 14.

²Cora Elsie Kinzie and Rose Kinzie, Lipreading for the Deafened Adult, (Philadelphia: The John C. Winston Company, 1931), p. 1.

³Elizabeth Helm Nitchie, Op. Cit., p. 46,

⁴Miriam D. Pauls, "Speechreading," Hearing and Deafness, Ed. Hallowell Davis and S. Richard Silverman, (New York: Holt, Rinehart and Winston, Inc., 1960), p. 355.

It appears that spoken language is not particularly well adapted to the purpose of lipreading. This is evident from the many sounds that are formed within the mouth or even the throat. To further complicate the matter, the difference between voiced and non-voiced consonants is not visible to the eye.¹ Thus, the eyes must overcome the obscurity of many of the movements, as well as the rapidity of their formation.²

Because of these difficulties, lipreading is often defined in a broader sense. It is far more than merely reading the speaker's lips. "It is reading speech and the implications of the speaker's words and of the situation in which both speaker and listener participate."³ One of the more recent definitions suggests that "Lipreading is the correct identification of thoughts transmitted via the visual components of oral discourse," or "visual thought comprehension."⁴

Summary: Lipreading is the method whereby an individual makes use of the visual components of oral language to understand speech. In its broadest sense it involves interpretation of gestures, facial expressions, and environmental cues, in addition to the specific movements of the organs of speech.

¹Edward B. Nitchie, Op. Cit., p. 16.

²Elizabeth Helm Nitchie, Op. Cit., p. 26.

³Boris V. Merkevich, "Rehabilitation of the Aurally Handicapped through Study of Speech Reading in Life Situations," Journal of Speech and Hearing Disorders, 12 (1947), p. 363.

⁴O'Neill and Oyer, Op. Cit., p. 2.

The Teaching of Lipreading

Authorities in the area of lipreading differ among themselves regarding the status of lipreading. The disagreement lies in the answer to the questions: Can lipreading be taught? Is lipreading a form of learned behavior? The answer to these questions is an individual matter, derived from extensive study of the subject. A true and unquestionable answer has not been given. However, most people involved in speech and hearing science find themselves at one time or another in their careers attempting to teach lipreading to deaf or hard of hearing clients. Perhaps they are teaching a new form of behavior; perhaps they are merely exposing the client to an extensive amount of practice in a form of art. This author prefers to think of it as a matter of teaching. But, whatever the status of the work, goals must be set, methods must be devised to attain these goals, and means of measuring the success of the methods must be provided.

The primary goal of lipreading training is to restore to the aurally handicapped person the ability to understand speech.¹ The eye must be trained to perceive, distinguish, and combine the outward movements of the organs of speech in order to attain this goal.²

The methods by which this goal is ultimately met are many. A discussion of all possible teaching methods would be an impossible, and perhaps rather useless, task. The author has thus selected four major methods upon which she believes many of the other methods are based. These are the Jena Method, as described by Anna Bunger; the Mueller-Walle Method, as described by Martha Bruhn; the method devised

¹ Morkovin, Op. Cit.

² Martha Emma Bruhn, The Mueller-Walle Method of Lip-Reading for the Deaf, (Lynn, Mass.: The Nichols Press, 1924), p. 5.

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by Edward Nitchie and currently followed by his daughter Elizabeth Nitchie; and the Kinzie Method as described by Cora and Rose Kinzie. These methods seem to represent a continuum from the analytic to the synthetic approach to lipreading, and to show how the two extremes can be combined.

Jena Method: The objectives upon which the Jena method are based, and which provide a guide for lipreading practice, are three: (1) become aware of the feeling of the speech movements as we talk; (2) learn to imitate visible speech movements as we watch a speaker; and (3) realize that speech rhythm is an aid to understanding.¹ The adult who has normal command of speech and language must continue to be concerned with speech in its complete form, and the above objectives must be met quickly so that he can utilize his new ability to understand speech as it exists in a social environment. For the deaf child, on the other hand, considerable emphasis must be placed on the teaching of speech movements, and the meeting of these objectives becomes a slower process.²

Corresponding to each speech movement there is a characteristic muscle sensation, the awareness of which is called kinesthesia. The student's first aim must be to develop this kinesthetic awareness of speech.³ The method begins with teaching the student to feel the position of the articulators and the movements involved in consonant sounds.⁴

¹Anna M. Bunger, Speech Reading - Jena Method, (Danville, Illinois: The Interstate, 1944), p. 32.

²Ibid., p. 22.

³Ibid., p. 24.

⁴Ibid., p. 26.

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Vowels are memorized in a specific order for use in syllable drills based on combinations of consonants and vowels. The syllable drills stress the rhythmic features of the exercises, and basic rhythm is established by means of some bodily movement, such as clapping or tapping in rhythm.¹ The student imitates the bodily movements of the instructor, then proceeds to imitate the spoken syllables until he can say them rhythmically with the instructor.² Success is reached when the student can repeat the syllables along with the instructor with no prior knowledge of the order of presentation of the stimuli.

While the early lessons stress syllable exercise, immediate application of this procedure should be made to word series, phrases, and sentences, for the mental habits of a person with normal command of language are synthetic.³

This method appears to be analytic in its approach to initial teaching, with procedures designed to move as quickly as possible toward complete thought comprehension.

Mueller-Walle Method: Bruhn divides the instruction in lip-reading into the following categories: (1) the study of the visible characteristics of the positions of the organs of speech in producing a single sound, and (2) the study of the visible characteristics of the organs of speech in passing from one sound to another. Both kinds of study are equally important for those who are born deaf, but for the hard of hearing adult the greatest stress must be laid on the second category. It is upon this category of study that the Mueller-Walle

¹Ibid., pp. 34-35.

²Ibid., pp. 39-43.

³Ibid., p. 47.

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method is based.¹

The conversations which the individual wishes to follow are made up of the passing from one sound to another. Every sound must thus be studied alone and in ever-varying combinations. While the number of combinations is practically limitless, the characteristics of these movements may be classified in a clear, orderly way, easy for the student to grasp.²

The Mueller-Walle method consists of the study of these visible characteristics of the movements of the organs of speech, graded to suit the ability of the average student.³ It is only through a conscientious and thorough study of the syllable drills and exercises that the mind and the eye can be trained to work together. For this reason much emphasis is laid on drill work.⁴ These drills are the most logical and sequential way of training the eye to be accurate, to be quick, and to do its work subconsciously.⁵ A person cannot read the lips well without a clear understanding of the characteristics of the movements.⁶

As soon as the student becomes familiar with these movements to the extent that he can recognize sound combinations in syllables, he must try to grasp the meaning of the sentence as a whole.⁷ If the

¹Bruhn, Op. Cit., P. 2.

²Ibid.

³Ibid., p. 3.

⁴Ibid., p. 4.

⁵Martha E. Bruhn, Elementary Lessons in Lip Reading, (Lynn, Mass.: The Nichols Press, 1930), p. vi.

⁶Bruhn, The Mueller-Walle Method of Lip-Reading, Op. Cit., p. 4.

⁷Ibid.

syllable drill has been successful, the transition to understanding of thought units will be a smooth and easy one.

The major argument in favor of the Mueller-Walle method, as stated by Bruhn, is that the method of syllable practice requires only one mental process, while the individual word practice requires two. If a list of words is given to the student, he must first recognize the movements and then find some word in his vocabulary for which those movements stand. Considering the fact that about fifty percent of the words in the English language have one or more words that are homophenous to them, it is only natural that the wrong ones are often given. In a syllable drill the student's attention is entirely upon the movement, and this, once having been mastered, is later easily applied to sentence practice. Then his mind unconsciously recognized the movements while his attention is directed to the thought.¹

This method appears to stress analytic recognition of sound movements for the purpose of making this recognition subconscious. The approach to understanding of speech is synthetic, since once the movements are recognized without effort or concentration the lipreader is free to follow the thought which is spoken.

Nitchie: The rationale behind Nitchie's method is similar to that for the Mueller-Walle method, However, Nitchie seems to prefer the use of words to the use of syllables.

Since sounds pronounced singly all tend to be exaggerated and perhaps even mispronounced, they must be seen and recognized as movements in words and sentences.² The method of learning the movements

¹Bruhn, Elementary Lessons in Lip Reading, Op. Cit.

²Elizabeth Helm Nitchie, Op. Cit., p. 27.

involves, first, a clear conception of their characteristics, and second, much practice in the observation of them. The aim of practice is to make the recognition of the sound movements an unconscious act; that is, by much repetition to make the association of certain movements with certain sounds a habit which is done without effort or concentration.¹ Only one new visible movement is taught at a time, and this is immediately combined with all movements previously studied.²

Since Nitchie considers that the only true way of studying the sounds is by observing the formations as they occur in words, the student should use words containing the sound to be studied and concentrate on that sound as it appears in conjunction with the other sounds in the word. This is done through repetition of the word.³ Trying to memorize words as one would a vocabulary is fairly useless. It is not possible to memorize word formations so that the eye will infallibly recognize them whenever seen.⁴ It is possible only to recognize movements and then to recognize what word the combination of movements represents. This form of practice should aim to develop a nearly infallible accuracy and quickness of perception of the easier movements, leaving to the mind in large measure the task of supplying the harder movements.⁵

When the sound movements can be recognized in words, these words should be put into sentences immediately. Thus the transition from recognition of sound movements to comprehension of connected

¹Edward B. Nitchie, Op. Cit., p. 90.

²Ibid., p. 88.

³Ibid., p. 92.

⁴Ibid.

⁵Elizabeth Helm Nitchie, Op. Cit., p. 27.

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discourse is rapid; probably more so than in the other methods thus far discussed.

Kinzie Method: The Kinzies credit their method to Bruhn and Nitchie; certain fundamental principles were taken from these two methods.¹ The eyes must be trained to do their work automatically. Conscious effort must be applied to the study of the elements, their visible formative characteristics, appearance in words, and contrasts with similars. In this study the student is being instructed in the facial characteristics of the movement in order that he may know what to look for. This phase of the lesson is brief, for the new movement is at once incorporated into context designed for extensive drill. Under this treatment recognition soon becomes subconscious, and the student finds himself interpreting many sentences with ease.²

The Kinzie method is composed of courses of progressive instruction in nine grades. These grades are all built on the same vocabulary lists and the movements are presented in the same order in all grades. This serves to establish definitely the fundamental movements in the student's mind. Vowels and consonants are classified into lessons and with these elements a vocabulary is constructed.³ Not a sound occurs in a lesson that is not contained in that classification or in preceding classifications. The first lessons contain almost exclusively visible movements. By the time the student has mastered the groups of visible sentences in the first lesson he is able to grasp the thought of a simple story.⁴

¹Kinzie and Kinzie, Op. Cit., p. 27.

²Ibid., p. 28.

³Ibid., p. 3.

⁴Ibid., p. 4.

Vocabulary words are built on the sounds that have been studied. They afford an excellent means of acquiring a clear conception of the movements in their natural setting. At the outset the student should practice them with a mirror. He should observe the word as a whole and then note the appearance of the individual sound formations. If he analyzes the word to determine the number of individual sounds it contains and then says the word as many times as there are sounds in it, he can concentrate his observation on each different sound. After this practice he should have the words given to him by an assistant, and the list repeated until it is thoroughly mastered. The assistant should give the student three chances to recognize a word. If it is not recognized after three trials, it should be shown in the book and then repeated again.¹ Sentences are based on the vocabulary words of each lesson.

The entire method is geared to the concept that mental activity must not be directed to the recognition of individual movements or words, but to the thought which they convey.² The recognition of movements must be left entirely to the eye, which learns to do its work subconsciously. The mind puts together what the eyes have seen, supplies what they have failed to see or to recognize, and translates the whole into thought.³

Summary: All of these methods have one basic concept in common; they work toward the ultimate goal of visual thought comprehension. Individual sounds are studied only in terms of visual movements. They are incorporated into syllables or words or both, in order that the

¹Ibid., p. 49.

²Ibid., p. 26.

³Ibid., p. 30.

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many movement combinations may be seen, recognized, and learned. The movements are repeated often in ever-varying combinations with other movements. Syllables, words, and sentences are repeated until they are easily and correctly identified by the student. When recognition of the movements becomes immediate, or subconscious, the lipreader can concentrate on looking for the thought of the conversation with confidence that the perception of sound movements will be automatic.

These methods, or methods of similar nature, are used continuously to provide training for individuals who can no longer make full use of auditory perception for the understanding of speech. They are based upon procedures which have been found to be successful over many years of lipreading teaching. However, they are not infallible, and there is a need for continued research into the many factors involved in the lipreading process.

Research in Lipreading

Because of the complexities involved in the process of lipreading, research is vitally important to the understanding of this process. In lipreading research one must study the speaker, the receiver, and the stimuli. Each is a variable which exerts influence upon the others.

Speakers: It is rather commonly accepted knowledge that all speakers are not uniformly readable. This knowledge was confirmed in a study by Black.¹ This lack of uniformity does not appear to be due to the rate of speaking, as shown in a study by Byers and Lieberman. In this study, subjects viewed filmed speakers at the normal rate of

¹ John W. Black, Patricia P. O'Reilly and Linda Peck, "Self-Administered Training in Lipreading," Journal of Speech and Hearing Disorders, 28 (1963), p. 185.

120 words per minute, and at two-thirds, one-half, and one-third normal rate. The results showed no significant differences among the four rates in the number of words recognized correctly.¹ Probably the best explanation of this lack of uniformity considers the fact that speakers vary in preciseness of articulation, in flexibility of lip movements, and in mobility of facial expression.² Whatever the reason, some persons are much easier to lipread than others. Thus, speakers of varying degrees of lipreadability should be included when teaching lipreading and when carrying out research.³

Receiver: The second variable, the receiver, has probably been studied more thoroughly than the other two combined. It has long been accepted that some individuals are good lipreaders and others have a great deal of difficulty learning to use visual cues. Researchers have spent a great deal of time trying to discover what makes a good lipreader, hoping that the answer will help teachers of lipreading provide more successful training for those students who have difficulty grasping the process of lipreading.

A review of several studies concludes that there is no established relationship between lipreading ability and intelligence as measured by a variety of tests.⁴ O'Neill and Davidson suggest that

¹ Vincent Byers, Lewis Lieberman, "Lipreading Performance and the Rate of the Speaker," Journal of Speech and Hearing Research, 2 (1959), p. 275.

² S. R. Silverman, H. S. Lane, and D. G. Doehring, "Deaf Children," Hearing and Deafness, ed. Hallowell Davis and S. Richard Silverman, (New York: Holt, Rinehart and Winston, Inc., 1960), p. 441.

³ O'Neill and Oyer, Op. Cit., pp. 31-32.

⁴ Ibid., p. 39.

there is no statistically significant relationship between lipreading ability and level of aspiration, intelligence, reading comprehension, or digit memory span.¹ Reid was interested in the relationships between lipreading tests and the more general factors available to the educator in predicting lipreading ability. She found that lipreading ability is not quantitatively correlated with, and cannot be predicted from, the length of training in lipreading, mental age, intelligence, and grade status.²

In studies of behavioral patterns there have been some indications of "possible relationships between lipreading skill and certain definite indications of what constitutes the typical behavior of a good lipreader."³

Tateul and Davidson felt that promising variables in the study of lipreading were synthetic ability (anticipation of the whole from the knowledge of a few of its parts), visual perception, attention, and concentration. They measured synthetic ability by means of a letter prediction test, and compared scores made by good and poor lipreaders. The two groups did not differ significantly in their performance, and the investigators concluded that there were two possible reasons for this: either little relationship exists between lipreading ability and synthetic ability, or letter prediction measures are not related to

¹John J. O'Neill and Jo-Ann L. Davidson, "Relationship between Lipreading Ability and Five Psychological Factors," Journal of Speech and Hearing Disorders, 21 (1956), pp. 478-481.

²Gladys Reid, "A Preliminary Investigation in the Testing of Lipreading Achievement," Journal of Speech and Hearing Disorders, 12 (1947), p. 81.

³O'Neill and Oyer, Op. Cit., p. 40.

so-called synthetic ability.¹

Simmons found that factors which are significantly correlated with the results of lipreading tests appear to involve the ability to abstract meaning from printed material, the ability to perceive relations in a complex visual pattern, and the ability to reconstruct meaningful wholes from stimuli which have parts missing or are presented for an insufficient amount of time (synthetic ability). It was suggested that many of these are factors which can be improved with certain kinds of training.² When O'Neill and Davidson found a statistically significant relationship between lipreading ability and non-verbal concept formation, they suggested that training in recognition of simple forms or lip configurations should be included along with training in a regular method of lipreading.³ Indications are that further investigations of perceptual skills should be made. These would include memory span, perceptual field, social consciousness, and imagery types.⁴

It appears that the research concerned with the abilities of the receiver is only just begun. The most encouraging area for future research lies with non-verbal concept formation and perceptual skills.

Stimuli: The stimuli involved in lipreading include individual sounds, syllables, words, sentences, and connected discourse (stories

¹Corinne M. Tatoul and G. Don Davidson, "Lipreading and Letter Prediction," Journal of Speech and Hearing Research, 4 (1961), pp. 178-181.

²Audrey Ann Simmons, "Factors Related to Lipreading," Journal of Speech and Hearing Research, 2 (1959), p. 351.

³O'Neill and Davidson, Op. Cit.

⁴O'Neill and Oyer, Op. Cit., p. 42.

and conversation). Each type of stimuli is used in the teaching of lipreading, to greater or lesser extent depending upon the method of teaching which is followed. Each of these types of stimuli has been subjected to various research procedures.

Woodward and Barber discuss phonemes as the lowest-order units of communicative value, or the ultimate functional constituents of speech. They anticipated that one component of lipreading comprehension should be statable in terms of relative visibility of differences among phonemes, and proceeded to analyze these differences.¹ Subjects made alike-different judgments to pairs of spoken nonsense syllables and the results categorized the initial English consonant sounds into four sets classified as visually contrastive: bilabial (p b m); rounded labial (hw w r); labiodental (f v); and nonlabial (all other consonants). While these units contrast visually with each other, they are internally homophenous; that is, the members of each set look alike to the lipreader.²

Brannon considered monosyllabic words according to categories of visibility, these categories based upon the visibility of the consonant sounds contained within the words. The categories are as follows:

1. No consonant elements clearly visible. Phonemes included were alveolars, velars, and glottals.
2. One consonant highly visible, one not visible. Phonemes included as highly visible were bilabials, labiodentals, linguadentals, and the glide (w).

¹Mary F. Woodward and Carroll G. Barber, "Phoneme Perception in Lipreading," Journal of Speech and Hearing Research, 3 (1960), p. 212.

²Ibid., p. 219.

3. One consonant moderately visible, combined with a vowel or diphthong. Considered moderately visible were (s), (z), (sh), (ch), (dzh), (r), (l), (y).
4. One consonant highly visible, combined with a vowel or diphthong.
5. Two consonants visible.
6. Three consonants visible.

It was concluded that words of lesser visibility were generally more difficult to lipread. However, after category three, the addition of another visible consonant did not seem to aid in visual identification and perhaps only complicated the process. It was interesting to note in this study that words of more than one syllable were not identified any more readily than monosyllables.¹

Brannon and Kodman studied the variables contributing to visual identification of monosyllabic words. They concluded that the correct identification of these words was not significantly affected by differences in the size of the vertical mouth opening, the familiarity of the word, or the phonetic length of the words. The visual recognition of the words was directly related to the place of articulation, the lip sounds being most visible and the sounds made in the back of the mouth being the least visible.²

In a study of self-administered lipreading training, Black inferred that noncontextual materials such as the ones of the multiple-choice intelligibility tests, can be feasible samples of language for use in lipreading instruction.³

¹John B. Brannon, "Speech Reading of Various Speech Materials," Journal of Speech and Hearing Disorders, 26 (1961), pp. 348-354.

²O'Neill and Oyer, Op. Cit., p. 47.

³Black, O'Reilly, Peck, Op. Cit., p. 185.

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The recognition of single words is complicated by the fact that many are homophenous; they look alike on the lips.¹ Woodward has observed that lipreaders must distinguish among members of homophenous sets on the basis of phonetic, lexical, or grammatical redundancy, since the articulatory differences among them are not noticeable in visual observation.² This means that the lipreader must rely to a considerable measure on the context of the conversation and the situation in order to distinguish between the many homophenous words. For this reason, and even more importantly because individual words are not typical of most verbal communication, much use is made of sentences in the teaching of lipreading.

Perhaps the greatest amount of research concerning sentence stimuli is centered in the question of whether sentences act as a better predictor of lipreading skill than do individual words. The results of the research seem to indicate that they do.

Brannon found that when words were presented in sentences the subjects identified nearly 50% of them, but they were able to identify only 30 to 35% of the isolated words.³

In an effort to isolate variables relative to the materials which contribute to visual identifications made by skilled and unskilled lipreaders, and to determine the important differences between these two groups, Brannon and Kodman presented subjects representing these two groups with word and sentence stimuli. It was found that little difference exists between the performance of skilled and unskilled lipreaders when viewing individual monosyllabic words. The performance

¹ Silverman, Lane, and Doehring, Op. Cit., p. 441.

² O'Neill and Oyer, Op. Cit., p. 46.

³ Brannon, Op. Cit., pp. 348-354.

of the skilled lipreaders greatly exceeded that of the unskilled when viewing the words presented in sentences. Since the skilled group identified only 20% of the individual words, and since this list was a representative sample of the speech sounds of conversation, it was inferred that only 20% of the words of conversation can be identified. Therefore approximately 80% of the speech information must be supplied from contextual, situational, and other cues.¹

Utley found that the skills of word, sentence, and story recognition are interrelated, as shown by high coefficients of intercorrelation on her filmed lipreading test. She believed that the relationships were high enough to indicate a great deal of overlapping among the various skills. However, she warned that the combined skills do not represent a single unitary ability, and that word, sentence, and story recognition should be measured separately for diagnostic purposes.²

O'Neill and Stephens sought the answer to the question: "Which sort of recall, that is, recall of individual elements (words) or recall of thought units (sentences) is most representative of lipreading skill?" They found conflicting answers. High correlations indicated the grouping of thought content and the recognition of individual words involve somewhat similar skills, while other comparisons indicated that there is no evidence that recognition of thought units is related to word recognition.³

¹John B. Brannon, Jr., and Frank Kodman, Jr., "The Perceptual Process in Speech Reaching," AMA Archives of Otolaryngology, 70 (1959), p. 118.

²Jean Utley, "A Test of Lipreading Ability," Journal of Speech and Hearing Disorders, 11 (1946), pp. 109-116.

³John J. O'Neill and Mary C. Stephens, "Relationships Among Three Filmed Lipreading Tests," Journal of Speech and Hearing Research, 2 (1959), pp. 63-64.

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It appears that all of the available measures of lipreading ability are centered in the articulatory aspects of speech and the context of the word combinations alone. Reid suggests that this omits such stimuli as gestures, bodily tensions, movements, and general situations, all of which go into the interpreting of speech by visual cues. She suggests that a finer test is needed that will measure the more elusive and subtle factors of communication.¹

Summary: Research involving speakers has shown that speakers are not uniformly intelligible to the lipreader. This appears to be due in large measure to variation in preciseness of articulation, flexibility of lip movements, and mobility of facial expression. Thus, the lipreader's ability to understand one speaker is not necessarily indicative of his ability to understand others.

The lipreader himself, the receiver, has been studied quite extensively in terms of the characteristics commensurate with good lipreading ability. Intelligence, age, grade status, reading comprehension, memory span, and level of aspiration do not appear to be prognostic of lipreading ability. The most profitable areas for further research have been found to be non-verbal concept formation and perceptual skills.

In reviewing research which has been done relative to stimuli, one sees evidence that single words are not as prognostic of lipreading ability as are thought units where context comes to the aid of the indistinguishable sounds. It is also the consensus of professional opinion that sentences are more typical of general communication than are words, and thus are of more benefit in lipreading training. There is no question, however, as to the worth of word study, as evidenced by the use of such study in all methods of lipreading training. Study of

¹Reid, Op. Cit., p. 82.

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all forms of visual stimuli through continued research is a necessity.

Familiarity of Stimuli

In any research study involving individual words, the choice of the words to be used is important. Studies concerned with word stimuli in lipreading suggest that recognition of a word in isolation depends upon the visibility of the sounds involved within the word. There is another variable, however, which must be considered. No matter how visible a word is, if the word is not familiar to the lipreader it is probable that he will not recognize it. While the issue of word familiarity does not appear to have been examined closely in lipreading research, there is a considerable amount of information in this area with regard to auditory discrimination and visual recognition of written words.

Concerned with the differences in difficulty between the PB 50 and CID W-22 monosyllabic word lists, Owen suggested that the familiarity of the W-22 words was more closely regulated than it was for the PB 50 lists. Using the Large count of 4,500,000 words, it was found that the overall familiarity of the W-22 words is markedly higher than the PB 50 words. Word lists were then made up based on phonetic make-up and frequency of usage, and discrimination scores were obtained for normal hearing subjects under low-pass filtered conditions. The lists characterized by greater familiarity, even to a slight degree, were significantly more intelligible.¹

Black found that the more familiar words possess a characteristic of being more accurately identified, even among generally common words.²

¹Elmer Owens, "Intelligibility of Words Varying in Familiarity," Journal of Speech and Hearing Research, 4 (1961), pp. 113-129.

²John W. Black, "Accompaniments of Word Intelligibility," Journal of Speech and Hearing Disorders, 17(1952), p. 417.

He suggests that two contrary influences, word familiarity and word complexity appear to operate in the auditory recognition of a word somewhat independently of the phonetic content. This contrary influence arises from the observed indication that longer words are considered to be more intelligible since there are more sounds included which give more information to the listener, while the most familiar words are generally shorter words. Black concludes that for auditory discrimination the prediction of word intelligibility from phonetic content alone becomes virtually impossible.¹

In a study of visual recognition of written words, Hewes and Solomon considered the relationship between word-probability and speed of recognition. They asked the question "What is the relationship between the relative frequency of occurrence of specific words in the English language and the visual duration threshold necessary for correct report of these words when they are tachistoscopically exposed?"² Words were typed on an adding-machine roll and flashed on the screen for exposure durations from 10 to 1000 msec. The data compiled from the results demonstrate a strong inverse relationship between relative word-frequency and duration threshold. Words of high frequency of occurrence required shorter exposure durations for correct response than did words of low relative frequency of occurrence.³ King-Ellison and Jenkins confirmed these results in a similar study.⁴ Postman and

¹Ibid.

²Davis H. Hewes, and Richard L. Solomon, "Visual Duration Threshold as a Function of Word-Probability," Journal of Experimental Psychology, 41 (1951), p. 401.

³Ibid., p. 404.

⁴Patricia King-Ellison and James J. Jenkins, "The Durational Threshold of Visual Recognition as a Function of Word-Frequency," American Journal of Psychology, 67 (1954), p.703.

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Rosenzweig expanded the study by including auditory discrimination with visual recognition, and by regulating the amount of familiarity by a training period for the subjects. The rationale for their study was discussed as follows:

"Under conditions of reduced stimulation, the subject attempts to identify the stimulus-items on the basis of fragmentary discriminations. The more frequently a stimulus-item has been encountered or used in the past, the smaller is the fragment sufficient for identification of the total item; i.e., the preliminary training reduces the number of alternative responses among which the subject will choose."

The subjects had a tendency to complete partially discriminated stimuli in terms of high frequency of exercise. However, the frequency of occurrence in the language exerted significant effects over and above those influenced by practice.¹

Dewey issues a warning against attempts to compile analytic data based on the commonest words only, however, when one is interested in relating the data to the language as a whole. He points out that some of the commonest syllables of the English language scarcely occur among the 500 or even 1000 commonest words, but owe their importance to occurrence in many different words each relatively infrequent. Thus data based on commonest words only will give a distorted picture of the language as a whole.² This becomes a particularly difficult problem when one wishes to compile words according to the frequency of occurrence of the sounds of the English language, such as is attempted in the lists used for auditory discrimination testing, and also take into consideration the experimental data concerning the greater intelligibility of frequently used words.

¹Lee Postman and Mark R. Rosenzweig, "Practice and Transfer in Visual and Auditory Recognition of Verbal Stimuli," American Journal of Psychology, 69 (1956), p. 223.

²Godfrey Dewey, Relative Frequency of English Speech Sounds, (Cambridge: Harvard University Press, 1923), p. 6.

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Summary: It appears from these studies that for purposes of auditory recognition, familiarity of words plays a major role in word intelligibility. This also holds true for the visual recognition of written words. This would be a factor to consider carefully in experimental investigations concerned with individual words.

Stimulus Repetition

The constant search by the U. S. Military Services for better and more effective methods of communication has produced many studies concerned with the intelligibility of speech. One of the possible methods of improvement of communication has been that of repetition or redundancy of the message.

Moser, Dreher, and Adler suggested that while one might increase the intelligibility of a message by repeating it, most available evidence indicates that if a listener makes a mistake on the first hearing he will tend to make the same mistake when hearing the message again.¹ They believed that stuttered numbers might prove more effective than these said normally and repeated.² They presented two-digit numbers spoken with a single-bounce stuttering technique under varying conditions of S/N ratio. The results left little doubt but that voluntary stuttering materially aids digit transmission under unfavorable listening conditions.³ This study was followed by a comparison of single- and double-bounce transmissions and their effects upon the intelligibility

¹H. M. Moser, Jehn J. Dreher, and Sel Adler, "Two Digit Number Transmission by Voluntary Stuttering," Journal of Speech and Hearing Disorders, 20 (1955), p. 388.

²Ibid., p. 389.

³Ibid., p. 391.

of operational words. The investigators felt that if it may be inferred that the redundancy introduced by repeating the initial sound of a word accounts for its improved reception, the question arises as to whether even better results might be achieved by the additional redundancy of the double-bounce. Results indicated that the single bounce was superior to the double, as well as to normal transmission. Trained clinical observers agreed that the double-bounce suffered in its precision of delineating the initial sound. "The consequent compression and more rapid muscle activity of the double-bounce acted in this test to detract rather than add to the deliberate effect of the repetition."¹ The conclusions derived from these studies indicate that intelligibility of air messages might be significantly and importantly increased by the use of the single bounce technique in voice delivery.²

The same investigators compared the various methods of the telling of repeated digits, and concluded that the use of the terms "double" and "triple" to denote multiple successive occurrences of digits does not offer any advantage over the method of telling these digits singly. The use of the terms "hundred" and "thousand" was found to be inferior to single-digit telling of the numbers involving these magnitudes.³ Since the single-digit telling involved repetitions of the

¹ Henry M. Moser, John J. Dreher, John O'Neill, and Sol Adler, Effects of Repeating the Initial Sounds of Words on the Intelligibility of Air Messages, (Bolling Air Force Base, Wash., D. C.: Air Force Cambridge Research Center, Operational Applications Laboratory, Technical Report No. 30, Contract No. AF-19-604-1577, Columbus, Ohio: Ohio State University Research Foundation, 1956), pp. 1-33.

² Ibid.

³ Henry M. Moser, John J. Dreher, and Sol Adler, Number Telling of Repeated Digits, Exact Hundreds and Thousands, (Bolling Air Force Base, Was., D. C.: Air Force Research Center, Operational Applications Laboratory, Technical Report No. 32, Contract No. AF 19-604-1577, Columbus, Ohio; Ohio State University Research Foundation, 1956), pp. 1-8.

same number, it can be supposed that the redundancy involved aided the intelligibility of the numbers.

Fairbanks, Guttman, and Miron studied the double presentation of complete messages at normal and compressed rates of utterance. The double presentation of the messages yielded higher scores than the single presentation at both normal and compressed rates.¹

Miller, Heise, and Lichten considered this problem of repetitions, not from a military standpoint, but as the result of the following question: "Why is a stimulus configuration, a word, heard correctly in one context and incorrectly in another?" One of the contexts explored was that in which the item is a repetition of the immediately preceding item. With this sort of context, the repeated word must be one of the few words similar to the word just heard.² The results of their study indicate that the improvement that can be achieved by the simple repetition of a message is slight. This was true for both one and two repetitions of the initial word. They concluded that "the repeated message contains approximately the same information, and the same omissions, that the original message contained. If the listener thinks he heard the word correctly, he persists in his original response, whether it is right or wrong." No strong factor is at work to improve the accuracy on repeated presentations, and so only a very slight improvement is obtained due to the repetitions.³ These

¹ Grant Fairbanks, Neuman Guttman, and Murray S. Miron, "Auditory Comprehension of Repeated High-Speed Messages," Journal of Speech and Hearing Disorders, 22 (1957), pp. 20-22.

² George A. Miller, George A. Heise, and William Lichten, "The Intelligibility of Speech as a Function of the Context of the Test Material," Journal of Experimental Psychology, 41 (1951), p. 329.

³ Ibid., p. 335.

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conclusions relative to the persistence of erroneous responses are in agreement with those formed by Moser, Dreher, and Adler.

Summary: This research seems to indicate that redundancy in terms of voluntary stuttering and repeated presentations of thought units is an aid to auditory intelligibility. The effect of the repetitions of isolated words is questionable, however. There are some indications that erroneous responses are perseverated, resulting in negligible improvement due to repeated stimuli.

Applications of Preceding Materials to the Present Study

The study to be described in this paper involves redundancy of spoken words in a lipreading task. Individual words are used for lipreading practice in many of the leading teaching methods. There is some disagreement, however, as to how effective isolated word practice really is. It appears that sentences are better predictors of lipreading ability than are words, although high correlations between word and sentence recognition have been found. Monosyllabic words seem to be as visually intelligible as are words of more than one syllable, provided the monosyllables contain one or two visible consonants. One of the biggest arguments against word practice is the problem of homophenous words, where context is not available to assist in differentiation. In auditory research, word familiarity appears to be an important factor in auditory discrimination. This factor has scarcely been touched upon in lipreading research. Only one brief mention of it was found by this author, the indications being that familiarity was not a factor in visual intelligibility. More research appears to be needed here. The question of redundancy has arisen in auditory research, but apparently not in research concerned with lipreading. While the available research yields conflicting results, there are indications that for

purposes of auditory discrimination, stimulus repetitions tend to perpetuate original errors.

It will be the purpose of this study to discover what effect repetitions have on visual discrimination, with the use of frequently employed spoken words.

CHAPTER III

SUBJECTS, EQUIPMENT, AND PROCEDURES

General Organization

This study is concerned with the effect of redundancy on the visual intelligibility of frequently used spoken words. In order to investigate this problem it was necessary to present subjects with spoken words in such a way that they received only visual cues, and could not rely on auditory stimuli. To achieve this situation a test was devised whereby speakers were filmed while saying the stimulus words. The test which was presented to the subjects was filmed.

Stimuli

The stimulus words chosen for use in this study are the first 45 words from Voelker's list of 1000 most frequently used spoken words.¹ They are listed, in order of frequency of occurrence, in Appendix A. The use of 45 words was selected because of a 40 minute time limit imposed upon the testing situation. This time limit is the result of attempts to create optimum testing conditions by avoiding subject fatigue.

Speakers

Three male graduate students at Michigan State University were selected as the speakers for this study. All three speakers used

¹ Charles H. Voelker, "1000 Most Frequent Spoken Words," Quarterly Journal of Speech, 28 (1942), pp. 189-197.

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general American speech and were well-versed in the area of speech and hearing science.

Subjects

The viewer subjects for this study were students enrolled in various speech classes at Michigan State University during the first five-week summer session of 1964. The number of subjects totaled 150; of these 75 were speech and hearing science majors, and 75 were enrolled in speech courses not within the realm of speech and hearing science. Of the latter group, none were speech and hearing science majors. Of the total of 150 subjects, 56 were males and 94 were females. Ages ranged from 17 to 62 with a mean age of 24.6 and a median age of 22. In the group of 75 speech and hearing science majors, 23 were males and 52 were females; ages ranged from 19 to 51 with a mean age of 25.6 and a median age of 23. In the group of non-speech and hearing science majors, 33 were males and 42 were females, ages ranged from 17 to 62 with a mean age of 23.3 and a median age of 21. None of the subjects had received any formal training in lipreading, although several of the speech and hearing science majors had taken courses concerned with methods of teaching lipreading.

Equipment

The films for this study were taken with a Chinon Zoom 8mm movie camera, Model 7A, Serial number 324774, manufactured by the San-shin Optical Company, Limited, Tokyo, Japan. This camera is operated by a high precision electric motor, powered by four 1.5 volt penlight batteries. The batteries used were Eveready, Alkaline batteries, No. E91, 1.5 volts, from the Union Carbide Company. The following description of this camera is provided by the manufacturer:

System: Roll film loading.

Lens: Built-in Chinon zoom lens; F 1.8, 9.5 mm to 30 mm.

Finder: Half mirror prism system single lens reflex type,
actual image finder with focusing eye-piece.

Exposure Meter: Fully automatic exposure meter automatically
coupled with ASA speeds from 10 to 40 (DIN speeds from 11
to 17), with red visual warning signal for under exposure.

Angle of Shutter Blades: 160 degrees.

Shutter Speed: 16 frames per second.

Operating Power: 4 pen light batteries operate miniature high
efficiency motor.

Footage Counter: 0 to 25 feet, automatic.

Battery Tester: Built-in.

Remote Control: Built in, used with Remote Control Accessory.

Size: 108 x 55 x 215 mm. (7 inches x 2 1/8 inches x 8 1/2
inches).

Weight: 1.0 dg. (2.2 pounds).

The camera was operated by means of a Remote Control accessory.

The film used was Kodachrome II Movie film, Type A for Photo-flood Light, 8mm roll. The speed was ASA (American Standard Speeds or Exposure Indexes) 40, and thus the meter setting of the camera was ASA 40. The film is manufactured by Eastman Kodak Company, Rochester 4, New York.

In order that the speakers could keep the successive word utterances evenly spaced, a metronome was used. The metronome was manufactured by Seth Thomas Clocks, Division of General Time Instruments Corporation, Thomaston, Connecticut. It was model number 758-A1, serial number 4807.

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Two photoflood lights were used for adequate lighting during the filming procedure, each with a 300 watt bulb. These were placed equidistant to either side of the camera in such a manner that the light from them could be reflected from the ceiling. The visual warning signal built into the camera indicated that such lighting was adequate.

The experimenter used a total of fifty-four 25 foot rolls of film, each film being divided during processing to make 50 feet of exposed film. Processing was done by the Eastman Kodak Company. These exposed rolls of film were edited and condensed into 15 separate films. This was done with the use of a Bell and Howell Editor-Viewer, and a splicer.

The films were shown to the subjects with a Bell and Howell 8mm movie projector, automatic threading, Serial number BF 12819.

Response forms for the use of the subjects were devised by the experimenter, typed onto stencils and mimeographed. These are presented in Appendix B.

A lamp with an adjustable neck and a 75 watt bulb was used during the experiment so that the subjects could see to write their responses.

Procedure

Organization of Stimuli: This study was organized so that each speaker would say the list of 45 words five different times. For each speaker the list was randomized into five different orders according to a table of random numbers.¹ List 1 contains one utterance of each word;

¹ Allen L. Edwards, Statistical Methods for the Behavioral Sciences, (New York: Holt, Rinehart and Winston, 1961), pp. 472-276.

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list 2 contains two successive utterances of each word; list 3 contains three successive utterances of each word; list 4 contains four successive utterances of each word; list 5 contains five successive utterances of each word. It must be remembered that an utterance is defined in this study as one presentation of a word. Thus two successive utterances of a word indicates that the word is said two times in succession. This organization resulted in 15 lists of 45 words, each randomized separately into an order differing from all the others, and from the original word list. The word lists for each speaker are presented in Appendix C.

Filming Procedure: For a lipreading study it is desirable that the stimulus words be spoken with normal vocal intensity so that exaggerated or unnatural lip movements may be avoided. "The use of filmed motion picture techniques allows for control over the constancy of speech movements and the visibility of speech presentation."¹ For this reason, filmed lipreading tasks are often devised. Such is the case in this study. Each speaker was filmed saying the five lists of words described above. A black background was provided for the pictures by placing a black sheet of poster-board on the wall behind the head and shoulders of the speaker. Each speaker stood against the wall in front of the background poster-board. By standing thus, with the head as close to the wall as possible, the double shadow created by the photoflood lights could be kept at a minimum. The camera was placed on a tripod 12 feet from the speaker, with the lens adjusted to the level of the head of the speaker. The zoom lens was adjusted so that only the head and shoulders of the speaker were visible in the picture. The on and off control of the camera was regulated by means of a remote

¹ O'Neill and Stephens, Op. Cit., p. 61.

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control attachment in order that the position of the camera would not be inadvertently changed with excessive handling.

The filming proceeded in the following manner. The list of words was placed on a table in front of the speaker. The words were organized into five groups (A through E) with nine words per group. This type of word separation was utilized to minimize confusion on the part of the viewer subjects. It seemed reasonable to suppose that the subjects would lose their places while writing their responses less easily with five short groups of nine words each than one long list of 45 words. Cards numbered A1 through E9 were placed on the table with the word list. The appropriate number was held up by the speaker preceding the speaking of each word. The number was filmed for three seconds, then the camera was stopped and the number was removed from camera range. The speaker then checked the list for the corresponding word; the word was said aloud to the speaker by the experimenter as extra assurance that the correct word would be spoken. The camera was started again, and after a brief pause, for the viewer subjects to adjust to the picture, the speaker said the word. The camera remained focused on the speaker for approximately five seconds after the word was spoken; this was to allow writing time for the viewer subjects as they viewed the film. Following the five seconds of writing time the camera was stopped, and the same procedure was repeated for the next word. The same procedure was followed for each of the five lists of words spoken by each speaker, with a slight additional precaution taken for those lists which contained more than one utterance of the words. In filming these lists, use was made of a metronome. With the metronome set at a speed of 72, the speaker would utter the word on every third beat. In this way the same amount of time would be allowed between each

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utterance of each word, and time differences would not create a variable among speakers and among words spoken by one speaker.

Film Editing: After the filming was completed and the exposed film processed by the Eastman Kodak Company, the experimenter edited the film, separating it into the original 15 lists of words. The edited film was timed for assurance that the correct amount of writing time was allowed for each word or word group. For any writing time less than .07 of a minute, (4.2 seconds) additional film was spliced in for correction. For writing time of more than .10 of a minute (6.0 seconds) the proper amount was taken out, again for correction. In the final edition of each film, the writing time varied only from .07 to .10 of a minute. The total time taken by each film can be found on the word lists in Appendix C.

Pilot Study: Before the present study was continued, a pilot experiment was run. The purposes for this were two: (1) to determine if enough writing time was allowed for the viewer subjects, and (2) to examine varying degrees of subject preparation in terms of familiarity with the word list used in the study. It was further hoped that comments from the pilot study subjects would lead to the formation of the clearest directions possible.

For the pilot study, fifteen subjects were selected. Ten subjects were speech and hearing science majors and five were individuals not connected with the speech department in any way. The subjects were divided into three groups of five subjects each. The films chosen for this study were lists 1, 2, and 3 spoken by speaker 3. Each group of subjects viewed the same three films in the same order; list 1 was viewed first, followed by list 2, and finally list 3. The first group of subjects, consisting of three speech and hearing science majors and

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two non-speech students, was asked to learn the original list of words and write as many of them as they could remember before beginning the experiment. The second group of subjects, consisting of four speech and hearing science majors and one non-speech student, was asked to look through the list of words before beginning the experiment. These subjects were not required to learn the list or write the words in advance. The third group of subjects, consisting of three speech and hearing science majors and two non-speech students, was shown the three films without any prior exposure to the word lists.

The subjects were not allowed to use the word lists during the viewing of the film. The directions for the experiment were written at the top of the response forms, and the experimenter read them aloud as the subjects read them silently. These response forms are presented in Appendix K. As the subjects wrote their responses to each stimulus the experimenter watched closely to determine if they appeared to be hurried due to insufficient writing time.

At the end of the experiment, the subjects were asked for any comments they might have concerning the directions and the amount of writing time. The comments indicated that the subjects did not feel rushed when writing their responses. It was suggested that the experimenter familiarize the subjects with the numbering system before beginning the experiment, and that the subjects be told that they should repeat any word as often as they think it appears throughout the filmed list of words. This latter suggestion arose from the existence in the word list of many words which apparently looked alike to subjects. These suggestions were incorporated into the final set of directions for the actual experiment.

The responses of the subjects were scored according to the

number of words recognized correctly. The scores were subjected to a two-way analysis of variance with interest centered upon the differences in scores resulting from the three varying degrees of preparation of the subjects. The results of this analysis are presented in Appendix L. These results indicate that the differences in mean scores obtained from subjects differing in familiarity with the word list used are not the result of chance. Analysis of differences between individual means indicate that for each word list the differences between all groups were significant. It appears that the scores increase in accordance with the familiarity with the words to be viewed. Because of these results the experimenter decided to allow all subjects in the study equal time in which to become familiar with the words to be viewed during the experiment. Each subject would be allowed five minutes to study the original word list before beginning the experiment.

Selection of Subjects: The subjects for this study were obtained on a volunteer basis from six speech and hearing science classes and six general speech classes in session at the time of the experiment. The students in each of these classes were asked to indicate on a prepared questionnaire whether or not they would be willing to participate in this experiment, and if so, to indicate the times at which they would be available. This questionnaire will be found in Appendix D. From the completed questionnaires the experimenter assigned the volunteers to specific times and returned to them an appointment form with the time of the experiment indicated. The appointment form will be found in Appendix E. Each subject was then placed into one of 15 groups. This was done as randomly as was possible with the following restrictions. No more than 10 subjects were placed in a single group. Each group of 10 subjects contained

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five subjects from the speech and hearing science classes and five subjects from the general speech classes. The subjects who had volunteered for the same time periods were automatically included in the same groups.

Organization of Groups: The fifteen groups of subjects corresponded to the fifteen word lists described above. In this way, each word list was viewed by a different group of subjects. The groups of subjects viewing lists 1, 3, and 5 spoken by any of the speakers were also exposed to two additional lists. The following outline describes this procedure.

Group	Category I		Category II		Category III	
	Speaker	List	Speaker	List	Speaker	List
1	1	1	1	3	1	5
2	1	2				
3	1	3	1	5	1	1
4	1	4				
5	1	5	1	1	1	3
6	2	1	2	3	2	5
7	2	2				
8	2	3	2	5	2	1
9	2	4				
10	2	5	2	1	2	3
11	3	1	3	3	3	5
12	3	2				
13	3	3	3	5	3	1
14	3	4				
15	3	5	3	1	3	3

This procedure allowed for two types of statistical analysis.

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It will be noted that each of the 15 filmed word lists was seen by a different group of subjects. These are indicated by the first speaker-list category. Since the groups were formed as randomly as possible, with randomization limited by the availability of subjects and restrictions imposed on the selection procedures, it would be assumed that the groups would be homogeneous (see pages 53-54), and thus the mean scores for each of the 15 lists of words could be compared. This would meet the requirements for analysis of null hypotheses numbers 1 and 2. It will be further noted that certain of the groups of subjects were asked to view two additional lists of words, spoken by the same speaker as the initial list. This allowed for study of the learning or carry-over effect, and provided for the analysis of scores obtained for one utterance of the words preceded by zero, five, or eight previous utterances. This served to meet the requirements for analysis of null hypothesis number 3.

Testing of Subjects: The subjects were tested in the Speech and Hearing Science Laboratory at Michigan State University. This room is equipped with black window shades which eliminate outside light, making it particularly desirable for the viewing of films. Seating was arranged into two rows of five chairs each, the middle chair in each row being directly in line with the movie screen. Appendix F shows the diagram of the room arrangement and indicates the dimensions involved.

The subjects were tested singly, or in groups of two to seven individuals. Since appointments had been arranged according to the convenience of the subjects, this procedure was necessary. The subjects were seated so that nothing could block their view of the screen. A lamp with a 75 watt bulb was placed at the side of the room to furnish

enough light so that the subjects could see to write their responses. When the subjects were seated they were given a copy of the words to be viewed in the experiment. The words on this list were arranged according to the order of frequency of occurrence, and did not match the order of any of the lists to be viewed by the subjects. The subjects were instructed as follows:

"These are the words which you will be viewing in this experiment. You may have five minutes to study them before the experiment begins."

At the end of the five minutes the word lists were taken from the subjects, and the experimenter passed out the response forms. These forms are found in Appendix B. As the subjects read the directions silently, the experimenter read them aloud. The experimenter then proceeded to explain the numbering procedure in the following manner:

"Each word (or word group) will be preceded by a number corresponding to the numbers on the answer sheet. Thus, for the first word you will see the number A1 (the experimenter held up this number for demonstration) and then you will see the speaker say the word once (or 2 or 3 or 4 or 5 times in succession). If the word were 'jump', it would look like this: (the experimenter said the word the appropriate number of times). Do not start writing until you have seen all presentations of the word. Write each word only once even though it is repeated (2, 3, 4, 5) times."

The appropriate film was then shown to the group of subjects, and the subjects wrote their responses in the appropriate spaces on the response form. The groups who viewed three films were given time to read the subsequent directions while the experimenter was changing films on the projector. Since the directions were so similar to the first set, the experimenter did not read them aloud. Rather, she added the following statement before presenting the film:

"Remember, each word will be said (2, 3, 4, 5) times in succession (or only once). Do not start writing until you have seen all presentations of the word."

All groups of subjects were tested in the above manner. The testing took three weeks to complete.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The test results were tabulated and subjected to two forms of analysis of variance. Test scores were determined in two ways, resulting in two sets of data: first, the scores were determined by the number of correct responses; second, the scores were determined by the number of correct responses plus the number of responses which were homophenous with the correct word. Homophenous words were included in the second set of data because of the nature of the word list used. Many of the words were such that they had one or more homophenes which were also very frequently used words. Some of the words on the list were even homophenous with one another. Since some studies indicate that it is impossible to differentiate visually between homophenous words, it was believed that these words should be included in the data. The responses making up the test scores for both sets of data can be found in Appendix G.

Cochran's test for homogeneity of variances was applied to both sets of data.¹ For correct responses only, an R of .114 was obtained,

¹William C. Guenther, Analysis of Variance, (Englewood Cliffs, N. J.: Prentice Hall, Inc., 1964), pp. 21-22.

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and for correct responses plus homopheneous words, an R of .102 was obtained. An R of .1736 or greater was needed for significance at the 5% level of confidence. Therefore it must be concluded that the variances in the test data are homogeneous. Lindquist points out that if the variances are homogeneous, any variation determined through analysis of variance techniques must be assumed to result from differences between the means of the scores of the groups of subjects.¹

The first form of analysis of variance was such that Null Hypotheses numbers 1 and 2 could be tested. Thus a two-part analysis of variance was utilized.² The scores for the first word list viewed by each group of subjects were used in this analysis. These data are found in Appendix H. The number of successive utterances is designated as the A variable, and the speaker is designated as the B variable. The results of this analysis for correct responses only are presented in Table 1.

¹ E. F. Lindquist, Design and Analysis of Experiments in Psychology and Education, (Boston: Houghton Mifflin Company, 1956), pp. 93-94.

² Edwards, Op. Cit., pp. 340-349.

TABLE 1

TWO-PART ANALYSIS OF VARIANCE OF SCORES ON FIVE DIFFERENT
NUMBERS OF SUCCESSIVE UTTERANCES FOR GROUPS VIEWING WORD LISTS
SPOKEN BY THREE DIFFERENT SPEAKERS: CORRECT RESPONSES ONLY

Source of variation	Sum of Squares	df	Mean Square	F
Number of utterances	45.732	4	11.433	.421
Speakers	109.920	2	54.960	2.002
Interaction	438.148	8	54.769	2.015*
Between Groups	593.800	14	42.414	1.561
Within Groups	3996.200	135	27.179	
Total	4263.000	149		
*Significant at the 5% level of confidence.				

The F's for number of successive utterances, speakers, and between groups are not significant. The interaction, however, is significant at the 5% level of confidence. This seems to indicate that the effect of successive utterances on visual intelligibility depends upon the speaker being viewed.

The results of this same analysis for correct responses plus homophenous words are presented in Table 2.

TABLE 2

TWO-PART ANALYSIS OF VARIANCE OF SCORES ON FIVE DIFFERENT
NUMBERS OF SUCCESSIVE UTTERANCES FOR GROUPS VIEWING WORD LISTS
SPOKEN BY THREE DIFFERENT SPEAKERS: CORRECT RESPONSES PLUS
HOMOPHENOUS WORDS

Source of Variation	Sum of Squares	df	Mean Square	F
Number of utterances	81.158	4	20.290	0.649
Speakers	122.813	2	61.407	1.965
Interaction	693.322	8	86.665	2.773**
Between Groups	897.293	14	64.092	2.051*
Within Groups	4219.000	135	31.252	
Total	5116.293	149		
*Significant at the 5% level of confidence.				
**Significant at the 1% level of confidence.				

The F for the mean square between groups is significant at the 5% level of confidence. This indicates that the observed differences

between the groups are not the result of chance. Analysis of this sum of squares between groups reveals no significant difference between successive utterances or speakers, but does produce a significant F for interaction at the 1% level of confidence. This again indicates that the effect of successive utterances on visual intelligibility depends upon the speaker being viewed.

Because of the significant interaction involved in both sets of data, an analysis of variance was done individually for each speaker.¹ The results of this analysis for correct responses only are presented in Table 3.

TABLE 3

ANALYSIS OF VARIANCE OF SCORES FOR GROUPS VIEWING FIVE
DIFFERENT WORD LISTS, EACH CONTAINING A DIFFERENT NUMBER
OF SUCCESSIVE UTTERANCES: CORRECT RESPONSES ONLY

Source of Variation	Sum of Squares	df	Mean Square	F
Speaker 1				
Between Groups	193.28	4	48.32	1.6
Within Groups	1336.40	45	29.69	
Total	1529.68	49		
Speaker 2				
Between Groups	32.00	4	8.02	.003
Within Groups	996.80	45	22.15	
Total	1028.88	49		
Speaker 3				
Between Groups	258.52	4	64.63	2.17
Within Groups	1336.00	45	29.68	
Total	1594.52	49		

An F equal to or greater than 2.58 was necessary for significance at the 5% level of confidence. It appears that for correct responses only, there is no significant difference in scores for the various numbers of successive utterances of words spoken by any of the speakers.

¹ Edwards, Op. Cit., pp. 316-321.

The results of the same analysis for correct responses plus homophenous words are presented in Table 4.

TABLE 4

ANALYSIS OF VARIANCE OF SCORES FOR GROUPS VIEWING FIVE
DIFFERENT WORD LISTS, EACH CONTAINING A DIFFERENT NUMBER OF
SUCCESSIVE UTTERANCES OF EACH WORD: CORRECT RESPONSES PLUS
HOMOPHENOUS WORDS

Source of Variation	Sum of Squares	df	Mean Square	F
Speaker 1				
Between Groups	310.4	4	77.60	1.99
Within Groups	1751.6	45	38.92	
Total	2062.0	49		
Speaker 2				
Between Groups	39.8	4	9.95	0.41
Within Groups	1088.7	45	24.19	
Total	1128.5	49		
Speaker 3				
Between Groups	424.28	4	106.07	3.46*
Within Groups	1379.20	45	30.64	
Total	1802.98	49		
*Significant at the 5% level of confidence.				

In this analysis, the F for speaker 3 was significant at the 5% level of confidence. This indicated that the variation between scores for the different numbers of successive utterances of words spoken by this speaker was not due to chance alone. Therefore it was desirable to test the significance of the difference in means for the individual pairs of treatments. The procedure recommended by Lindquist was followed.¹ The differences between the individual means were compared to the critical difference computed by the formula $d = t \sqrt{\frac{2msw}{n}}$ with t at the 5% level with 45 degrees of freedom being 2.015. The results are presented in Table 5.

¹Lindquist, Op. Cit., pp. 93-94.

TABLE 5

DIFFERENCES BETWEEN INDIVIDUAL MEANS					
		A2	A3	A4	A5
Mean 1 - 20.7	A1	7.3*	2.9	4.0	0.8
Mean 2 - 13.4	A2		4.4	3.3	8.1*
Mean 3 - 17.8	A3			1.1	3.7
Mean 4 - 16.7	A4				4.8
Mean 5 - 21.5					

*Equal to or greater than the critical difference of 4.98.

These results indicate that the differences between the means for 1 utterance and 2 successive utterances of the words, and for 2 and 5 successive utterances of the words are significant at the 5% level of confidence. This probably accounts for the significant F for the mean square between groups, which was not significant in the analysis for correct responses only.

The second form of analysis of variance was such that Null Hypothesis number 3 could be tested. Test results for this analysis are presented in Appendix I. The data were organized in such a way that Lindquist's Type III factorial experiment could be utilized.¹ This experiment is performed with three factors, A, B, and C, with a possible total of ABC treatment-combinations. Classification A is such that all treatments in that classification are administrable to the same subjects, but this is not true of the other (B and C) classifications. Thus the main effect of A and all interactions involving A are "within" effects, while the main effects of B and C and the BC interaction are "between" effects. The subjects are divided at random into BC groups of the same size. Each group takes one of the B-C combinations with each level of A.² In this experiment the three factors

¹Ibid., pp. 281-284.

²Ibid.

under consideration were (A) number of successive utterances, (B) speakers, and (C) order of presentation of the word lists. Each factor may be broken down as follows:

Factor A: A1 represents 1 utterance.
A3 represents 3 successive utterances.
A5 represents 5 successive utterances.

Factor B: B1 represents speaker 1.
B2 represents speaker 2.
B3 represents speaker 3.

Factor C: C1 represents the order of A1 A3 A5.
C2 represents the order of A3 A5 A1.
C3 represents the order of A5 A1 A3.

Referring back to the discussion of Organization of Groups, page 49, it will be noted that groups 1, 3, 5, 6, 8, 10, 11, 13, and 15 are included in this analysis. Each group viewed all treatments in classification A in combination with one of the 9 B-C groups, as follows:

Group	A1	A3	A5
1			B1 C1
3			B1 C2
5			B1 C3
6			B2 C1
8			B2 C2
10			B2 C3
11			B3 C1
13			B3 C2
15			B3 C3

In this way the relationships between number of successive utterances, order of presentation of the word lists, and speakers, could be evaluated.

The results of this analysis for correct responses only are presented in Table 6 on the following page.

TABLE 6

ANALYSIS OF VARIANCE OF SCORES ON THREE DIFFERENT NUMBERS OF SUCCESSIVE
UTTERANCES (1, 3, 5) FOR GROUPS VIEWING WORD LISTS PRESENTED IN
THREE DIFFERENT ORDERS BY THREE DIFFERENT SPEAKERS: CORRECT
RESPONSES ONLY

Source of Variation	Sum of Squares	df	Mean Square	F
Between Subjects	2012.341	89	22.611	6.473**
B	1478.452	2	739.226	211.631**
C	32.119	2	16.060	4.598*
BC	218.837	4	54.709	15.662**
Error (b)	282.933	81	3.493	
Within Subjects	6781.600	180	37.676	0.939
A	17.874	2	8.937	0.223
AB	80.015	4	20.004	0.499
AC	106.496	4	26.624	0.664
ABC	78.496	8	9.812	0.664
Error (w)	6498.667	162	40.115	
Total	8793.941	269		

*Significant at the 5% level of confidence.

**Significant at the 1% level of confidence.

These results indicate that the variation between subjects is not due to chance alone. It appears that there is significant variation in scores due to speakers, and due to the order of presentation of the word lists. The significant interaction (BC) indicates that these two factors influence each other. The interactions involving Factor A are not significant, indicating that the scores obtained for various numbers of successive utterances are not influenced by either speakers or order of presentation of the numbers of successive utterances.

The results of this same analysis for correct responses plus homophenous words are presented in Table 7.

TABLE 7
ANALYSIS OF VARIANCE OF SCORES ON THREE DIFFERENT NUMBERS OF
SUCCESSIVE UTTERANCES (1, 3, 5) FOR GROUPS VIEWING WORD LISTS
PRESENTED IN THREE DIFFERENT ORDERS BY THREE DIFFERENT SPEAKERS:
CORRECT RESPONSES PLUS HOMOPHENOUS WORDS

Source of Variation	Sum of Squares	df	Mean Square	F
Between Subjects	2925.400	89	32.870	4.863**
B	2100.356	2	1050.178	155.375**
C	32.067	2	16.034	2.372
BC	245.510	4	61.378	9.081**
Error (b)	547.467	81	6.759	
Within Subjects	7580.900	180	42.116	0.970
A	32.467	2	16.234	0.374
AB	155.977	4	38.994	0.898
AC	242.133	4	60.533	1.394
ABC	116.890	8	14.611	0.337
Error (w)	7033.433	162	43.416	0.337
Total	10506.300	269		

**Significant at the 1% level of confidence.

These results again indicate that the variation between subjects is not due to chance alone. While it appears here that there is significant variation in scores due to speakers, variation does not seem to result from the order of presentation of the word lists. The significant BC interaction indicates that the speaker variation is influenced by the order of presentation of the word lists. The interactions involving Factor A are again insignificant.

Because of the variation due to speakers, and the effect of the order of presentation upon this variation, an analysis of variance for each speaker was carried out. In the consideration of the effect of the order of presentation of the word lists, the responses to the lists containing one utterance of the words are those with which this study is concerned. Therefore, this analysis considered the variation of responses to one utterance of the words according to the order of presentation of the word lists.¹ The results of this analysis for correct

¹ Edwards, Op. Cit., pp. 316-321.

responses only are presented in Table 8.

TABLE 8

ANALYSIS OF VARIANCE OF SCORES FOR GROUPS VIEWING WORD LISTS
CONTAINING ONE UTTERANCE OF EACH WORD AND PRESENTED IN
DIFFERENT PRESENTATION ORDERS: CORRECT RESPONSES ONLY

Source of Variation	Sum of Squares	df	Mean Square	F
Speaker 1				
Between Groups	59.47	2	21.735	1.13
Within Groups	707.20	27	26.190	
Total	766.67	29		
Speaker 2				
Between Groups	12.20	2	6.100	0.33
Within Groups	500.10	27	18.500	
Total	512.30	29		
Speaker 3				
Between Groups	72.73	2	36.37	0.90
Within Groups	1055.30	27	39.08	
Total	1128.03	29		

The results of this analysis for correct responses plus homophenous words are presented in Table 9.

TABLE 9

ANALYSIS OF VARIANCE OF SCORES FOR GROUPS VIEWING WORD LISTS
CONTAINING ONE UTTERANCE OF EACH WORD AND PRESENTED IN
DIFFERENT PRESENTATION ORDERS:
CORRECT RESPONSES PLUS HOMOPHENOUS WORDS

Source of Variation	Sum of Squares	df	Mean Square	F
Speaker 1				
Between Groups	125.07	2	62.54	2.07
Within Groups	814.80	27	30.17	
Total	939.87	29		
Speaker 2				
Between Groups	16.07	2	8.04	0.31
Within Groups	686.90	27	25.44	
Total	702.97	29		
Speaker 3				
Between Groups	22.87	2	11.44	0.32
Within Groups	949.00	27	35.14	
Total	971.87	29		

An F equal to or greater than 3.35 was needed for significance

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at the 5% level of confidence. No significant F was obtained, indicating that for no speaker is there significant variation in scores for one utterance of the words due to the order of presentation of the word lists.

Discussion

Null Hypotheses 1 and 2: Null Hypothesis number 1 was stated as follows: The mean scores of groups of subjects viewing frequently employed spoken words are identical regardless of the number of times each word is uttered. Null Hypothesis number 2 was stated as follows: The mean scores of groups of subjects viewing frequently employed words spoken by different speakers are identical.

In discussing results pertaining to these hypotheses we are interested in the first type of analysis of variance used. Of primary interest is the question, "is the visual intelligibility of a group of spoken words affected by successive utterances of the words?" The results indicate that the effect of successive utterances of the words is not significant. It must be noted, however, that the effect of repetitions differs from one speaker to another. Figure 1 pictures this interaction graphically for correct responses only. Figure 2 pictures this interaction for correct responses plus homophenous words.

The responses obtained under both scoring procedures follow the same pattern, with the mean scores for correct responses plus homophenous words being somewhat higher for each number of successive utterances than those for correct responses only. The mean scores for speaker 1 increase steadily from 1 utterance to 4 successive utterances, then drop markedly for 5 successive utterances of the words. For speaker 2 the mean scores increase steadily but with less magnitude until 3 successive utterances of the words is reached, then drop abruptly for 4

successive utterances and rise somewhat for 5 successive utterances.

There is a certain amount of similarity between the mean scores for the groups viewing the first two speakers. It appears that the scores improve slightly, though not significantly, from 1 utterance to 3 successive utterances of the words for speaker 2 and from 1 utterance to 4 successive utterances of the words for speaker 1, then drop rather abruptly when the high point is reached. The picture for speaker 3, however, is very different. The mean scores for 1 utterance and 5 successive utterances of the words are considerably greater than for 2, 3, and 4 successive utterances. The results of the analysis indicated that the differences in mean scores for correct responses plus homophenous words for this speaker were significant. A test for differences between means suggested that the mean score for 2 successive utterances of the words differed significantly from those for 1 utterance and 5 successive utterances of the words. This difference can be seen clearly on the graph in Figure 2.

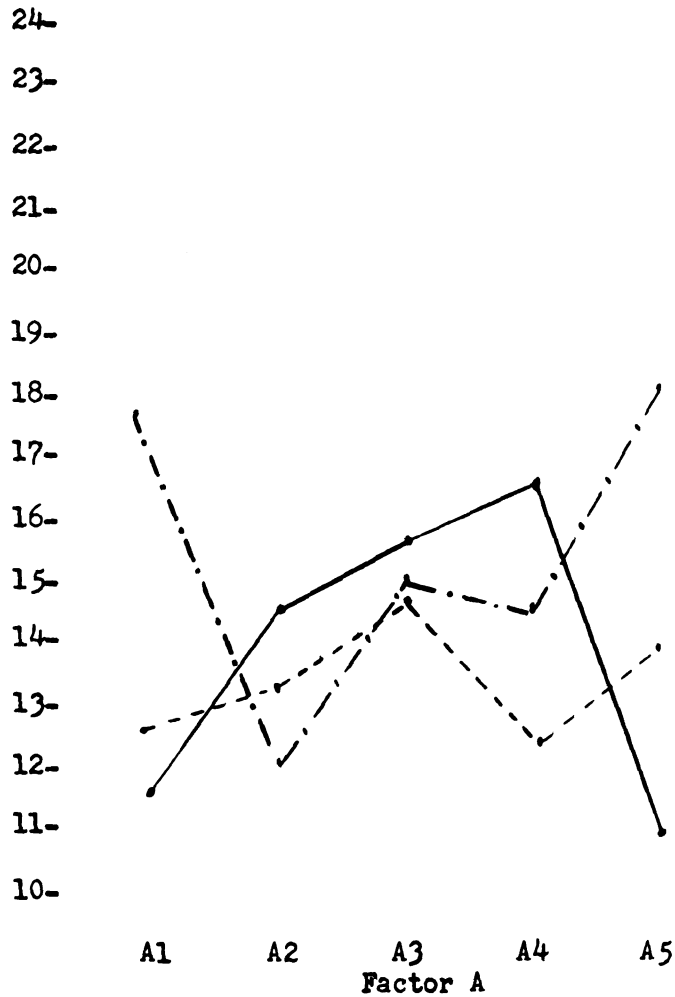
It would appear that the significant interaction between the number of successive utterances and the speakers results from the rather drastically different responses to speaker 3 from those to the other two speakers. It is possible that the groups viewing 1 utterance and 5 successive utterances of the words spoken by speaker 3 were made up of significantly better lipreaders than were the other groups of subjects, in spite of the procedure followed in an attempt to assemble the groups randomly. While this is only a supposition, it does not seem feasible that the effect of successive utterances of words should be so markedly different for one speaker than for the others.

In spite of this discrepancy due to speaker difference, the analyses for each speaker individually indicate that for speakers 1 and

Figure 1

INTERACTION BETWEEN NUMBER OF SUCCESSIVE UTTERANCES AND SPEAKERS;
CORRECT RESPONSES ONLY

Mean Score



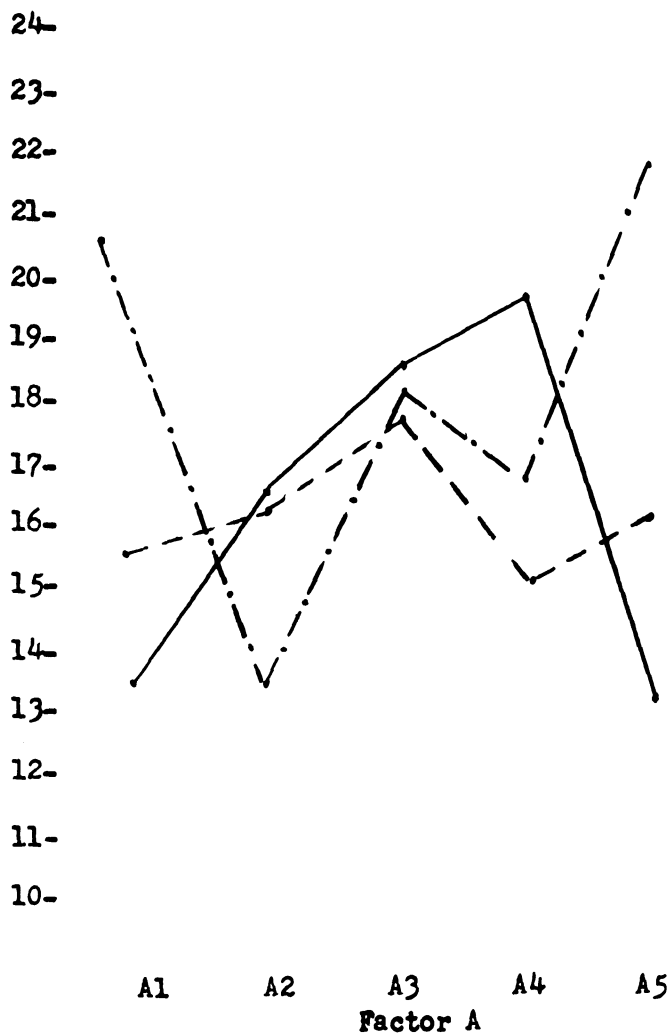
Speaker 1 _____
 Speaker 2 - - - - -
 Speaker 3 - . - . - . - . - . -

Figure 2

INTERACTION BETWEEN NUMBER OF SUCCESSIVE UTTERANCES AND SPEAKERS:

CORRECT RESPONSES PLUS HOMOPHENOUS WORDS

Mean Score



Speaker 1 _____

Speaker 2 - - - - -

Speaker 3 - . - . - . - . - . -

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2 at least the differences in scores for 1 utterance through 5 successive utterances of the words are not significant. It appears that with no prior training, successive utterances of words do not help the recognition of the words through lipreading.

Null Hypothesis 3: Null Hypothesis number 3 was stated as follows: The mean scores of groups of subjects viewing frequently employed spoken words uttered only once are identical regardless of the number of times the subjects have previously viewed the words.

This hypothesis deals with a learning, or carry-over, effect. The experimenter was interested in discovering what happens to the scores obtained when viewing one utterance of a word after that word has been uttered successively several times on previous trials. To suggest that learning takes place is questionable, since the responses to the words are not positively reenforced. However, if a learning or carry-over effect exists, it would result in suggestions for the teaching of visual word recognition through repetitions of the stimuli.

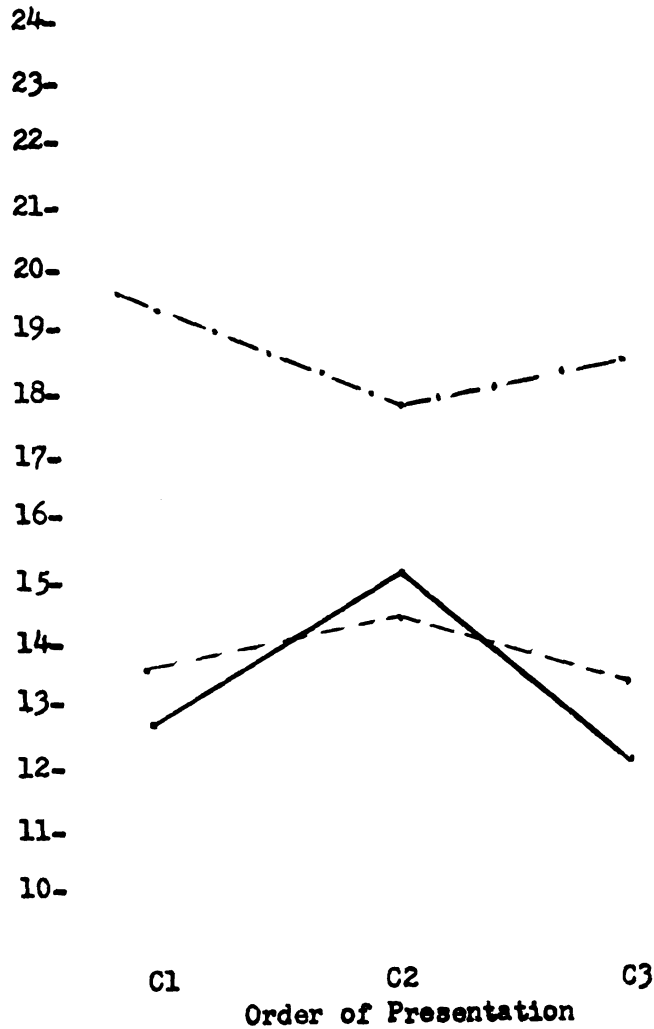
In this analysis, particular interest is manifested in the AC interaction; that is, how the scores for various numbers of successive utterances are affected by the order in which these lists of successive utterances are presented to the subjects. The results of the analysis indicate that the AC interaction is not significant. However, the BC interaction is significant, suggesting that the responses according to the order of presentation of the word lists differ according to the speaker viewed. Figure 3 pictures this BC interaction graphically for correct responses only, and Figure 4 pictures this interaction for correct responses plus homophemous words. For these graphs the mean scores for 1 utterance, and 3 and 5 successive utterances of the words were totaled for each presentation order. Thus the total mean score

can be seen for orders 1, 2, and 3 for speakers 1, 2, and 3. It will be noted that for speakers 1 and 2 the second order of presentation, where 3 successive utterances of the words were viewed first, followed by 5 successive utterances, then 1 utterance, yielded a slightly higher mean score than did the first or third order of presentation. For speaker 3, however, the second order of presentation yielded the lowest mean score. The significant BC interaction appears to result from the responses to speaker 3, as did the significant interaction between the number of successive utterances and the speakers.

Perhaps the lack of significance of the AC interaction can be attributed to this rather drastic speaker difference. The interest in the AC interaction is centered around the responses to the word lists containing only one utterance of the words. If the AC interaction is influenced in any way by speaker difference, the affect on responses to one utterance of the words should be studied. To do this one may refer to Table 8, where the responses to one utterance of the words are analyzed in terms of the order of presentation of the word lists for each speaker individually. The results of this analysis indicate that for no speaker is there significant variation between scores for one utterance of the word as the lists are presented in various orders. These results are pictured in graphic form in Figure 5 for correct responses only, and in Figure 6 for correct responses plus homophenous words. It can be seen that although the differences are not significant, there is a slight tendency for the second order of presentation to result in higher mean scores for all three speakers. In the second presentation order, it will be remembered that the subjects viewed the words first uttered three times, then uttered five times, and finally uttered only once. It appears that the mean scores for one utterance

Figure 3
INTERACTION BETWEEN SPEAKERS AND ORDER OF PRESENTATION
OF THE WORD LISTS: CORRECT RESPONSES ONLY

Mean Score



Speaker 1

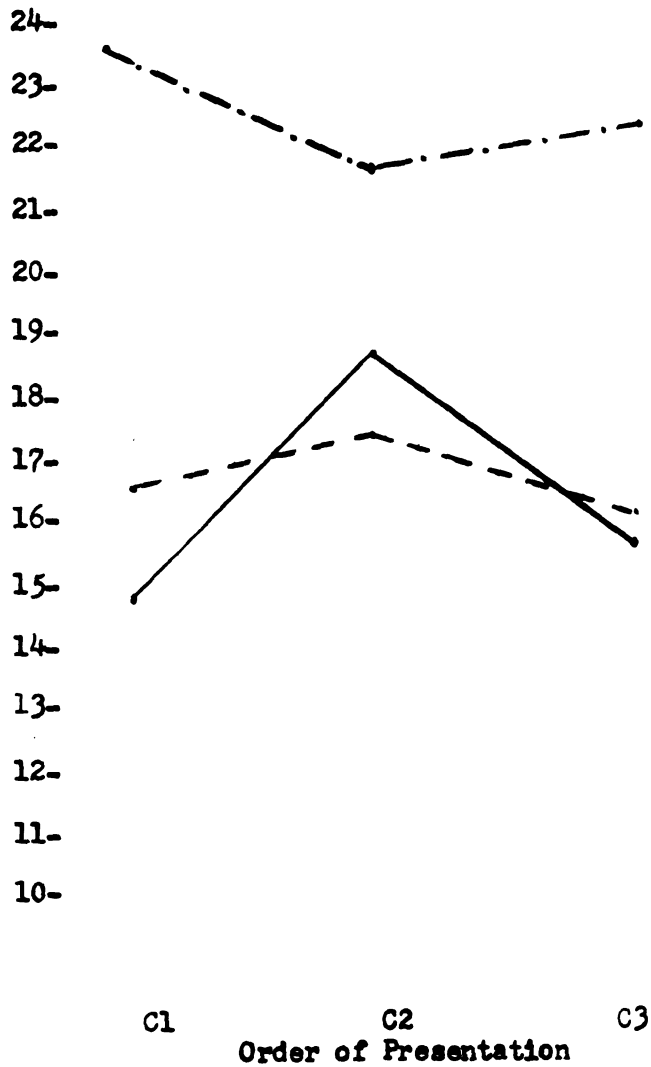
Speaker 2 - - - - -

Speaker 3 - . - . - . - . -

Figure 4

INTERACTION BETWEEN SPEAKERS AND ORDER OF PRESENTATION
OF THE WORD LISTS: CORRECT RESPONSES PLUS HOMOPHENOUS WORDS

Mean Score



Speaker 1 _____

Speaker 2 - - - - -

Speaker 3 - . - . - . - . - . -

of the word are somewhat better when the subjects have been exposed to the words through previous successive utterances. The graphs indicate that eight previous utterances result in higher scores than do five previous utterances. While these differences are not significant, they show a tendency in the direction which indicates the possibility of a carry-over effect, however slight. It must be remembered, however, that this tendency could be attributed to chance.

In general, the results of this study indicate that visual intelligibility of frequently employed spoken words is not affected by repetitions of the words.

Figure 5
RESPONSES TO WORD LISTS CONTAINING ONE UTTERANCE OF
THE WORDS PRESENTED IN VARIOUS ORDERS BY THREE DIFFERENT SPEAKERS:
CORRECT RESPONSES ONLY

Mean Score

24-

23-

22-

21-

20-

19-

18-

17-

16-

15-

14-

13-

12-

11-

10-

C1

C2

C3

Order of Presentation

Speaker 1

—————

Speaker 2

- - - - -

Speaker 3

- . - . - . - . - . -

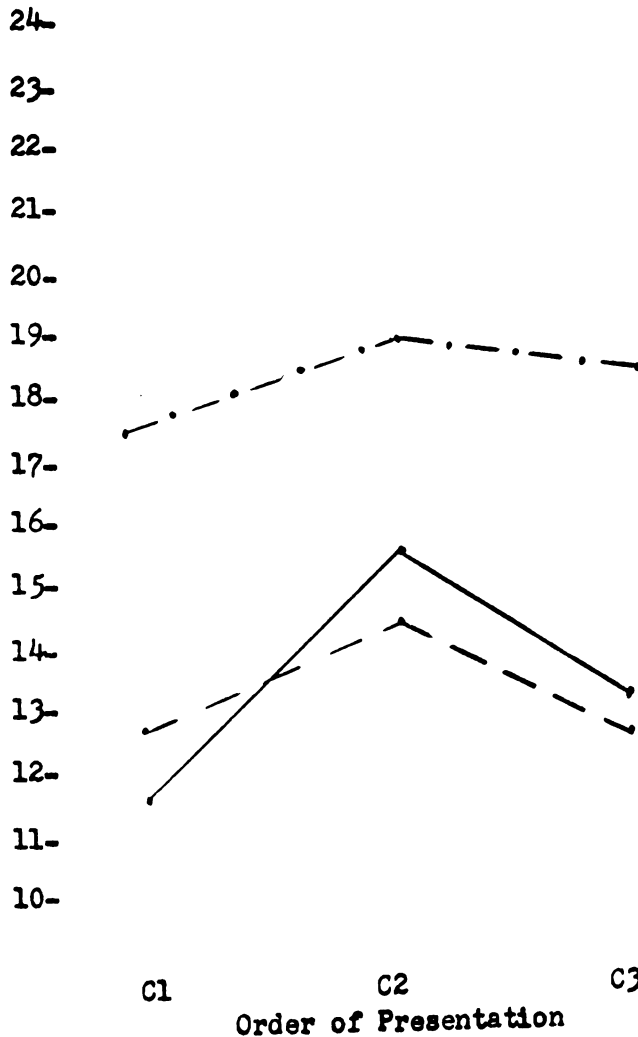
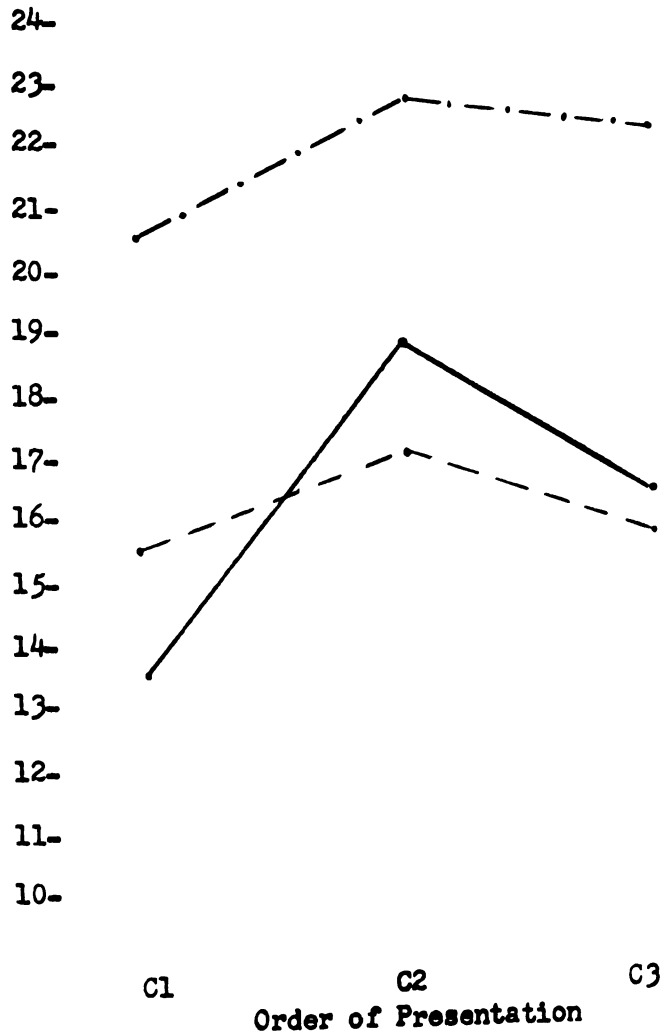


Figure 6

RESPONSES TO WORD LISTS CONTAINING ONE UTTERANCE OF THE WORDS
PRESENTED IN VARIOUS ORDERS BY THREE DIFFERENT SPEAKERS:

CORRECT RESPONSES PLUS HOMOPHENOUS WORDS

Mean Score



Speaker 1

Speaker 2

Speaker 3

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The greatest loss to an aurally handicapped person is the inability to hear and understand speech. It is through speech that one is able to maintain an intelligent and enjoyable relationship with others and with the environment in general. The deaf individual is unable to utilize auditory perception in any way; he who is hard of hearing has auditory perception abilities which are limited. For both of these individuals, the process of lipreading becomes an important avenue for the understanding of speech. For the deaf individual, lipreading is the sole means of receiving speech; for the hard of hearing individual, lipreading supplies in part that which the ear is no longer able to perceive.

The speech and hearing clinician is often called upon to help an aurally handicapped individual learn to develop lipreading ability. Through the years, several methods of teaching lipreading have been devised. While these methods differ from one another in many ways, they also contain many similarities. The goal of teaching lipreading is to restore to the student the ability to understand speech. For the student to succeed, he must first learn to recognize the visible movements of the vocal organs which occur as various sounds and syllables are produced. The methods by which this recognition is taught are

varied, but the ultimate goal is for this recognition to become so automatic that the lipreader may concentrate on the thought of the message, supplying with the mind the parts which the eye is unable to see or recognize.

There is much which is not yet understood concerning lipreading ability. Research into the various factors involved in lipreading is a continuing necessity. One of the important areas for research concerns the stimuli utilized in the teaching of lipreading.

This study has been concerned with individual words as lipreading stimuli. It has been the purpose of this study to determine if the immediate repetition of a word will improve the visual intelligibility of that word.

A list of 45 frequently employed spoken words was randomized into 15 separate lists. Three speakers were filmed, each saying five of the word lists. For each speaker, list 1 contained one utterance of each word, list 2 contained two successive utterances of each word, and so on through five successive utterances of each word. The resultant 15 films were viewed by 15 groups of 10 subjects each. These viewer subjects were students enrolled in speech classes at Michigan State University. The score for each subject was the number of words recognized correctly from the list being viewed. While each list was viewed by a different group of subjects, some of the groups were exposed to three of the films, presented in varying orders. This allowed for study of a learning, or carry-over, effect resulting from several exposures to each word.

The results of this study indicate that repetition of the stimulus word does not result in significant improvement in visual intelligibility. While the effect of the repetitions varies among

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speakers, there may be a slight trend toward improvement in recognition of the stimuli as the number of successive utterances increases. There appears to be a point at which further utterances become confusing to the viewer; this point differs from one speaker to another. The results further indicate that significant learning or carry-over does not take place from one list to another, although there appears to be a slight trend toward better recognition of a single word when it has been preceded by several successive utterances.

Conclusions

1. The mean scores of groups of subjects viewing frequently employed spoken words (indicating ability to recognize the words) do not differ significantly regardless of the number of times the words are uttered successively.
2. The effect of successive utterances of words on visual intelligibility differs from one speaker to another.
3. Repeated unreinforced exposure to spoken words does not result in improved ability to recognize the words as they are presented singly.

Implications for Future Research

This study has examined only a very small segment of an area which should be explored more deeply. A list of frequently used words was selected for this study, and the visibility of sound movements and the frequency of occurrence of the sounds in the English language were not regulated. A word list should be devised which would include all of these factors, and this study repeated.

The effect of word repetitions viewed by trained subjects would be another interesting and profitable research project. In this study the subjects were not trained, and any learning which might result from

the successive utterances of the words was not reinforced. The picture might be vastly different if training procedures could be utilized, and the value of this type of study to teaching methods could be great.

A study of successive utterances of short sentences would also be valuable. This would allow for use of context in word recognition, and would evaluate yet another type of lipreading stimuli.

A method whereby a response could be made after every utterance of a word in a word group would be desirable. In this way the thought process of the subject as he viewed several successive utterances of a word could be studied. This would be particularly useful in determining whether or not erroneous responses are perseverated.

A study similar to the one described in this paper, utilizing a list of words varying in frequency of occurrence in the English language would shed considerable light on the effect of word frequency upon word recognition. This has been done for auditory discrimination and visual perception of written words, but does not appear to have been considered in terms of lipreading.

The results from studies such as these give to the area of lipreading valuable information relative to repetitions of stimuli and the effect upon stimulus intelligibility.

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APPENDICES

APPENDIX A

ORIGINAL LIST OF FORTY-FIVE WORDS

the	an
and	as
of	not
a	if
to	make
in	on
it	there
is	was
that	or
have	all
this	but
be	will
work	would
I	with
are	which
they	people
do	more
for	light
he	very
many	at
you	by
we	man
one	

APPENDIX B

RESPONSE FORMS

DIRECTIONS - List 1

You will be viewing on the screen a speaker saying 45 words. Each word will be said once. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	(Groups 1, 6, 11,
B5 _____	D5 _____	first presentation)
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--ContinuedDIRECTIONS - List 3

You will be viewing on the screen a speaker saying 45 words, each appearing 3 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 3 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 3 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	(Groups 1, 6, 11,
B5 _____	D5 _____	second presentation)
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

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ca
wi

Ne
A
A
A
A
A
A
A

APPENDIX B--Continued

DIRECTIONS - List 5

You will be viewing on the screen a speaker saying 45 words, each appearing 5 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 5 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 5 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 1, 6, 11,
B4 _____	D4 _____	third presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B-- Continued

DIRECTIONS - List 2

You will be viewing on the screen a speaker saying 45 words, each appearing 2 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 2 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen both presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 2, 7, 12)
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--Continued**DIRECTIONS - List 3**

You will be viewing on the screen a speaker saying 45 words, each appearing 3 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 3 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 3 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 3, 8, 13,
B4 _____	D4 _____	first presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--Continued

DIRECTIONS - List 5

You will be viewing on the screen a speaker saying 45 words, each appearing 5 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 5 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 5 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 3, 8, 13,
B4 _____	D4 _____	second presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--ContinuedDIRECTIONS - List 1

You will be viewing on the screen a speaker saying 45 words. Each word will be said once. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

(Groups 3, 8, 13,
third presentation)

APPENDIX B--Continued

DIRECTIONS - List 4

You will be viewing on the screen a speaker saying 45 words, each appearing 4 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 4 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 4 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 4, 9, 14)
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--Continued

DIRECTIONS - List 5

You will be viewing on the screen a speaker saying 45 words, each appearing 5 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 5 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 5 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 5, 10, 15,
B4 _____	D4 _____	first presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--ContinuedDIRECTIONS - List 1

You will be viewing on the screen a speaker saying 45 words. Each word will be said once. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 5, 10, 15
B4 _____	D4 _____	second presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX B--Continued

DIRECTIONS - List 3

You will be viewing on the screen a speaker saying 45 words, each appearing 3 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 3 times. Repeat any word as often as you think it appears throughout the list. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 3 presentations of the word.

Names: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	(Groups 5, 10, 15,
B4 _____	D4 _____	third presentation)
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX C

WORD LISTS FOR EACH SPEAKER

Speaker 1, List 1

Time required: 8.26 minutes

A1 make
A2 the
A3 there
A4 do
A5 be
A6 would
A7 people
A8 or
A9 are

B1 you
B2 in
B3 is
B4 for
B5 very
B6 if
B7 one
B8 at
B9 and

C1 we
C2 he
C3 with
C4 that
C5 will
C6 more
C7 as
C8 an
C9 by

D1 work
D2 light
D3 they
D4 was
D5 not
D6 which
D7 this
D8 all
D9 many

E1 to
E2 I
E3 man
E4 it
E5 have
E6 but
E7 of
E8 a
E9 on

APPENDIX C--Continued

Speaker 1, List 2

Time required: 9.30 minutes

- A1 you - you
A2 are - are
A3 was - was
A4 all - all
A5 many - many
A6 but - but
A7 of - of
A8 light - light
A9 they - they
- B1 at - at
B2 with - with
B3 an - an
B4 make - make
B5 it - it
B6 is - is
B7 man - man
B8 be - be
B9 that - that
- C1 people - people
C2 will - will
C3 this - this
C4 if - if
C5 and - and
C6 in - in
C7 one - one
C8 or - or
C9 we - we
- D1 have - have
D2 work - work
D3 I - I
D4 very - very
D5 for - for
D6 the - the
D7 to - to
D8 a - a
D9 by - by
- E1 not - not
E2 which - which
E3 do - do
E4 he - he
E5 there - there
E6 would - would
E7 more - more
E8 as - as
E9 on - on

APPENDIX C-- Continued

Speaker 1, List 3

Time required: 10.27 minutes

- A1 do - do - do
A2 with - with - with
A3 is - is - is
A4 will - will - will
A5 as - as - as
A6 to - to - to
A7 an - an - an
A8 was - was - was
A9 one - one - one
- B1 it - it - it
B2 of - of - of
B3 are - are - are
B4 work - work - work
B5 be - be - be
B6 I - I - I
B7 many - many - many
B8 for - for - for
B9 would - would - would
- C1 there - there - there
C2 make - make - make
C3 all - all - all
C4 in - in - in
C5 this - this - this
C6 you - you - you
C7 that - that - that
C8 a - a - a
C9 if - if - if
- D1 at - at - at
D2 very - very - very
D3 people - people - people
D4 they - they - they
D5 light - light - light
D6 but - but - but
D7 by - by - by
D8 which - which - which
D9 on - on - on
- E1 and - and - and
E2 we - we - we
E3 not - not - not
E4 he - he - he
E5 or - or - or
E6 more - more - more
E7 the - the - the
E8 have - have - have
E9 man - man - man

APPENDIX C--Continued

Speaker 1, List 4

- Time required: 11.63 minutes
- A1 an - an - an - an
 A2 more - more - more - more
 A3 I - I - I - I
 A4 make - make - make - make
 A5 with - with - with - with
 A6 a - a - a - a
 A7 will - will - will - will
 A8 as - as - as - as
 A9 the - the - the - the
- B1 by - by - by - by
 B2 it - it - it - it
 B3 and - and - and - and
 B4 many - many - many - many
 B5 on - on - on - on
 B6 one - one - one - one
 B7 if - if - if - if
 B8 would - would - would - would
 B9 but - but - but - but
- C1 you - you - you - you
 C2 light - light - light - light
 C3 man - man - man - man
 C4 or - or - or - or
 C5 which - which - which - which
 C6 he - he - he - he
 C7 people - people - people - people
 C8 that - that - that - that
 C9 all - all - all - all
- D1 this - this - this - this
 D2 we - we - we - we
 D3 be - be - be - be
 D4 of - of - of - of
 D5 in - in - in - in
 D6 for - for - for - for
 D7 is - is - is - is
 D8 do - do - do - do
 D9 very - very - very - very
- E1 was - was - was - was
 E2 are - are - are - are
 E3 to - to - to - to
 E4 work - work - work - work
 E5 not - not - not - not
 E6 they - they - they - they
 E7 at - at - at - at
 E8 there - there - there - there
 E9 have - have - have - have

APPENDIX C--Continued

Speaker 1, List 5

- A1 is - is - is - is - is Time required: 12.27 minutes
 A2 work - work - work - work - work
 A3 many - many - many - many - many
 A4 light - light - light - light - light
 A5 by - by - by - by - by
 A6 as - as - as - as - as
 A7 in - in - in - in - in
 A8 for - for - for - for - for
 A9 the - the - the - the - the
- B1 that - that - that - that - that
 B2 very - very - very - very - very
 B3 are - are - are - are - are
 B4 make - make - make - make - make
 B5 do - do - do - do - do
 B6 an - an - an - an - an
 B7 with - with - with - with - with
 B8 have - have - have - have - have
 B9 will - will - will - will - will
- C1 on - on - on - on - on
 C2 man - man - man - man - man
 C3 you - you - you - you - you
 C4 or - or - or - or - or
 C5 he - he - he - he - he
 C6 a - a - a - a - a
 C7 I - I - I - I - I
 C8 people - people - people - people - people
 C9 there - there - there - there - there
- D1 it - it - it - it - it
 D2 more - more - more - more - more
 D3 if - if - if - if - if
 D4 one - one - one - one - one
 D5 but - but - but - but - but
 D6 would - would - would - would - would
 D7 which - which - which - which - which
 D8 to - to - to - to - to
 D9 not - not - not - not - not
- E1 be - be - be - be - be
 E2 this - this - this - this - this
 E3 we - we - we - we - we
 E4 at - at - at - at - at
 E5 of - of - of - of - of
 E6 was - was - was - was - was
 E7 and - and - and - and - and
 E8 they - they - they - they - they
 E9 all - all - all - all - all

APPENDIX C--Continued

Speaker 2, List 1

Time required: 7.76 minutes

A1 the
A2 it
A3 one
A4 be
A5 work
A6 have
A7 they
A8 in

B1 would
B2 for
B3 is
B4 but
B5 or
B6 an
B7 on
B8 all
B9 many

C1 do
C2 a
C3 he
C4 light
C5 of
C6 if
C7 which
C8 we
C9 to

D1 this
D2 make
D3 I
D4 with
D5 by
D6 more
D7 there
D8 you
D9 that

E1 as
E2 was
E3 very
E4 at
E5 will
E6 people
E7 are
E8 and
E9 not

APPENDIX C--Continued

Speaker 2, List 2

Time required: 9.04 minutes

- A1 of - of
A2 with - with
A3 one - one
A4 on - on
A5 for - for
A6 he - he
A7 is - is
A8 man - man
A9 do - do
- B1 very - very
B2 many - many
B3 be - be
B4 was - was
B5 an - an
B6 would - would
B7 or - or
B8 you - you
B9 the - the
- C1 but - but
C2 are - are
C3 if - if
C4 this - this
C5 which - which
C6 more - more
C7 it - it
C8 I - I
C9 will - will
- D1 that - that
D2 to - to
D3 work - work
D4 not - not
D5 in - in
D6 make - make
D7 people - people
D8 as - as
D9 they - they
- E1 we - we
E2 light - light
E3 at - at
E4 all - all
E5 there - there
E6 and - and
E7 a - a
E8 have - have
E9 by - by

APPENDIX C--Continued

Speaker 2, List 3

Time required: 10.19 minutes

A1 very - very - very
A2 as - as - as
A3 work - work - work
A4 they - they - they
A5 people - people - people
A6 to - to - to
A7 more - more - more
A8 with - with - with
A9 light - light - light

B1 there - there - there
B2 many - many - many
B3 would - would - would
B4 you - you - you
B5 and - and - and
B6 that - that - that
B7 an - an - an
B8 the - the - the
B9 which - which - which

C1 he - he - he
C2 at - at - at
C3 not - not - not
C4 it - it - it
C5 is - is - is
C6 will - will - will
C7 in - in - in
C8 have - have - have
C9 if - if - if

D1 or - or - or
D2 all - all - all
D3 make - make - make
D4 a - a - a
D5 but - but - but
D6 are - are - are
D7 was - was - was
D8 man - man - man
D9 one - one - one

E1 do - do - do
E2 of - of - of
E3 we - we - we
E4 this - this - this
E5 I - I - I
E6 for - for - for
E7 on - on - on
E8 by - by - by
E9 be - be - be

APPENDIX C--Continued

Speaker 2, List 4

- Time required: 11.07 minutes
- A1 the - the - the - the
 A2 one - one - one - one
 A3 this - this - this - this
 A4 we - we - we - we
 A5 man - man - man - man
 A6 be - be - be - be
 A7 light - light - light - light
 A8 and - and - and - and
 A9 of - of - of - of
- B1 it - it - it - it
 B2 you - you - you - you
 B3 as - as - as - as
 B4 a - a - a - a
 B5 in - in - in - in
 B6 all - all - all - all
 B7 on - on - on - on
 B8 with - with - with - with
 B9 for - for - for - for
- C1 he - he - he - he
 C2 is - is - is - is
 C3 do - do - do - do
 C4 very - very - very - very
 C5 many - many - many - many
 C6 was - was - was - was
 C7 an - an - an - an
 C8 would - would - would - would
 C9 or - or - or - or
- D1 but - but - but - but
 D2 are - are - are - are
 D3 more - more - more - more
 D4 if - if - if - if
 D5 which - which - which - which
 D6 I - I - I - I
 D7 will - will - will - will
 D8 that - that - that - that
 D9 to - to - to - to
- E1 not - not - not - not
 E2 make - make - make - make
 E3 people - people - people - people
 E4 they - they - they - they
 E5 at - at - at - at
 E6 work - work - work - work
 E7 there - there - there - there
 E8 have - have - have - have
 E9 by - by - by - by

APPENDIX C--Continued

Speaker 2, List 5

- Time required: 12.24 minutes
- A1 a - a - a - a - a
 A2 if - if - if - if - if
 A3 or - or - or - or - or
 A4 there - there - there - there - there
 A5 do - do - do - do - do
 A6 in - in - in - in - in
 A7 very - very - very - very - very
 A8 is - is - is - is - is
 A9 I - I - I - I - I
- B1 one - one - one - one - one
 B2 that - that - that - that - that
 B3 but - but - but - but - but
 B4 they - they - they - they - they
 B5 have - have - have - have - have
 B6 you - you - you - you - you
 B7 he - he - he - he - he
 B8 as - as - as - as - as
 B9 the - the - the - the - the
- C1 work - work - work - work - work
 C2 which - which - which - which - which
 C3 will - will - will - will - will
 C4 be - be - be - be - be
 C5 this - this - this - this - this
 C6 people - people - people - people - people
 C7 man - man - man - man - man
 C8 it - it - it - it - it
 C9 would - would - would - would - would
- D1 many - many - many - many - many
 D2 make - make - make - make - make
 D3 are - are - are - are - are
 D4 we - we - we - we - we
 D5 by - by - by - by - by
 D6 of - of - of - of - of
 D7 was - was - was - was - was
 D8 an - an - an - an - an
 D9 all - all - all - all - all
- E1 more - more - more - more - more
 E2 to - to - to - to - to
 E3 and - and - and - and - and
 E4 not - not - not - not - not
 E5 on - on - on - on - on
 E6 for - for - for - for - for
 E7 light - light - light - light - light
 E8 with - with - with - with - with
 E9 at - at - at - at - at

APPENDIX C--Continued

Speaker 3, List 1

Time required: 7.45 minutes

A1 do
A2 make
A3 if
A4 man
A5 to
A6 this
A7 at
A8 is
A9 not

B1 by
B2 we
B3 with
B4 and
B5 it
B6 one
B7 which
B8 was
B9 there

C1 have
C2 will
C3 a
C4 I
C5 all
C6 are
C7 he
C8 you
C9 work

D1 as
D2 of
D3 the
D4 but
D5 people
D6 for
D7 very
D8 that
D9 would

E1 light
E2 more
E3 they
E4 be
E5 or
E6 many
E7 in
E8 an
E9 on

APPENDIX C--Continued

Speaker 3, List 2

A1 light - light

Time required: 8.49 minutes

A2 but - but

A3 it - it

A4 at - at

A5 they - they

A6 one - one

A7 have - have

A8 an - an

A9 or - or

B1 to - to

B2 very - very

B3 which - which

B4 would - would

B5 in - in

B6 man - man

B7 people - people

B8 all - all

B9 there - there

C1 make - make

C2 more - more

C3 do - do

C4 for - for

C5 as - as

C6 are - are

C7 if - if

C8 by - by

C9 is - is

D1 you - you

D2 was - was

D3 many - many

D4 of - of

D5 with - with

D6 and - and

D7 be - be

D8 this - this

D9 will - will

E1 that - that

E2 we - we

E3 work - work

E4 I - I

E5 the - the

E6 a - a

E7 not - not

E8 he - he

E9 on - on

A2
A2
A2
A4
A
A
A
A
E
E
E
E
E
E
E
E

APPENDIX C--Continued

Speaker 3, List 3

A1 this - this - this
 A2 as - as - as
 A3 and - and - and
 A4 a - a - a
 A5 of - of - of
 A6 in - in - in
 A7 all - all - all
 A8 you - you - you
 A9 on - on - on

 B1 with - with - with
 B2 one - one - one
 B3 an - an - an
 B4 more - more - more
 B5 are - are - are
 B6 but - but - but
 B7 the - the - the
 B8 he - he - he
 B9 or - or - or

 C1 would - would - would
 C2 was - was - was
 C3 be - be - be
 C4 many - many - many
 C5 very - very - very
 C6 do - do - do
 C7 man - man - man
 C8 is - is - is
 C9 for - for - for

 D1 if - if - if
 D2 which - which - which
 D3 it - it - it
 D4 I - I - I
 D5 will - will - will
 D6 that - that - that
 D7 to - to - to
 D8 people - people - people
 D9 make - make - make

 E1 not - not - not
 E2 work - work - work
 E3 they - they - they
 E4 we - we - we
 E5 light - light - light
 E6 at - at - at
 E7 there - there - there
 E8 by - by - by
 E9 have - have - have

Time required: 10.66 minutes

APPENDIX C--Continued

Speaker 3, List 4

A1 but - but - but - but Time required: 12.08 minutes
 A2 on - on - on - on
 A3 which - which - which - which
 A4 would - would - would - would
 A5 light - light - light - light
 A6 there - there - there - there
 A7 as - as - as - as
 A8 that - that - that - that
 A9 man - man - man - man

 B1 one - one - one - one
 B2 do - do - do - do
 B3 have - have - have - have
 B4 in - in - in - in
 B5 will - will - will - will
 B6 you - you - you - you
 B7 with - with - with - with
 B8 or - or - or - or
 B9 he - he - he - he

 C1 a - a - a - a
 C2 I - I - I - I
 C3 the - the - the - the
 C4 people - people - people - people
 C5 many - many - many - many
 C6 for - for - for - for
 C7 it - it - it - it
 C8 more - more - more - more
 C9 if - if - if - if

 D1 is - is - is - is
 D2 an - an - an - an
 D3 make - make - make - make
 D4 are - are - are - are
 D5 very - very - very - very
 D6 all - all - all - all
 D7 not - not - not - not
 D8 to - to - to - to
 D9 they - they - they - they

 E1 this - this - this - this
 E2 work - work - work - work
 E3 by - by - by - by
 E4 we - we - we - we
 E5 at - at - at - at
 E6 was - was - was - was
 E7 of - of - of - of
 E8 be - be - be - be
 E9 and - and - and - and

APPENDIX C--Continued

Speaker 3, List 5

A1 he - he - he - he - he Time required: 13.05 minutes
 A2 man - man - man - man - man
 A3 at - at - at - at - at
 A4 it - it - it - it - it
 A5 if - if - if - if - if
 A6 as - as - as - as - as
 A7 for - for - for - for - for
 A8 make - make - make - make - make
 A9 very - very - very - very - very

 B1 but - but - but - but - but
 B2 was - was - was - was - was
 B3 of - of - of - of - of
 B4 an - an - an - an - an
 B5 on - on - on - on - on
 B6 would - would - would - would - would
 B7 the - the - the - the - the
 B8 by - by - by - by - by
 B9 have - have - have - have - have

 C1 one - one - one - one - one
 C2 I - I - I - I - I
 C3 you - you - you - you - you
 C4 that - that - that - that - that
 C5 we - we - we - we - we
 C6 all - all - all - all - all
 C7 they - they - they - they - they
 C8 light - light - light - light - light
 C9 or - or - or - or - or

 D1 there - there - there - there - there
 D2 more - more - more - more - more
 D3 with - with - with - with - with
 D4 many - many - many - many - many
 D5 do - do - do - do - do
 D6 a - a - a - a - a
 D7 work - work - work - work - work
 D8 people - people - people - people - people
 D9 which - which - which - which - which

 E1 to - to - to - to - to
 E2 this - this - this - this - this
 E3 not - not - not - not - not
 E4 are - are - are - are - are
 E5 is - is - is - is - is
 E6 and - and - and - and - and
 E7 will - will - will - will - will
 E8 in - in - in - in - in
 E9 be - be - be - be - be

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APPENDIX D

QUESTIONNAIRE FOR OBTAINING SUBJECTS

I am in need of approximately 150 subjects to take part in a research experiment. The experiment deals with lipreading and takes about 40 minutes to complete.

Your participation in this experiment will be greatly appreciated. Please complete this form and return it to me at the end of this class period. You will be notified within the next few days concerning the time and place of the experiment.

Thank you very much for your cooperation.

Karen Nielsen

Name: _____
 Status: Freshman _____ Junior _____ MA _____
 Sophomore _____ Senior _____ Ph.D. _____

Have you had any formal training in lipreading? Yes _____ No _____

If yes, describe: _____

Time preferred for the experiment: (Please make 3 choices in order of preference. Indicate by using number 1 for the first choice, number 2 for the second choice, and number 3 for the third choice).

Week of June 29 to July 3:

9:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
10:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
11:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
12:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
1:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
2:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
3:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
4:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
7:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
8:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____

Week of July 6 to July 10:

9:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
10:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
11:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
12:00 AM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
1:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
2:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
3:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
4:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____
7:00 PM	Mon. _____	Tues. _____	Wed. _____	Thurs. _____	Fri. _____

Check here if you are unable to participate. _____

APPENDIX E

APPOINTMENT FORM

To: _____

From: Karen Nielsen

Thank you so much for your offer to participate in my research experiment. I have scheduled you for (day, date) at (time) in room 235 Auditorium.

If for any reason this time is inconvenient for you, please contact me at one of the following places: my office, room 235 Auditorium, phone 3556690; my home, ED2-5206; or through my mailbox in the main speech office. I will be glad to make other arrangements with you.

APPENDIX F
SPECIFICATIONS AND DIAGRAM OF ROOM ARRANGEMENT
FOR TESTING OF SUBJECTS

Specifications

Distance from:

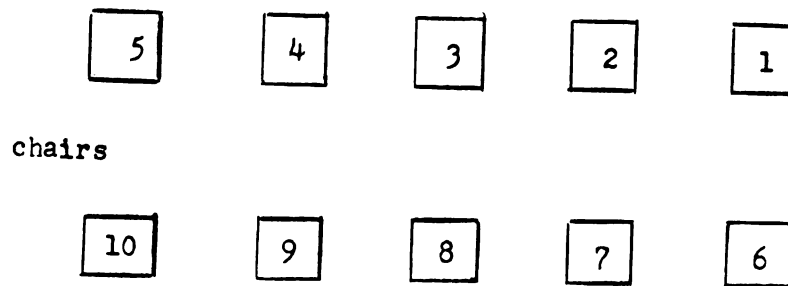
Projector to screen - - - - - 16 feet
 Screen to chair 1 - - - - - 10 feet
 Screen to chair 2 - - - - - 9 feet 10 inches
 Screen to chair 3 - - - - - 9 feet 8 inches
 Screen to chair 4 - - - - - 10 feet
 Screen to chair 5 - - - - - 10 feet 9 inches
 Screen to chair 6 - - - - - 12 feet 11 inches
 Screen to chair 7 - - - - - 12 feet 9 inches
 Screen to chair 8 - - - - - 12 feet 10 inches
 Screen to chair 9 - - - - - 12 feet 11 inches
 Screen to chair 10 - - - - - 13 feet 6 inches
 Screen to lamp - - - - - 9 feet
 Lamp to chair 1 - - - - - 4 feet 9 inches

 Distance between chairs - - - - - 2 feet 3 inches
 Distance between rows - - - - - 3 feet

 Picture size on screen - - - - - 21 inches x 30 inches.

APPENDIX F--ContinuedDiagramscreen

lamp ○



projector

APPENDIX G

SUBJECT RESPONSES

Speaker 1 - List 1

Group 1

Correct

Word	Al	Bl	Cl	Dl	El	Fl	Gl	Hl	Il	Jl
the	the	them	they	mother	the	the	them	the	there	the
and	--	--	--	heavy	how	--	at	a	an	I
of	often	of	have	offer	off	often	often	--	often	off
a	I	am	how	high	how	--	--	a	in	on
to	to	to	to	thanku	school	so	--	you	to	soon
in	he	in	--	here	a	he	--	he	in	--
it	yes	in	by	--	--	is	an	is	it	hate
is	eight	is	at	his	ate	is	where	and	is	--
that	that	that	then	that	that	the	that	that	that	that
have	have	if	have	have	of	--	it	ever	--	have
this	this	these	this	this	this	this	this	this	this	this
be	be	me	be	please	--	be	to	--	be	be
work	would	work	work	work	work	will	what	with	were	were
I	I	--	--	--	of	I	a	a	an	I
are	I	--	--	all	--	--	--	and	I	--
they	they	they	there	the	there	the	over	they	there	that
do	look	--	who	--	to	--	--	to	to	good
for	four	for	for	--	--	--	--	for	for	for
he	eight	in	a	here	ate	in	an	he	in	he
many	mine	me	be	bring	pain	be	but	be	boy	be
you	you	me	work	thanku	to	--	--	to	you	look
we	read	we	where	read	read	he	what	we	way	we
one	write	one	when	--	what	will	what	what	one	one
an	a	an	--	high	and	--	the	on	on	I
as	ice	at	--	ask	ate	--	on	and	at	ice
not	not	--	--	talk	talk	--	the	the	with	--

APPENDIX G---Continued

Speaker 1 - List 1

Group 1

Correct Word	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
if	if	--	--	very	fish	in	many	if	if	if
make	bait	make	--	by	they	be	but	be	one	be
on	--	--	other	other	off	--	--	--	again	on
there	the	--	the	there	the	their	--	the	they	those
was	write	--	why	with	when	--	when	when	what	wait
or	--	--	when	hurry	--	--	oh	--	or	going
all	holy	all	all	--	all	--	--	or	only	all
but	but	but	but	pouch	brush	but	but	but	boat	but
will	where	we	where	red	when	when	to	when	when	we
would	read	--	when	--	--	--	many	we	way	we
with	with	with	with	weather	with	with	when	with	with	with
which	which	which	which	which	grade	which	very	which	what	wait
people	--	people	--	people	--	will	people	people	anywhere	--
more	boy	--	boy	more	boy	--	boy	--	boy	boy
light	like	light	late	last	class	and	ask	that	let	like
very	very	--	--	farther	violin	--	lovely	--	--	free
at	ice	make	hat	house	hot	--	a	an	and	I
by	buy	--	may	pie	bag	be	--	make	by	--
man	man	make	make	palace	been	--	--	make	bed	pay

APPENDIX G--Continued

Speaker 1 - List 3

Group 1

Correct Word	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the yes of high you hit it his that have this be one I -- they so four he meet you we once eyes eyes lost if paint	they of off on you in in it that have this me work I all they to full he many you we one at at talk if make	them I of I to his him at then if this be when I all them to for him be you we when hat light got if by	there ham offer hard you hill help his that have this press week -- help they ajou for hair Billy you where were ask ask choice leave pay	them ate often hem to here and hate that half then be which am of them do for him pay whom read gripe hot I often if make	the -- -- -- -- him is his that have this be would I come them to -- -- -- you will one a a -- if be	them an people up to at by at that after that a -- an if them -- for an -- -- when what at ask talk live --	the and of at to -- is is that ever this be with a all them -- for -- the you we -- and at -- if make	there and often an -- in it is that if this by way a toy thing to for in be you where way at as walk if big	them hand off on -- he -- -- that have this -- we on on -- fool he -- you we when high ice toss leaf pay

APPENDIX G--Continued

Speaker 1 - List 3

Group 1

Correct Word	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
on	ought	--	a	hour	caught	--	hot	us	hard	all
there	they	then	the	thought	them	them	there	the	there	there
was	once	one	when	want	bright	was	what	what	when	--
or	hood	--	or	hoarse	when	--	oh	who	buy	or
all	call	all	all	ball	all	--	over	a	or	all
but	bus	but	but	parts	--	--	--	much	bite	--
will	wait	will	when	were	when	will	when	when	where	we
would	would	work	work	work	when	will	jump	--	word	where
with	with	with	with	with	with	with	what	with	with	with
which	rich	which	which	which	which	which	was	which	which	which
people	pupil	people	maybe	people	people	--	people	people	anywhere	people
more	boy	book	book	poor	book	boy	boy	but	boy	book
light	lice	light	let	thanks	let	let	like	this	light	light
very	Phillip	--	--	very	flower	--	--	--	--	very
at	eyes	at	at	ask	hot	--	--	at	at	hot
by	mice	--	by	palace	pray	be	--	--	pay	part
man	bait	make	bat	pair	bake	--	--	make	bet	paint

APPENDIX G--Continued

Speaker 1 - List 5

Group 1

Correct Word	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
the	the	them	them	there	them	them	them	them	there	them
and	ice	had	at	eyes	ax	will	--	that	at	hot
of	of	off	of	often	of	--	over	off	--	off
a	hi	I	a	arm	arm	are	a	a	are	--
to	chore	to	do	thankyou	told	--	--	to	your	shown
in	eight	in	at	his	it	in	--	he	it	is
it	it	it	it	his	let	--	--	them	him	his
is	is	make	be	paste	is	is	ask	--	this	please
that	that	them	them	that	that	them	at	that	that	that
have	have	have	of	have	half	--	--	--	have	half
this	this	this	this	this	this	this	this	this	this	this
be	be	me	be	pair	please	be	--	be	be	be
work	will	work	when	hurry	read	will	what	when	where	we
I	high	I	at	ham	ham	I	--	time	an	I'm
are	--	had	him	help	are	are	on	an	I	harm
they	think	they	them	them	them	them	there	the	they	them
do	to	you	you	you	to	--	to	to	you	--
for	for	for	for	for	for	--	--	for	for	for
he	it	he	by	heat	am	--	boy	him	any	be
many	be	me	be	pear	been	him	when	be	be	be
you	you	new	you	true	go	--	to	to	you	do
we	wait	we	when	where	when	will	where	when	will	we
one	right	one	when	what	bright	what	what	which	when	went
an	hat	had	I	help	and	time	--	can	at	high
as	eyes	at	I	eyes	at	are	at	--	at	ice
not	just	talk	I	thought	talk	talk	talk	the	right	cough
if	even	if	got	leave	if	if	--	if	if	live
make	mine	--	be	pay	play	be	it	be	been	be

APPENDIX G--Continued

Speaker 1 - List 5

Group 1

Correct Word	LA	LB	LC	LD	LE	LF	LG	LH	LI	LJ
on	hard	ought	us	hoarse	ought	is	--	us	lay	ought
there	they	there	there	there	them	their	them	the	there	there
was	wait	what	wait	which	when	when	to	with	when	wait
or	or	all	at	all-over	--	calm	on	what	boy	or
all	all	all	all	--	all	on	--	all	all	all
but	mine	man	but	parts	--	--	let	--	bite	--
will	read	will	way	free	read	will	what	we	when	we
would	with	work	would	work	--	--	over	when	boy	win
with	with	with	with	with	with	with	with	with	with	with
which	question	which	which	which	which	which	which	which	which	waste
people	paper	people	baby	people	people	people	people	people	pepper	people
more	morning	--	boy	--	birthday	--	many	and	pretty	book
light	light	light	let	last	light	let	like	like	that	light
very	very	very	very	very	flower	film	people	--	very	--
at	eyes	had	at	eyes	at	--	a	a	and	on
by	mine	--	by	palate	play	be	have	make	by	pay
man	paint	bad	but	past	make	--	but	--	bet	pay

APPENDIX G--Continued

Speaker 1 - List 2

Group 2

Correct Word	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the on of are to I it his that have this many work I all think to for in many to we what I hat talk if man	the at off I to eat hit hit that half this please word am hill the do full him pully to we run hot hat dog if pay	father lack have -- -- hand hand high that have the bring one had have think to of -- bring to why one I -- -- far big	the and off am to in is and that half this be will an on they to forty in be you when what and as people if be	the ate off how so -- are -- that half this be were high on they soon for he pen you we white I -- -- if pay	them at of am to it it -- that -- this be will -- -- the to -- be -- we one ate as toss if --	them as off a you is he -- they if this be with as I them you for a be you we when an as just if be	them at off on go an it -- that off this -- will on a they to for I -- room will wait at as -- if --	the at of of -- in or in the -- this be work at and the you -- in -- do we one an and -- if be	the us off -- no and and -- the if this be when him are the you -- him me you we with -- -- -- if by

APPENDIX G--Continued

Speaker 1 - List 2

Group 2

Correct Word	2A	2B	2C	2D	2E	2F	2G	2H	2I	2J
on	on	all	dog	on	ought	hot	all	on	on	all
there	there	there	father	there	there	there	they	there	there	the
was	what	one	one	one	was	run	when	want	want	writing
or	or	hole	one	--	oil	oil	or	or	or	--
all	all	all	long	on	--	all	or	all	all	hello
but	man	but	bring	but	--	but	but	by	--	--
will	one	will	one	when	will	will	with	when	want	we
would	will	we	away	what	we	would	when	when	we	--
with	with	with	with	with	with	with	with	where	with	with
which	which	razor	--	what	rush	which	with	wish	which	when
people	people	people	--	people	people	people	people	people	--	--
more	whole	pull	bother	more	boy	poodle	boy	boy	--	--
light	let	light	light	light	light	let	them	let	let	let
very	very	very	fifth	very	--	very	--	--	--	if
at	I	hot	light	as	a	at	at	at	at	--
by	--	--	black	be	buy	--	--	man	may	--
man	might	but	bat	might	buy	but	but	by	--	by

APPENDIX G--Continued

Speaker 1 - List 3

Group 3

Correct Word	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the has of I do it it is that have this be with I all thick to for he be do we one and as cause if be	the hay of hi to hay him -- that have this -- would hi -- they to fun he pin you we when had -- tot if pin	the had of are to in it is that have this be work I all them to for he many you ring was has I cause if man	they as off on to as at is then have this be when I on them to for he me you we when as as cost if may	the I often I to he ate as that off this be work I -- them town forty he be you we what eyes I cough if bait	the hand off a you him him -- that have this be work I all they do full him -- you we one and I'm -- -- man	they at often on to an is and then have this been when on all them do few him be you we what and and on if been	them -- of am -- -- -- as then as this -- when -- -- them people from am -- whom -- -- all -- -- if --	they I often I you a any is that of this -- -- all all they so for he -- you we -- I I talk if --	the at often are -- ask light as then if this people one -- -- them little for -- be you we way as light taught if many

APPENDIX G---Continued

Speaker 1 - List 3

Correct Word		Group 3																
on	3A	hard	3B	hot	3C	our	3D	are	3E	on	3F	on	3G	off	3H	all	3I	3J
there		thin		they		then		there		the		then		them		all		come
was		was		was		was		was		run		was		when		went		there
or		hole		who		or		or		whom		all		----		whole		one
all		all		ball		all		--		all		all		----		all		old
but		bus		pot		must		--		part		but		by		push		for
will		we		when		will		--		will		when		with		went		----
would		work		would		would		will		work		what		----		was		one
with		with		with		with		with		with		with		----		with		work
which		which		which		which		with		which		which		----		wash		wreath
people		people		people		people		people		people		people		----		--		right
more		boy		pool		poor		purple		book		put		----		--		people
light		late		let		light		like		light		like		----		--		boy
very		very		lets		lets		like		light		like		----		--		let
at		fingering		follow		follow		following		hat		few		----		--		firstly
by		hot		as		as		kite		hat		at		----		--		am
man		pray		my		my		pie		--		--		----		--		by
		man		pay		pay		pie		pain		been		----		--		be

APPENDIX G--Continued

Speaker 1 - List 5

Group 3

Correct Word	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J
the	the	the	the	them	the	the	the	the	then	them
and	has	hot	at	as	at	hat	as	as	us	ask
of	off	of	off	off	off	of	off	off	often	often
a	are	a	on	on	I	I'm	I'm	I'm	a	are
to	told	told	to	so	to	you'll	you	--	so	so
in	him	him	him	him	him	him	his	am	is	am
it	hit	him	it	is	him	him	his	the	is	is
is	is	--	is	is	please	it	is	at	is	be
that	that	the	that	thanks	that	them	that	then	that	them
have	have	have	have	have	if	have	have	have	of	often
this	this	this	this	this	this	this	this	this	this	this
be	peg	peg	be	be	me	breem	be	--	pen	be
work	--	--	would	when	we	work	which	them	will	way
I	I	I	I	I	my	ham	a	as	are	am
are	are	are	on	on	all	on	my	all	all	calm
they	they	they	them	them	them	them	them	that	the	them
do	to	to	do	you	to	you	too	to	you	you
for	four	four	for	for	for	for	for	for	for	first
he	be	be	he	he	me	him	him	am	--	am
many	pin	pin	man	me	peg	been	be	am	pick	be
you	--	--	do	too	to	you	you	home	you	your
we	we	we	we	when	will	we	when	when	we	we
one	what	what	when	one	what	rum	what	one	what	way
an	hi	hi	I	as	am	ham	and	at	our	light
as	has	has	has	class	as	and	as	ask	house	ask
not	tot	tot	cause	sought	talk	--	got	at	thought	talk
if	if	if	if	if	if	if	if	if	if	if
make	pin	pin	man	me	be	--	be	by	--	right

APPENDIX G--Continued

Speaker 1 - List 5

Group 3

Correct Word	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J
on	hard	--	on	on	off	all	ours	am	us	all
there	think	the	there	they	them	them	there	them	then	there
was	week	was	was	--	with	--	was	was	was	wait
or	hold	call	on	boy	or	--	all	--	all	all
all	all	ball	all	all	all	all	all	off	all	all
but	but	--	must	pun	but	--	put	--	push	by
will	we	win	will	we	with	we	will	with	will	we
would	we	would	will	we	when	were	we	when	one	read
with	with	with	with	with	with	with	with	with	with	with
which	which	which	wish	which	witch	which	which	it	wash	which
people	people	people	people	prepare	people	people	people	people	purple	people
more	book	pony	put	boy	poke	--	many	--	poor	boy
light	light	light	light	his	like	light	less	--	last	at
very	very	--	fingering	fifty	--	filigrim	very	from	very	fever
at	ask	hot	at	has	at	at	as	I'm	us	light
by	be	pain	by	place	pile	--	price	--	--	by
man	but	pass	man	pays	bat	pen	bat	by	pass	by

APPENDIX G--Continued

Speaker 1 - List 1

Group 3

Correct Word	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the act awful air to he hit is that have this be work had all thin to for he big to we want he ask talk if as	the had of a to -- is his that have this be -- a all the to -- a be -- we what hay had tot if pet	the had off are to in his is that have this be work I all then to for in penny do an one and at talk if man	them and of on so he his is that have this me when am ale they so for he may close we one an as taught if may	the at off I you he is is that if this be will I island there to forty he pea you we what at at talk if may	the -- often ham cool -- it it that if this be work I'm -- them cod fooling him -- you we one ham hot dog if be	then at often on you his is his that have this be what at I'll there you very in put do when what an as lots if been	then at of and to ask as am then have with at went with all -- to for at but through when when have ask -- if at	they all over a also it is is is this of this -- were a all they you fool he pay you we was are as toss if pass	them at often are your is is is that if them be work am all them you if am be your we one am ask taught if be

APPENDIX G--Continued

Speaker 1 - List 1

Group 3

Correct Word	3A	3B	3C	3D	3E	3F	3G	3H	3I	3J
on	ought	--	all	--	are	--	always	on	others	all
there	the	they	there	their	there	there	there	all	there	there
was	was	what	one	was	white	white	was	was	was	way
or	bold	--	who	own	hole	hole	how	home	all	always
all	all	hall	all	all	all	all	always	all	all	all
but	bust	pot	but	must	only	put	bus	at	push	boy
will	we	we	will	when	puss	we	we	with	way	way
would	we	we	will	we	will	we	we	--	when	we
with	with	with	with	with	with	with	with	with	with	with
which	which	which	which	which	which	which	which	went	wash	right
people	people	people	people	--	people	people	people	after	purple	upper
more	boy	boy	pull	boy	poor	pool	boy	but	pull	boy
light	late	light	light	lets	like	light	lets	--	let	let
very	very	--	very	fifty	fellow	fairy	very	off	very	over
at	ask	has	at	as	at	hat	as	have	us	as
by	big	pie	man	may	pie	--	and	my	--	be
man	bad	pie	man	may	pay	pack	been	my	pack	be

APPENDIX G--Continued

Speaker 1 - List 4

Group 4

Correct	Word	4 A	4 B	4 C	4 D	4 E	4 F	4 G	4 H	4 I	4 J
the	the	the	the	the	--	the	the	then	the	them	that
and	high	not	of	has	as	has	hide	an	--	--	--
of	hum	of	of	of	of	off	off	of	--	huff	--
a	--	I'm	--	I'm	a	are	I'm	--	--	harm	--
to	to	do	to	do	to	to	to	you	to	boat	--
in	him	--	it	--	--	it	in	yes	--	hill	--
it	it	his	it	his	his	as	it	in	is	he	--
is	his	his	his	his	that	it	it	it	it	hisp	--
that	that	thus	that	thus	that	that	that	that	that	that	that
have	have	if	if	if	if	off	if	if	half	have	have
this	this	this	this	this	this	this	this	that	this	this	--
be	me	me	me	me	be	be	me	peep	be	me	--
work	work	work	will	work	where	work	work	would	work	where	--
I	I	time	I	I	I	I	I	I	and	high	--
are	high	--	--	--	I	I	I'm	on	--	lip	by
they	thee	then	think	then	I	thing	they	the	then	them	--
do	to	to	to	to	to	to	to	you	do	through	--
for	fool	for	for	for	for	food	food	for	for	form	--
he	him	him	him	him	a	he	he	him	him	him	--
many	money	pen	man	man	be	--	--	make	--	tree	--
you	you	you	you	you	to	you	you	you	you	you	--
we	we	we	will	we	win	we	we	we	we	where	we
one	one	what	one	what	what	what	what	one	white	when	when
an	and	am	an	had	had	and	and	an	bad	hand	bad
as	light	as	has	as	as	hide	hide	and	--	height	--
not	taught	toss	tonight	tonight	--	taught	taught	now	--	caught	--
if	if	if	if	if	if	if	if	if	if	belief	have
make	mine	--	my	--	pay	--	--	made	--	be	--

APPENDIX G--Continued

Speaker 1 - List 4

Group 4

Correct Word	4A	4B	4C	4D	4E	4F	4G	4H	4I	4J
on	hot	all	all	on	--	on	all	on	horn	--
there	there	them	them	them	there	their	them	them	there	--
was	wise	was	what	was	what	what	when	what	wise	when
or	--	all	whole	look	old	--	oy	--	boil	--
all	hot	all	all	all	all	all	all	--	bought	boy
but	money	but	--	--	but	but	put	but	spite	--
will	we	will	with	win	win	--	will	which	when	--
would	we	would	would	wood	it	would	would	--	--	--
with	with	with	with	with	with	with	with	--	weather	whether
which	which	which	which	which	which	which	which	which	which	wedge
people	people	people	people	people	paper	people	people	--	paper	people
more	boy	putout	people	put	boy	boy	boy	--	boy	--
light	let	light	light	light	last	let	light	light	light	--
very	very	fickery	very	very	find	very	very	very	very	--
at	hot	at	had	as	at	at	I	that	hand	bad
by	be	be	--	by	--	by	man	--	be	--
man	wine	man	pen	my	--	bid	me	--	blend	bat

APPENDIX G--Continued

Speaker 1 - List 5

Group 5

Correct Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
the	them	the	thumb	them	the	they	them	the	them	the
and	it	hand	--	as	ice	an	--	boy	as	hat
of	off	of	--	off	off	--	off	off	off	coffee
a	arm	--	a	I	ham	--	him	brown	are	hope
to	soon	toe	to	you	to	--	to	show	so	joy
in	--	it	him	him	be	--	--	me	eight	look
it	is	him	it	is	east	an	--	man	eight	saw
is	is	hiss	it	--	--	it	--	man	a	the
that	than	the	that	them	--	man	be	man	them	that
have	have	have	half	have	that	them	them	that	half	haven't
this	this	this	this	this	this	--	have	have	that	this
be	--	be	--	be	be	the	--	the	be	many
work	when	word	work	would	will	me	be	--	when	would
I	I'm	am	I	am	I'm	--	we	boy	I	him
are	--	arm	--	all	I	in	--	hat	I	lamb
they	them	they	them	them	I	I	have	he	all	them
do	to	to	to	you	you	they	them	they	them	you
for	--	for	form	for	for	you	then	you	two	--
he	in	him	him	is	bay	--	him	he	four	man
many	--	be	--	by	be	and	be	--	eat	be
you	to	whom	you	you	you	you	could	--	be	him
we	where	we	win	when	we	--	when	you	two	women
one	one	one	what	what	was	when	one	why	we	wonder
an	hot	hand	high	a	I	I	have	what	one	man
as	is	has	bright	ask	I	how	--	--	I	has
not	such	--	not	talk	--	--	--	talk	--	talk
if	if	if	if	if	if	if	if	have	not	heavy
make	--	be	paint	be	be	be	be	--	if	many

APPENDIX G--Continued

Speaker 1 - List 5

Group 5

Correct Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
on	--	ought	auto	are	hot	--	had	talk	on	come
there	them	them	there	there	there	them	them	the	them	them
was	ways	we	wait	was	wiz	went	when	wait	one	wouldn't
or	--	--	--	all	ball	--	--	boy	or	war
all	on	arm	all	all	all	--	all	off	all	--
but	--	but	part	but	pie	--	but	boy	but	money
will	when	we	we	we	we	we	with	run	three	win
would	which	--	win	when	will	--	we	--	where	war
with	with	with	with	with	with	with	with	with	with	which
which	which	water	which	water	which	--	when	wash	which	which
people	people	people	people	people	paper	people	people	paper	people	people
more	--	boy	program	--	pushhim	--	--	--	--	--
light	--	like	light	like	--	--	--	--	light	like
very	very	very	finger	very	fill	people	very	--	firey	farther
at	eye	ham	height	and	last	and	had	now	as	his
by	--	pie	--	by	by	more	--	--	place	do
man	pot	best	buy	been	by	man	--	bite	bang	many

APPENDIX G--Continued

Speaker 1 - List 1

Group 5

Correct Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
the	them	the	then	them	them	they	the	them	then	them
and	had	had	--	--	--	an	had	hot	eight	have
of	off	off	off	of	off	of	of	off	--	coffee
a	I'm	arm	I	am	I	I	am	--	are	hi
to	to	to	do	two	threw	to	to	--	to	you
in	he	he	he	--	ache	in	--	they	it	he
it	is	is	hit	an	itch	--	and	hard	each	his
is	hate	his	him	--	a	--	is	he	it	his
that	that	the	that	that	they	the	them	the	that	thing
have	have	have	half	have	half	if	have	half	have	heavy
this	this	this	this	this	things	--	this	the	this	this
be	be	be	be	be	be	be	be	be	be	--
work	work	work	work	would	which	when	one	through	work	would
I	eye	I	high	a	I	an	and	--	I	he
are	eye	hall	high	all	I'll	I	I	--	help	low
they	them	the	them	them	there	they	them	then	there	them
do	to	--	you	you	you	you	to	who	on	you
for	for	fool	full	for	four	--	four	after	four	therefore
he	an	he	he	he	he	in	he	--	in	him
many	--	be	--	barn	pea	be	--	bay	been	them
you	you	you	you	you	through	you	to	you	your	two
we	where	we	we	we	will	be	we	--	we	where
one	when	one	--	what	why	when	one	what	one	what
an	had	had	high	are	is	--	had	--	an	him
as	has	has	height	ask	eight	it	has	house	and	hi
not	shot	--	--	talk	sauce	--	--	talk	talk	dog
if	if	if	if	have	leaf	if	if	often	if	--
make	man	be	--	bat	like	be	be	boy	back	man

APPENDIX G--Continued

Speaker 1 - List 1

Group 5

Correct	Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
on	there	--	--	--	--	oak	--	--	--	call	harder
was	them	there	one	wait	there	there	--	the	the	there	either
or	horn	horn	horn	could	was	old	--	way	what	wait	women
all	all	hall	all	all	old	all	--	--	hurry	how	--
but	bus	--	bus	but	place	place	a	all	hurry	all	hello
will	we	we	we	will	we	we	--	but	bite	push	boy
would	we	work	we	we	we	we	one	we	we	we	where
with	with	with	with	with	with	with	he	we	what	we	throw
which	which	which	which	--	which	which	with	--	with	with	--
people	people	people	people	people	paper	paper	people	people	red	which	which
more	boy	poor	boy	--	poor	poor	more	boy	--	people	people
light	less	light	less	lets	light	light	in	like	boy	boy	book
very	very	--	very	--	--	--	--	very	like	light	like
at	has	hide	has	I	as	as	and	hot	--	off	farther
by	by	buy	by	bad	be	be	be	--	on	high	hat
man	man	bat	man	by	bag	bag	man	be	--	beer	man
									--	man	man

APPENDIX G--Continued

Speaker 1 - List 3

Group 5

Correct Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the had off I'm to an in is that have this bee we I'm I'm them -- for am me to when what hand eye -- if pan	the -- off arm to him him his thus have this be work hi -- they to for he be you we one has us cars if man	thumb I off -- do him him him that half this be work I -- them you form he -- you we what I I auto if my	then an of and two am him as that have this be would I'm all them you for he pan you we what at as talk if barn	that I off I you lay -- like that half this pea which I'm all them two for brings pig your which will at -- cost give pay	them an if I to in in in that if this be with an -- them to -- in be -- we what an and -- if be	them and of am going -- is is this have this be one am help them -- them him be you when when had had can if --	the hot off hot you play -- had fun have that be where -- -- they -- three many -- you we what hot boy talk life be	them I off I two a ate eight that half this be we I all them two fort him me you we when at as not if make	them hat coffee hot you them -- them that heavy this been when him -- them though heavy them mom through where what hat band -- even money

APPENDIX G---Continued

Speaker 1 - L4st 3

Group 5

Correct	Word	5A	5B	5C	5D	5E	5F	5G	5H	5I	5J
on	on	on	arm	auto	are	all	of	--	off	on	hand
there	them	them	them	them	there	there	they	them	the	there	there
was	what	what	one	what	was	was	what	when	--	what	was
or	horn	--	who	--	would	hole	--	--	who	hole	boy
all	on	--	ball	--	all	all	--	and	call	all	for
but	much	--	bus	--	possum	possum	but	but	--	but	was
will	when	we	we	we	we	we	--	--	why	went	way
would	work	work	would	work	one	one	which	with	was	when	where
with	with	with	with	with	with	with	with	with	with	with	with
which	which	which	wish	which	wish	wish	which	with	wish	which	which
people	people	people	people	people	people	people	people	people	paper	people	people
more	boy	boy	--	boy	book	book	more	put	pull	book	boy
light	light	light	less	let	lesson	lesson	but	like	yes	let	like
very	very	--	very	very	fillerup	fillerup	--	very	flower	firey	people
at	hot	I	--	as	as	as	I	--	fox	at	hot
by	man	buy	pie	buy	barn	plan	man	--	play	by	time
man	pan	buy	base	buy	back	buff	man	put	play	make	mom

APPENDIX G--Continued

Speaker 2 - list 1

Group 6

Correct Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the had of a you he is in that I'll this be with a a then you for he be you where when -- has like if be	this and have are you -- listen is than have this me -- -- I then you forty -- me choose when when -- lets -- if many	the an of a you it is is the an the be were I all the you for it be you will work an at lot if big	the like of I you he it is -- at this me -- I all the you for he my to we one a at -- if me	the hand have car you his key his the -- this be witch I -- the to -- be -- we with and his -- lift be	the like of a to in and -- the an -- but what I how the to very in be you when when -- at -- if be	them pay -- come you can am -- them -- this be work now follow this you fine -- be use we one make -- get leave better	the -- -- hot you it the kiss then -- this be which hi hot the you for these been you when what light light lot if big	the at of I you it it is then at this -- what I I this you for it be you we what -- is like leave many	the and of -- to is light his that has this be which I all the to for in might you will with had an clung if make

APPENDIX G--Continued

Speaker 2 - List 1

Group 6

Correct Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
on	--	---	or	could	--	--	go	or	good	could
there	then	there	the	the	the	the	the	the	this	this
was	was	when	what	was	which	what	one	what	this	was
or	oh	--	or	or	who	--	going	--	who	--
all	oh	--	all	--	who	--	to	--	--	call
but	about	must	book	--	many	but	mine	above	many	among
will	when	--	will	--	witch	when	where	when	will	was
would	which	above	work	we	with	when	wish	when	we	will
with	with	with	with	with	with	with	with	with	with	with
which	which	which	which	which	which	--	which	which	which	which
people	people	--	people	--	--	--	people	people	paper	--
more	--	more	boy	--	boy	--	work	boy	--	poor
light	like	lets	like	--	like	--	less	this	at	light
very	feel	fur	four	very	--	let	--	very	very	--
at	an	has	at	at	his	very	guess	at	at	as
by	be	--	by	my	by	had	--	many	my	by
man	big	my	bell	my	may	but	by	bat	my	man

APPENDIX G--Continued

Speaker 2 - List 3

Group 6

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Correct

Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
the	the	them	the	them	the	the	them	then	them	the
and	has	and	an	at	hand	I	an	it	am	an
of	of	--	of	at	have	of	--	have	of	of
a	a	--	I	--	--	a	do	on	come	--
to	you	choose	you	you	chew	to	you	you	you	you
in	an	any	ill	any	--	--	him	it	seem	--
it	it	--	it	--	his	let	be	it	leave	in
is	is	is	is	is	his	his	his	not	is	is
that	that	then	that	that	the	that	them	then	them	that
have	have	have	have	--	have	have	after	half	aft	have
this	this	this	this	this	this	this	this	this	this	this
be	be	me	big	be	me	be	better	pea	be	be
work	would	--	work	wood	work	work	we	whim	work	will
I	had	lie	I	I	--	I	have	hi	am	I
are	I'll	--	arm	all	--	--	--	--	psalm	all
they	the	then	the	the	the	the	them	them	them	the
do	you	cher	you	you	should	you	shoot	you	you	you
for	for	fool	for	for	food	very	for	for	for	for
he	any	--	it	--	he	he	he	it	am	in
many	--	many	jump	many	--	--	man	many	--	many
you	you	you	you	you	chew	you	you	you	you	you
we	we	foe	we	we	--	when	week	when	--	will
one	with	when	will	we	--	when	week	when	--	will
an	had	any	an	--	hand	I	has	hit	am	at
as	has	has	and	at	had	has	hide	hate	at	as
not	like	lot	lot	not	--	lot	us	lot	come	light
if	if	if	if	if	lift	if	every	if	leaf	if
make	be	many	big	be	pay	been	pass	been	many	but

APPENDIX G--Continued

Speaker 2 - List 3

Group 6

Correct Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
on	--	--	one	or	--	--	good	cook	or	all
there	the	then	the	the	the	the	them	the	them	then
was	what	was	what	was	what	what	with	one	one	was
or	who	hook	or	--	her	or	could	or	cook	or
all	--	--	all	could	--	or	good	look	look	are
but	but	--	bug	--	bad	but	me	but	among	but
will	when	--	work	--	witch	when	will	when	--	will
would	which	--	work	would	wow	work	wish	which	will	what
with	with	--	with	with	with	with	with	with	with	with
which	which	wish	which	which	which	which	wish	which	which	which
people	people	people	people	people	people	paper	people	people	paper	people
more	more	more	more	bubble	poor	poor	more	boy	poor	boy
light	like	--	let	light	last	like	us	the	like	light
very	field	fury	fewer	very	--	very	never	very	for	very
at	at	as	an	at	--	like	they	--	came	and
by	by	--	my	by	my	by	--	buy	mine	--
man	pay	--	man	may	may	by	mine	mine	many	man

APPENDIX G---Continued

Speaker 2 - List 5

Group 6

Correct Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	then had of a you he -- its that haven't this be when I'm I'll the you for he bad you we work had has I if --	nothing -- -- lie choose -- his list then laugh this be -- high -- -- chew four in many cher we where -- hands -- if many	the an us a you it is is that have this me work I all they you for he man you we work an as us if my	them -- -- -- you him -- his they half this beam -- I'm -- them you form -- -- chew -- one -- ask -- if --	the hey -- had chew hid -- his then have this -- wood hi hey they chew food hey man chew wait work hand has hi live --	the had of I you he his yes that have this -- were I all the you for has me he we what had -- -- if my	then -- -- come you leave and them this have this man will time like them use for give many to win work have nice -- ever mile	then -- homes on June in is this then have this many would I'm on them you for -- but you when what -- and on if --	them as of come you -- him is them laugh this be -- time come them you for him apart you we win a ask come if among	the and have time to in his his that have this -- work time are than you for he many you will with and as light if many

APPENDIX G--Continued

Speaker 2 - List 5

Group 6

Correct Word	6A	6B	6C	6D	6E	6F	6G	6H	6I	6J
on	--	--	or	go	--	--	book	--	look	could
there	this	then	the	the	the	the	the	them	them	think
was	wait	--	was	was	--	what	one	what	what	was
or	good	--	or	your	her	your	you	your	your	or
all	her	hurry	all	--	her	--	you	corn	or	her
but	be	best	but	be	--	but	by	many	pen	must
will	we	--	work	--	would	work	we	when	win	will
would	we	--	were	--	would	were	which	when	--	toward
with	with	--	with	with	with	with	with	with	with	with
which	which	wish	which	wish	which	which	--	which	which	which
people	people	people	people	people	people	paper	people	people	paper	people
more	bore	--	boy	--	boy	boy	boy	book	poor	more
light	like	lets	lets	--	late	like	--	not	--	light
very	very	--	very	very	--	very	future	very	for	very
at	has	--	an	hat	band	has	ice	had	at	as
by	bad	man	by	my	bag	my	--	by	my	my
man	bad	--	man	--	man	pie	--	by	mine	man

APPENDIX G--Continued

Speaker 2 - List 2

Group 7

Correct Word	7A	7B	7C	7D	7E	7F	7G	7H	7I	7J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the -- have on two in it is that have this me work I on the you for in many you we one I ice -- live but	then had have on you in his his then have this me would I all they you -- he many you we will had has like if many	then hadn't have of shoe it is has then have this miss when I all then use foot is be you win wind hadn't ax on if been	think as have -- you eight is his then have this -- -- -- -- they to four is be to went went -- ask -- -- man	think a how a to on it is that house this me work I at then you -- it be you we one and and cut if me	think hay hot ha chew -- eat -- thank auris this pig -- hi hot the chew force eat pig shoe win weight hot host cot -- pig	then as have hot to -- it it the lives this be win I all they to four it mine to we when -- -- at left by	the -- of -- two and -- is that have this be work -- -- they you for he be you we was had -- -- if --	then and have an to -- -- hands then -- this -- work nine -- -- then to for then -- do when wait and at the left pan	-- -- on I -- it it it they -- this be -- I on then you -- in -- you win win and height -- -- beat

APPENDIX G--Continued

Speaker 2 - List 2

Group 7

Correct Word	7A	7B	7C	7D	7E	7F	7G	7H	7I	7J
on	or	horse	ought	--	or	hot	all	or	horn	or
there	the	think	then	their	the	this	then	there	the	then
was	was	was	when	want	once	weat	when	was	was	--
or	or	horse	could	hold	to	horse	or	or	--	look
all	gone	her	could	her	early	--	--	--	--	--
but	but	--	best	--	but	bug	mine	but	pin	beat
will	--	will	which	will	with	wind	win	working	when	--
would	work	work	would	will	were	--	work	--	width	--
with	with	with	with	with	with	with	with	with	with	with
which	with	which	which	wish	which	wish	once	was	wish	which
people	people	people	people	paper	people	paper	people	people	paper	people
more	more	more	boor	pull	boy	poor	boy	--	book	book
light	like	like	lite	--	let	let	like	like	light	light
very	very	very	filling	very	very	ferry	very	--	--	--
at	hot	hand	I	as	an	hand	at	has	last	--
by	by	my	buying	by	mine	buy	mine	by	--	--
man	mine	man	might	man	man	bag	mine	my	back	--

APPENDIX G--Continued

Speaker 2 - List 3

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	than I of on to -- it it thing half this my went hi or that do for it many to really will at eye on if many	there height of on you it it and then have this many would a odd they two four he -- you we wet height height lot if build	the I'll all on you -- in is that after this be would I -- they you for he -- you we will any -- -- if be	them had of I you could is his them have this me would I all they you for it many you will went had and like if man	then a of I you -- is is then -- this me wish a at they you form is pill you with with ate as let if me	the hot have hand to little hit hit that have this be was had have the you for he money you we went ate at lot if man	the height have a who little light nice they have this me when I am I the cute for a money you really when I ice lot live money	the a -- ha you -- is is the have this be was I all the too very he many you we when and -- like if pin	this higher I've I who -- item -- this I've think be which I'm -- this to further either -- you when when higher any item if --	thing an of high you hear -- -- the half this peg will I -- the you for he my you when when I and light have my

APPENDIX G---Continued

Speaker 2 - List 3

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
on	ought	all	on	heard	heard	who	earth	--	ought	--
there	this	there	this	they	this	the	then	the	this	--
was	what	was	was	was	with	was	what	was	when	--
or	who	where	her	could	could	girl	who	her	or	or
all	her	--	--	her	could	girl	hurry	--	or	her
but	much	but	but	much	--	--	mine	mess	--	mine
will	what	would	will	would	with	wind	when	win	which	we
would	what	would	work	would	with	work	with	which	which	will
with	willing	with	work	with	with	with	with	with	whether	with
which	which	which	which	which	--	wish	which	which	which	wish
people	people	people	people	people	people	paper	people	people	people	paper
more	more	more	more	more	boy	book	boy	poor	--	more
light	--	light	let's	like	light	light	light	like	like	light
very	very	phony	very	very	very	figuring	very	very	further	very
at	at	at	at	had	a	had	light	at	item	hot
by	mile	buy	my	man	man	my	mine	pie	by	mine
man	may	pay	my	man	my	man	mine	mine	better	mine

APPENDIX G---Continued

Speaker 2 - List 5

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	than at of on you are ear it that half this many were I hot thing to for it many you while was all at on if mine	the height of on two in is in the have this be would I are they you fool he many you wait wake eye ite not if many	the as of on you he it his that have this be work I'm all they to for is -- you will will had at on if about	them has house I you him his his then have this me would I in them you for he man you will would and has come if me	this ache -- a you hear is is this -- this me when I -- they you -- in be you with when -- as us if pen	the had -- us you hill his his that have this be win time -- them you food him money you we went had ask none if make	the handy have I you he his nice then have this me with I'm hard they who for he money to with when handy had not give money	them -- -- hot you here -- his them -- this be we I'm I'm them you four he -- you we was climb -- -- if --	then any I've in you in is isn't then have this be would higher ought there through forth it been you when when any hasn't -- if been	the had have hot you it is us that half this be when time I they you for a my you wind when have height -- if my

APPENDIX G---Continued

Speaker 2 - List 5

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
on	good	hurt	--	could	could	who	good	--	--	hurt
there	than	that	this	them	this	the	then	them	think	the
was	what	was	want	was	when	went	was	wasp	which	wants
or	or	who	or	could	could	who	good	--	could	or
all	her	hole	her	her	could	hall	good	hurt	could	her
but	much	but	but	much	be	bus	busy	piece	better	mine
will	when	will	will	with	we	wind	we	we	when	we
would	twin	work	work	would	worship	wish	whose	which	would	--
with	with	with	with	with	with	with	with	with	with	with
which	which	which	which	which	--	which	which	which	which	which
people	people	people	people	people	people	people	people	people	people	people
more	boy	more	boy	pull	book	book	boy	boy	--	more
light	light	light	light	and	let	light	light	like	any	like
very	very	very	very	very	very	very	very	very	further	very
at	at	I	at	am	ace	hat	had	at	ask	hat
by	by	buy	by	mine	pie	--	mine	pie	--	mine
man	my	buy	back	mine	--	band	mine	pie	--	pen

APPENDIX G--Continued

Speaker 2 - List 1

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
the	thing	the	this	them	think	the	the	the	think	the
and	at	nigh	are	have	lay	bad	lie	am	less	--
of	of	of	of	of	of	have	have	--	item	of
a	on	tie	on	I	car	on	a	I	I'm	a
to	to	too	you	you	you	two	who	you	to	who
in	it	he	in	did	in	hill	him	is	each	it
it	I	it	it	did	in	hill	the	is	each	he
is	it	it	is	is	is	this	nice	his	each	is
that	than	--	then	them	they	that	then	the	think	than
have	of	have	after	have	at	have	have	have	I've	have
this	this	this	--	this	this	this	this	this	this	this
be	many	be	been	me	be	be	me	me	been	me
work	were	work	would	would	when	work	will	one	which	we
I	I	are	I	time	ah	high	are	I	item	are
are	off	all	all	am	--	high	hard	are	I'm	are
they	this	they	this	then	this	the	the	the	this	the
do	to	you	to	to	you	to	who	you	you	you
for	for	four	four	for	fork	food	for	for	for	for
he	it	he	in	did	in	hit	it	he	any	he
many	many	be	been	many	be	be	money	be	been	me
you	to	you	you	you	chew	you	sure	you	choose	use
we	we	wick	will	will	we	we	when	we	when	will
one	what	wait	will	would	when	we	when	we	when	when
an	at	high	--	had	a	had	had	are	I'm	hail
as	on	--	light	as	ate	at	nice	as	ice	hat
not	land	lot	--	done	--	us	not	--	ice	light
if	if	if	if	even	if	if	live	if	--	if
make	be	pay	bill	man	be	be	money	many	pen	mine

APPENDIX G -- Continued

Speaker 2 - List 1

Group 8

Correct Word	8A	8B	8C	8D	8E	8F	8G	8H	8I	8J
on	her	could	could	could	could	hold	or	--	could	hurt
there	there	the	this	them	this	the	the	the	this	then
was	where	was	want	was	when	was	was	was	when	was
or	good	or	could	could	could	girl	or	--	or	or
all	--	old	all	heard	could	hold	or	--	only	--
but	much	buy	but	man	--	bus	mine	must	--	mug
will	we	where	will	we	we	will	with	we	which	with
would	went	work	work	which	win	work	will	--	which	we
with	with	with	with	with	with	with	with	with	whether	with
which	which	which	which	which	question	wish	which	which	which	wish
people	people	people	people	people	people	people	people	people	people	people
more	would	more	boy	would	book	book	poor	poor	for	more
light	I	height	light	like	ate	light	light	--	less	like
very	very	very	very	very	very	very	very	very	feel	very
at	at	lot	on	had	as	hot	--	hot	item	--
by	my	buy	bell	many	be	--	mine	my	pen	my
man	my	pay	by	may	pan	--	money	by	by	my

APPENDIX G--Continued

Speaker 2 - List 4

Group 9

Correct Word	9A	9B	9C	9D	9E	9F	9G	9H	9I	9J
the	the	the	the	the	then	there	the	that	the	that
and	had	can	has	has	hide	as	--	an	as	I
of	--	laugh	bug	I	as	has	--	--	are	have
a	kind	are	I	you	I	I	can	I	as	a
to	two	to	you	you	you	you	you	you	true	who
in	he	in	he	--	--	he	he	he	he	he
it	this	in	he	is	is	is	he	he	eat	it
is	his	let	his	is	is	his	--	his	--	--
that	that	the	they	that	that	then	they	then	think	that
--	--	laugh	has	as	as	have	--	have	have	have
have	this	this	think	this	this	this	this	this	this	this
this	--	--	--	be	be	men	--	be	be	need
be	--	--	which	we	we	work	work	we	work	worry
work	would	were	when	I	I	I	I	I	high	I'm
I	high	I am	high	I	--	--	--	us	hot	--
are	like	are	hot	all	--	thing	they	that	that	they
they	they	there	then	think	them	you	you	thing	you	to
do	two	to	shoe	you	you	four	you	you	four	for
for	few	for	for	for	for	in	food	for	he	--
he	the	lip	he	he	he	by	head	it	be	--
many	buy	but	bad	bad	many	to	play	me	be	--
you	shoe	so	you	you	you	when	you	you	true	to
we	what	will	we	we	we	one	we	we	when	will
one	one	what	we	had	one	any	was	one	will	which
an	high	an	had	I	I	has	--	I	--	had
as	light	light	has	as	as	light	and	as	at	--
not	hot	let	like	like	like	if	can	not	at	us
if	if	leave	if	if	if	repeat	if	if	leave	even
make	boy	lip	pick	by	by		pay	be	--	big

APPENDIX G--Continued

Speaker 2 - List 4

Group 9

Correct Word	9A	9B	9C	9D	9E	9F	9G	9H	9I	9J
on	good	or	her	her	good	--	am	hurt	--	--
there	the	the	this	they	than	thing	they	they	this	the
was	was	what	won	was	was	was	was	one	what	want
or	cold	could	bow	her	your	--	could	heard	--	could
all	cold	here	her	her	your	her	could	--	--	her
but	one	--	pie	mine	--	repeat	--	--	--	--
will	with	will	when	we	we	when	we	with	when	will
would	with	were	which	with	we	wish	work	we	what	wouldn't
with	with	with	with	with	with	with	with	with	with	with
which	which	which	which	which	with	wish	wish	which	question	which
people	--	paper	paper	people	people	people	people	--	people	people
more	boy	put	bowl	more	boy	boy	more	book	--	put
light	light	like	light	like	like	line	light	like	let	like
very	--	for	flower	very	--	very	--	--	--	very
at	that	let	hot	had	as	lies	it	as	at	at
by	my	--	by	by	by	supply	pay	mine	today	party
man	my	by	but	by	--	by	pay	mine	buy	by

APPENDIX G-Continued

Speaker 2 - List 5

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
the	then	then	then	the	the	the	they	thin	the	then
and	and	any	hat	ate	like	my	as	had	--	at
of	of	hot	house	often	like	are	a	cot	--	hot
a	on	I	call	on	I	--	as	--	a	and
to	you	two	you	you	to	you	to	shoe	you	through
in	in	he	here	he	in	--	and	let	him	it
it	is	kick	in	hit	it	--	a	ate	his	is
is	is	is	this	his	at	--	as	--	is	this
that	that	that	then	they	that	the	they	then	they	that
have	half	have	have	of	laugh	you	and	help	I've	after
this	this	this	this	this	this	they	there	thing	this	there
be	be	be	me	me	be	me	pay	--	me	be
work	when	quick	when	would	which	when	will	twin	when	work
I	I	high	eye	I	I'm	--	on	bot	I	all
are	are	I	all	--	I	are	on	bot	I	en
they	then	that	them	--	them	that	there	think	the	--
do	who	you	you	you	do	you	will	too	you	to
for	food	four	for	fork	four	for	very	--	ford	for
he	is	he	he	he	in	--	an	let	he	--
many	me	many	be	--	me	make	pay	pot	pen	but
you	you	you	you	you	do	you	to	took	you	to
we	will	quick	when	we	win	we	with	when	we	which
one	when	one	when	would	which	what	when	one	we	what
an	and	any	at	hate	I	an	--	hate	hand	and
as	as	ask	as	ask	at	mine	as	hot	as	after
not	us	clock	lost	on	lot	--	at	it	I'm	not
if	if	if	if	if	if	if	if	even	if	if
make	many	many	men	bucket	man	my	pay	play	a pen	break

APPENDIX G--Continued

Speaker 2 - List 5

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
on	could	could	your	court	caught	on	you	took	booked	--
there	then	then	them	the	the	the	there	the	the	the
was	was	was	was	once	when	when	was	white	west	--
or	could	could	your	could	or	what	or	who	or	--
all	her	cold	hole	hurry	on	who	not	look	her	her
but	but	but	mess	--	--	be	part	bite	but	but
will	will	work	wet	will	win	we	would	--	when	when
would	wish	where	win	--	which	we	which	when	work	where
with	with	with	with	with	with	with	with	whether	with	with
which	which	question	which	which	which	which	which	wrench	which	once
people	people	people	people	people	people	baby	people	Bober	people	--
more	poor	more	boy	boy	boy	more	very	boy	more	boy
light	light	like	light	light	like	--	--	light	--	as
very	very	family	very	very	finger	very	--	--	very	--
at	as	as	last	hat	at	--	at	hat	--	at
by	mine	buy	buy	pie	man	by	--	--	mine	by
man	man	man	bet	bite	back	my	part	man	make	--

APPENDIX G--Continued

Speaker 2 - List 1

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
the	then	then	them	the	then	that	there	think	the	the
and	and	egg	at	a	and	like	as	--	hey	laugh
of	of	of	have	of	of	--	--	--	have	of
a	a	high	eye	a	I	I	a	hot	hi	into
to	you	you	you	you	to	you	one	too	you	true
in	in	he	in	a	in	he	if	the	here	in
it	is	it	he	he	in	he	is	let	in	it
is	is	it	is	his	it	--	if	--	his	is
that	than	that	then	that	then	the	there	than	then	--
have	have	hat	have	have	at	I	and	hat	have	at
this	this	this	this	this	then	the	there	then	this	this
be	me	be	me	me	me	me	about	be	me	where
work	wish	work	which	would	will	we	with	would	work	with
I	I	I	eye	high	I	I	a	what	I	all
are	on	--	on	on	car	on	a	hot	hi	lot
they	then	the	they	the	the	the	it	think	this	then
do	you	you	you	you	to	you	to	you	you	who
for	fool	for	for	for	four	for	for	fool	for	for
he	in	he	in	he	in	he	is	lead	he	there
many	me	be	be	bee	me	my	bet	but	me	bit
you	you	you	you	you	to	who	would	you	you	turn
we	when	we	win	we	will	when	with	when	we	when
one	would	when	with	what	will	when	was	where	we	when
an	and	and	eye	I	at	I	as	hat	a	all
as	as	at	high	hate	at	like	as	hot	yes	as
not	little	lot	all	luck	tie	bot	us	--	--	call
if	if	if	if	if	if	live	if	lift	if	give
make	met	bake	me	peck	man	my	but	been	make	but

APPENDIX G--Continued

Speaker 2 - List 1

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
on	could	could	--	could	or	on	own	look	hook	hold
there	then	then	there	the	then	the	the	think	this	then
was	want	what	was	what	will	when	with	wait	was	--
or	your	could	your	could	--	who	or	could	where	whole
all	her	hole	oil	oil	oil	--	or	cook	her	hi
but	among	but	mess	--	man	me	about	but	mine	upon
will	when	will	with	will	win	when	which	when	we	well
would	will	work	win	will	which	--	with	we	work	were
with	with	with	with	with	with	with	with	whether	with	with
which	which	which	which	which	which	which	which	--	which	--
people	people	people	people	people	people	baby	--	baby	people	people
more	poor	put	boy	poor	boy	put	poor	would	more	more
light	us	not	let	light	like	like	at	cot	less	--
very	very	funny	very	very	finger	very	figure	--	very	very
at	at	hat	at	--	at	I	at	--	hat	at
by	mine	buy	may	buy	band	my	above	be	mine	upon
man	mile	buy	me	buy	buy	my	but	bat	make	but

APPENDIX G---Continued

Speaker 2 - List 3

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the as off I you hear his is then have this me with I on then you fool in many you we will and has luck if me	then at off I you hello kick is that half this be work high all then you for he -- you we will a at lot if pay	them and off on you here in is then have this be with eye all thing you for he been you we with had and lot if be	the hate of a you -- it his then have this bee work high -- they you fool he bee you we when ate ask -- if bee	the at of I to in it in then laugh this me wind I I then to four in be do we win and at cat if me	the my on I you little my his that -- this me which I all that you for he be you we we high light -- if my	they as half a you is he is that half they by we as hi the to for he by you will with have at hat if bat	think lot hot lot you the hate -- then a this -- when hot hot think shoe four -- be you when when that hat lot if be	the hey huff I'm you hill his his them have this pea work hi -- the you food he money you we when him as lock if make	they that half I who -- aim -- there half thin apart with how on the -- for here upon to well quick -- at cat if upon

APPENDIX G---Continued

Speaker 2 - List 3

Group 10

Correct Word	10A	10B	10C	10D	10E	10F	10G	10H	10I	10J
on	her	own	or	--	on	all	--	would	--	hot
there	their	then	there	the	the	that	there	think	them	then
was	want	want	was	what	what	when	why	when	west	when
or	could	corn	or	could	or	who	or	hurt	hook	bold
all	her	call	all	hurl	on	who	her	look	hurry	call
but	must	but	but	but	--	mine	but	bat	but	apart
will	when	quick	win	when	we	we	will	when	when	we
would	wish	work	wish	would	wind	we	with	when	work	where
with	with	with	with	with	with	with	with	whether	with	with
which	wish	which	wish	which	which	which	which	which	which	--
people	people	people	people	people	people	baby	bubble	baby	people	people
more	more	pat	more	poor	boy	more	a	boy	more	both
light	like	like	less	like	like	little	at	hetter	alike	lot
very	very	fairy	very	very	after	--	figure	figure	very	very
at	and	at	as	and	an	--	at	lamb	and	--
by	mine	buy	my	pie	buy	mine	by	baln	mine	--
man	may	pan	pal	--	man	my	by	bat	man	ball

APPENDIX G--Continued

Speaker 3 - Last 1

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	there at of -- you -- -- -- yes after there be -- I -- that -- for here -- your we -- at at -- -- --	them at of high you late let is that half these my where hi at that to -- at many through where what mine out out half about	there and awful are you he lady is than half this be would my are they you before he baby your will water -- ask nine if buy	the had of on cool -- can is that have this -- -- on car than -- -- bunny to one run had ask lock have man	there I of a you -- it is that of this be would my all they would for it -- -- we what my at nine if my	there cat of are -- clear -- -- those have three may one high tall then do over here many through way run man at -- if man	they at of a you it it is then of thus be would a are then we for in many could we when at ask at of me	the in of a you him it is that if this big work I all they you for in money you we one in as it if my	there add of a you -- it his that half this me why I -- than who for he ready you where run an at let off by	there and of I you it yes is that have this me won I are than or for is money you we run had has not off man

APPENDIX G--Continued

Speaker 3 - List 1

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
on	odd	bat	body	hide	mine	--	at	on	hot	had
there	there	thank	there	there	there	there	then	there	there	there
was	watch	what	was	watch	what	one	watch	was	what	what
or	--	hoe	or	coal	would	or	or	all	or	all
all	all	all	all	all	all	all	all	all	all	all
but	--	--	mother	--	my	right	but	my	--	--
will	will	what	will	will	will	one	will	will	will	where
would	will	where	woody	wooly	would	would	would	would	would	run
with	with	with	with	with	with	with	with	with	with	with
which	--	--	which	which	which	run	which	which	which	which
people	--	many	paperdoll	people	people	people	people	people	--	people
more	more	more	more	more	more	more	more	more	one	more
light	light	like	like	light	that	light	like	like	light	light
very	very	people	58	very	--	--	very	fairly	--	fair
at	ask	at	at	ice	as	--	as	at	at	and
by	bye	my	by	by	my	man	a	by	by	man
man	--	my	buy	man	my	man	me	man	bad	man

APPENDIX G--Continued

Speaker 3 - List 3

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	that hot of -- your in let -- that after this -- willing high -- there your for here money -- win -- at at light if --	the out off a who he each each then half then he when hi hello they school fall he many jury where width hat hat hat if my	thigh paddle off by your little list is that half this pen wood at collar than your four he money jury when water had pass glasses if be	the had of a new -- is is that have this be wooly eye -- they new four he bunny -- read run -- has like if man	the mine of my cool -- this is that after this be would I more they cool for he money you real with man as man if man	thought at of on who in ledge as that half this me would I hard they throwing fall he many through we one at at that live man	then and of a could in is is that of this he would an are they could for he many your we when an at that if may	the man of a who in its his that have this me work high all they your full in many your wee one and hot block if many	the add off a you it his his that half this me work I all than you for he money you we run at at flat if bad	the had of a you in it is that have this me won I are than you for he many you we run had has that if many

APPENDIX G--Continued

Speaker 3 - List 3

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
on	--	hat	battle	doll	nine	at	in	on	at	had
there	there	there	there	there	there	there	there	there	there	there
was	white	what	was	once	what	one	many	once	once	right
or	all	--	or	all	--	--	all	or	you'll	or
all	all	all	call	call	all	all	all	all	all	all
but	but	--	base	once	money	might	but	us	might	right
will	will	bill	will	will	will	will	will	will	really	one
would	--	wait	wool	run	will	would	when	only	twenty	ran
with	with	with	with	with	with	with	with	with	with	with
which	which	which	wish	once	which	which	which	which	which	which
people	people	people	paperdoll	people	people	people	people	people	people	people
more	--	bat	more	ball	more	--	more	more	boy	more
light	light	nice	last	light	last	let	like	light	light	light
very	very	fury	flowery	very	--	throwing	very	very	fairway	fairly
at	at	at	ask	has	--	at	that	hot	black	had
by	I	a	hi	my	my	I	I	my	I	my
man	--	back	paddle	man	man	man	many	man	bad	man

APPENDIX G--Continued

Speaker 3 - List 5

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	thought at often I your let -- each after this -- one I our they your for here -- your when worthy hat as light if make	the at off a you in hit is that half this me what a all that who for he many through when what hat as at if my	thumb -- off an do lily is his that have this be when an air them your four he many your we wall had has gas if pay	the ad of a you ill -- is that have this be woolly I are they you four he money you read run had ask us if man	the at of I you -- is is that if this be where I are they you floor he money -- we would and as as if be	there an of I you -- it is that have this man would am are they -- for he money through we one at at at if many	the had of a could -- it is that have this me -- I are they could for he many your we will an and at if may	the hand of a you ill hit his that have this been would high air they you fall he money your we with and at not if make	the black of a you little is his that half this be one I are than you fall he money you we one and as as if may	the had of a you -- is is that have this me one I are they you for he many you we one had has nice if many

APPENDIX G--Continued

Speaker 3 - List 5

Group 11

Correct Word	11A	11B	11C	11D	11E	11F	11G	11H	11I	11J
on	bat	hot	coddle	ill	I	on	I	on	on	on
there	their	there	there	there	there	there	there	there	there	there
was	once	what	was	was	was	was	want	once	was	once
or	or	hope	oil	--	--	all	all	only	ball	or
all	all	all	all	all	all	all	all	all	all	all
but	--	much	box	box	man	might	but	must	bit	mine
will	will	want	will	will	will	will	will	will	really	only
would	willing	--	twenty	really	with	one	would	will	one	one
with	with	with	with	with	with	with	with	with	with	with
which	which	which	wish	race	which	was	which	which	rich	which
people	people	people	paperclip	people	people	people	people	people	people	people
more	more	more	boy	more	more	wall	more	more	ball	more
light	let	let	glass	lice	light	light	let	light	liked	lights
very	very	fairy	furry	very	very	very	very	very	very	fairy
at	at	bat	hat	has	ask	at	at	hot	at	had
by	bye	my	mine	my	my	my	my	my	by	man
man	mad	man	paddle	battle	man	man	man	man	bad	man

APPENDIX G--Continued

Speaker 3 - List 2

Group 12

Correct Word	12A	12B	12C	12D	12E	12F	12G	12H	12I	12J
the	the	them	come	how	then	there	the	them	the	the
and	at	--	what	I	black	at	red	--	many	and
of	of	of	of	of	--	of	of	off	of	--
a	a	I	I	gone	--	my	a	--	a	--
to	you	do	for	girl	--	of	you	--	--	--
in	lady	--	---	this	--	--	little	--	--	--
it	light	--	--	many	--	--	light	--	--	--
is	is	--	it	--	this	as	is	as	is	--
that	that	that	that	that	that	that	that	that	that	--
have	have	have	have	--	--	have	have	--	half	--
this	this	this	this	--	this	this	this	this	this	this
be	in	be	as	--	may	as	a	in	me	a
work	war	would	when	why	where	one	would	why	--	--
I	hi	my	at	--	black	I	mine	--	at	--
are	all	--	all	are	--	hard	are	--	--	--
they	than	that	that	as	then	they	they	there	that	that
do	going	--	away	could	--	you	you	hurry	--	--
for	for	for	for	--	before	--	for	from	--	from
he	he	he	--	they	at	them	he	if	him	lay
many	money	many	way	way	--	many	many	--	many	lady
you	going	--	--	--	your	--	you	hurry	--	--
we	ran	when	why	they	way	we	read	why	ran	--
one	one	want	one	boy	where	one	one	where	what	what
on	a	at	I	the	light	at	had	--	at	at
as	has	has	as	was	--	last	as	as	at	--
not	at	--	what	--	--	at	light	--	cat	--
if	laugh	live	of	after	--	of	of	--	of	laugh
make	mine	man	say	by	black	many	many	by	man	--

APPENDIX G--Continued

Speaker 3 - List 2

Group 12

Correct Word	12A	12B	12C	12D	12E	12F	12G	12H	12I	12J
on	halt	it	at	--	--	bot	I	hd	--	--
there	the	there	there	how	there	there	there	there	there	there
was	once	what	why	there	--	once	once	why	was	--
or	your	or	or	--	--	only	--	--	--	--
all	all	all	all	all	hall	all	all	--	all	all
but	much	--	at	--	--	play	--	by	--	but
will	well	well	where	--	--	will	will	why	--	while
would	one	--	--	--	will	--	--	where	--	when
with	with	with	with	these	white	--	with	whether	--	worth
which	--	--	--	--	with	one	--	which	which	--
people	paper	people	about	--	people	people	people	--	--	--
more	boy	more	lore	--	boy	--	more	more	boy	--
light	light	light	at	high	like	lay	light	--	at	and
very	very	very	--	for	--	only	--	--	--	--
at	has	at	I	at	--	at	has	--	at	at
by	by	man	at	at	my	at	mine	by	at	land
man	has	many	what	that	--	--	many	--	man	--

APPENDIX G--Continued

Speaker 3 - List 3

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
the	that	that	the	the	the	then	the	the	that	thought
and	and	and	and	of	as	brand	--	--	--	--
of	off	of	of	on	of	of	of	of	off	cough
a	on	I	on	on	a	hi	on	I	by	--
to	you	you	who	who	cool	oh	your	--	you	hello
in	--	any	in	in	in	and	any	many	fell	--
it	the	it	ill	ill	--	in	is	his	list	--
is	his	his	is	is	is	is	is	is	his	his
that	that	then	that	that	that	that	that	that	that	thank
have	have	have	half	half	have	half	half	of	half	half
this	this	this	--	--	this	this	this	is	this	--
be	we	me	him	him	me	be	be	me	be	--
work	we	work	why	why	would	work	one	will	one	would
I	an	a	I	I	I	I	I	I	I	hand
are	all	--	call	call	all	I	--	all	bottle	--
they	that	than	they	they	than	they	than	the	than	they
do	you	you	--	--	you	oh	you	--	you	--
for	full	fall	for	for	four	fall	for	the	fall	floor
he	he	he	in	in	he	a	he	a	him	and
many	--	many	any	any	many	ready	--	many	--	plan
you	your	--	--	--	--	good	--	people	you're	--
we	we	we	we	we	when	run	we	run	we	when
one	while	--	willy	willy	one	one	one	will	one	--
an	--	any	aid	aid	an	and	at	--	had	--
as	has	as	as	as	as	height	--	as	has	--
not	has	has	at	at	--	had	not	that	last	--
if	of	if	if	if	if	laugh	if	of	if	effort
make	be	many	may	may	many	by	many	many	money	paint

APPENDIX G--Continued

Speaker 3- List 3

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
on	all	--	--	it	on	hide	not	all	title	--
there	there	there	there	there	there	there	there	now	there	the
was	watch	was	white	white	one	one	white	runs	once	--
or	--	--	--	--	oil	oil	old	all	bole	call
all	all	--	all	all	all	all	all	all	all	call
but	--	--	men	men	but	but	bite	is	boys	--
will	will	will	willy	willy	will	will	will	well	well	will
would	will	--	--	--	one	one	one	will	willing	--
with	with	with	with	with	with	with	with	whether	with	with
which	which	wish	wish	wish	which	was	once	which	which	which
people	bottle	--	--	applaud	people	people	people	people	people	--
more	--	--	law	law	more	more	--	ball	--	ball
light	late	light	late	late	last	last	light	light	likes	light
very	--	very	--	--	follow	follow	--	--	form	forehead
at	has	any	ask	ask	has	has	at	bad	lad	bat
by	as	my	I	I	ha	ha	my	I	my	--
man	--	man	--	man	band	band	--	bad	make	--

APPENDIX G--Continued

Speaker 3 - L1st 5

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
the	the	the	the	the	the	the	the	the	them	thumb
and	at	any	had	had	hand	and	hand	that	yell	hand
of	of	of	off	off	of	of	of	of	of	how
a	a	on	on	on	a	I	a	a	high	high
to	you	you	who	who	do	cog	you	when	your	clue
in	they'll	hill	and	and	it	alley	ill	he	Linda	--
it	is	us	aim	aim	--	in	night	his	lets	--
is	is	his	is	is	is	each	his	his	his	his
that	that	is	that	that	that	then	that	that	that	then
have	have	have	half	half	have	have	half	have	have	laugh
this	this	this	this	this	this	then	thanks	these	this	thanks
be	be	me	him	him	be	be	pay	me	me	--
work	will	would	why	why	would	why	one	when	worry	Wally
I	an	I	I	I	I	hay	I	high	high	lamb
are	are	are	all	all	are	hard	are	hall	--	hard
they	they	they	that	that	they	they	than	the	than	them
do	you	your	who	who	you	cool	your	who	you	--
for	fall	fall	four	four	for	for	for	for	four	floor
he	he	he	him	him	a	he	he	he	he	he
many	many	many	many	many	many	pay	money	me	money	belate
you	to	to	who	who	you	ture	your	--	you're	throw
we	we	we	way	way	read	weigh	we	we	we	will
one	one	one	white	white	one	one	one	well	one	will
on	an	an	had	had	and	had	an	a	had	hand
as	as	as	hat	hat	as	has	as	has	has	hand
not	that	light	ask	ask	not	light	night	has	light	light
if	if	if	if	if	if	if	if	have	if	laugh
make	be	many	may	may	make	me	pay	me	mine	hand

APPENDIX G--Continued

Speaker 3 - L4st 5

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
on	a	on	on	all	on	on	might	laugh	holly	hot
there	there	there	there	them	there	they're	there	there	there	--
was	watch	was	one	was	was	was	once	was	once	what
or	oil	old	--	all	or	all	our	low	hole	only
all	all	all	all	all	all	all	all	all	all	all
but	box	nice	once	might	but	but	bite	most	must	bite
will	will	will	--	well	will	--	will	well	well	wool
would	will	wool	when	wait	would	--	twenty	will	world	would
with	with	with	with	with	with	with	with	what	with	with
which	which	wish	wait	wish	which	wait	twice	which	rich	rich
people	people	people	--	applaud	people	people	people	people	people	people
more	ball	ball	boy	maul	more	--	boy	wall	more	ball
light	lets	lets	light	light	light	light	light	light	lets	alright
very	very	very	--	very	very	fairy	--	after	fairy	fully
at	and	and	at	at	hat	has	at	has	last	hat
by	my	my	my	my	my	by	buy	by	by	buy
man	man	man	man	man	man	by	been	bad	man	pilot

APPENDIX G---Continued

Speaker 3 - List 1

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
the	there	the	the	the	the	there	the	the	there	thought
and	there	an	an	an	on	hay	at	had	lattice	and
of	of	and	off	off	of	half	of	of	if	half
a	a	on	on	on	a	hi	a	high	by	---
to	you	you	who	who	you	do	you	who	you	too
in	they	---	ill	ill	in	beal	ill	many	thrill	---
it	they	late	it	it	it	an	it	he	ink	---
is	is	it	is	is	is	is	is	his	is	---
that	that	that	that	that	that	that	that	that	that	---
have	have	laugh	if	if	have	half	have	have	have	half
this	this	this	this	this	this	this	this	these	this	---
be	be	build	many	many	be	pay	---	me	me	pay
work	we	where	would	would	would	work	were	---	wordy	would
I	an	high	I	I	I	hay	I	---	I	hand
are	all	call	all	all	are	ale	are	has	lair	---
they	they	than	that	that	they	there	than	than	they	than
do	you	do	who	who	to	do	you	who	you	---
for	after	before	for	for	for	fall	full	after	full	floor
he	he	he	him	him	he	he	he	he	he	---
many	many	---	may	may	many	bale	many	bad	money	please
you	your	---	good	good	you	look	you	through	you	lure
we	we	we	well	well	we	way	were	we	we	where
one	one	well	why	why	won	ready	one	well	will	would
an	an	hand	add	add	at	bad	man	had	hard	hand
as	ask	at	ask	ask	as	has	has	had	---	dance
not	not	cat	add	add	not	that	night	that	liked	lite
if	if	if	if	if	if	have	if	of	if	laugh
make	by	man	may	may	man	bat	my	people	happy	bite

APPENDIX G--Continued

Speaker 3 - List 1

Group 13

Correct Word	13A	13B	13C	13D	13E	13F	13G	13H	13I	13J
on there was or all but will would with which people more light very at man	at there watch all all by will will with -- people wall light -- as bad	mine there was your all -- will really with wish people more let very as man	-- there once hole all -- will world with wish paper boy light forget at man	on of what whole all my will would with wish people boy light very at man	on there was or all but will would with which people more light very at mat	bad there what or all but will worry with wish people more late fairy had buy	might there once call all bite will will with which people ball night very at I	had there when well hall we when will will which people boy that -- had bad	I'd their watch -- all -- will will with which people boy like fairy nice man	hot thought what hello call -- will woolly with which people wall lite forever eight buy

APPENDIX G--Continued

Speaker 3 - List 4

Group 14

Correct Word	14A	14B	14C	14D	14E	14F	14G	14H	14I	14J
the and of a to in it is that have this be work I are they do for he many you we one on as not if make	the that often on -- a -- is that and this many when and of that -- four a many -- where -- that -- -- if --	the the of I you hill ill his that have this me work I holler they would fall he many you we wall -- as light if bang	the they of a your ill lady as that have this be work I -- that your four a pull look read will all as light if by	the they off a three hill plane ace that half this plea worry I are they her for a pat -- when one at at light laugh pan	there that off hard -- look -- at that -- this -- way hand all they we for he play you we well had and light if man	-- then of on who it light as that half this me would had are than -- -- here really -- where -- had as last if --	the the of hot who -- -- -- that -- them be worry how -- they which fall head pen who -- when -- hide -- -- pen	thought fair of far to -- -- age that -- this me one mail home than you for hail many -- when when -- -- light even many	the they golf arm to all please -- that after this in work high all they good from -- -- girl quiet quiet hail -- let left wait	they they off I you -- place -- that have this be would high -- they you for he -- you we one -- as ice have back

APPENDIX G--Continued

Speaker 3 - List 4

Group 14

Correct Word	14A	14B	14C	14D	14E	14F	14G	14H	14I	14J
on	by	ball	--	all	at	and	any	--	--	--
there	the	there	the	the	there	there	the	--	the	--
was	what	watch	was	was	right	what	watch	--	one	was
or	--	or	oil	when	all	all	--	--	cool	--
all	long	all	all	all	fall	all	all	--	all	all
but	but	body	bite	light	write	--	but	--	will	--
will	--	well	will	--	well	well	when	when	--	well
would	--	will	--	would	way	would	when	where	while	--
with	--	with	with	with	with	with	whether	with	--	with
which	which	which	wish	which	wait	which	which	was	wait	was
people	people	people	black	--	plate	people	plan	--	polite	people
more	more	more	more	--	ball	more	--	more	quarrel	more
light	--	light	light	light	light	like	--	--	later	life
very	very	very	--	--	--	--	very	--	--	--
at	that	at	at	at	hat	at	hat	at	that	at
by	by	by	my	buy	buy	buy	mine	my	my	my
man	bat	bat	ple	bat	bad	bad	many	back	--	back

APPENDIX G--Continued

Speaker 3 - List 5

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
the	the	them	the	the	they	the	the	--	the	the
and	and	had	at	at	and	had	and	hand	--	high
of	of	of	--	--	of	of	of	love	cuff	of
a	my	I	my	my	I	by	a	I	hi	on
to	cool	you	--	--	--	you	you	you	to	cool
in	--	--	--	--	ill	let	--	--	little	--
it	his	is	is	is	--	let	his	--	--	hate
is	yes	is	is	is	ice	his	is	his	is	--
that	that	that	that	that	that	that	that	that	that	that
have	laugh	have	laugh	laugh	have	have	of	have	have	have
this	this	this	this	this	this	this	this	this	things	the
be	be	be	me	me	me	be	big	me	man	me
work	work	why	when	when	when	with	would	boy	why	one
I	an	--	at	at	high	have	I	I	an	had
are	are	--	almond	almond	higher	are	are	--	higher	--
they	they	there	they	they	they	them	they	them	they	they
do	you	you	who	who	who	blew	you	new	to	--
for	floor	--	for	for	for	for	for	for	for	for
he	he	he	he	he	he	be	and	he	an	an
many	many	--	main	main	many	many	play	many	many	many
you	through	--	you	you	who	lose	you	you	you	through
we	we	we	we	we	we	green	we	we	we	we
one	--	well	willing	willing	when	--	when	one	--	while
an	an	had	--	--	had	had	and	had	and	an
as	at	as	might	might	and	has	at	has	as	as
not	light	ask	hate	hate	neat	ask	light	hot	glass	at
if	if	have	after	after	if	if	if	--	cliff	if
make	pat	man	be	be	man	back	big	--	black	make

APPENDIX C--Continued

Speaker 3 - List 5

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
on	on	--	--	height	had	any	on	--	all	my
there	there	them	--	then	there	there	there	there	there	there
was	was	was	was	white	white	want	one	was	what	what
or	oil	--	early	--	horde	boy	all	only	crawl	ole'
all	all	all	all	--	all	all	all	all	all	all
but	bright	work	but	many	--	light	bit	--	but	but
will	will	--	will	we	will	will	when	really	will	will
would	only	was	whirly	win	when	really	when	--	--	--
with	with	with	with	with	with	with	with	with	with	with
which	which	wish	wish	which	with	--	wish	which	when	wet
people	--	people	--	baby	people	along	--	people	people	people
more	more	--	mol	boy	boy	boil	boy	boy	more	boy
light	light	this	like	light	let	let	light	light	let	let
very	very	--	very	form	foray	very	--	very	ferry	--
at	at	at	ask	hot	bad	ask	at	hat	at	--
by	ma	my	my	my	my	am	my	my	my	by
man	ball	man	man	many	man	back	bad	--	man	my

APPENDIX G--Continued

Speaker 3 - List 1

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	then at half are you -- leg his that left this big would at -- they you full he money you we one had at lot if big	them had of I you -- it he that have this me when I at them is -- he man you we why I have at if man	there and of I do hill any is that half this me were I are they you over him money you we one and task I if amen	there at laugh -- you -- like his that laugh this me win hi light they you afford he Betty you we write hat -- at if him	then had have are you all not his then have this me would I are they you wherefor he me you we one had has not of man	the -- of a glue -- let list that half thus many green an -- they do for he many who when many had ask bad have lady	the and of I you -- light its that of this me many I are that you for he many who when when had ask like if back	there had have a you -- be his that have this me would I there they you for he money you we -- had has not give me	there and if are you will it is that laugh this me were are -- they go for in many you we -- bad as not if --	the a of -- you -- -- ate that half that be we I -- they who for he many -- we we mine hat at if but

APPENDIX C--Continued

Speaker 3 - List 1

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
on	had	had	on	hi	had	light	and	had	bad	--
there	there	them	there	there	there	there	there	there	there	the
was	was	--	once	watch	was	what	what	was	what	wish
or	oil	--	noon	hole	her	goal	all	or	--	--
all	all	all	all	all	all	all	all	all	all	all
but	bright	--	one	mother	--	but	by	won	but	--
will	will	where	will	we	will	real	when	will	will	will
would	would	when	really	win	would	really	when	would	will	will
with	with	with	with	with	with	with	with	with	with	with
which	which	which	wish	which	which	which	--	which	reach	wish
people	people	people	people	baby	people	paper	people	people	people	people
more	boy	ball	more	boy	more	ball	more	boy	more	more
light	light	at	like	like	let	light	light	light	let	let
very	very	very	very	--	very	very	--	very	--	--
at	at	as	ask	at	at	hat	at	has	as	at
by	buy	man	by	my	my	ran	right	why	man	my
man	bad	at	man	may	man	man	bad	man	man	my

APPENDIX G--Continued

Speaker 3 - List 3

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
the and of a to in it is that have this be work I are they do for he many you we one an as not if make	the eight have ba you eat each yes that have this be work an hall they you four he many you we will at hat that if big	them at of -- you he -- his that have this him work at -- there you -- he man you we -- at as at of an	the and of I do hill his his that have this me were I hard they new for he money -- we one and as like if many	the many of my you it it it that laugh this me -- I arm they you afford he -- -- we white at at light if may	the mine of my who any his his that have this me work I bell they -- for he many -- we one had has had if men	the back of ah who any let's this that have this mean we am all than cool fall he many blue we running lady ask ask have me	the had of I you he it is that laughed this be would I all they you for he bad you we one and ask at if me	the had of I you in his his that have this me would had -- there you for he many you we one had has has if men	the at of are you in -- is that have this me when and -- they you for in many you we -- -- as that if man	the -- of on you -- -- hit that have that me would a -- they -- for he many you when will many hat lock if --

APPENDIX A--Continued

Speaker 3 - List 3

Group 15

Correct Word	15A	15B	15C	15D	15E	15F	15G	15H	15I	15J
on	on	had	on	light	mine	any	and	had	--	mine
there	there	this	there	there	there	their	there	there	there	there
was	was	why	was	white	was	one	what	was	what	what
or	old	or	oily	all	hole	for	--	boy	--	hole
all	all	--	all	all	all	all	all	all	all	all
but	bite	man	money	bite	my	buy	bite	much	might	mess
will	will	--	ready	willing	will	really	will	will	will	will
would	willing	--	will	--	when	raining	when	one	really	will
with	with	with	with	with	with	with	with	one	with	with
which	which	wish	which	which	which	which	which	with	which	which
people	people	people	--	maybe	people	people	--	people	people	people
more	more	--	more	fall	ball	ball	ball	more	more	boy
light	light	--	like	light	light	lass	light	less	let	let
very	very	--	very	--	flowing	very	--	very	very	fold
at	at	as	ask	at	had	ask	at	has	as	at
by	my	my	my	I	I	am	I	my	my	my
man	mad	man	man	many	men	batty	--	man	--	back

APPENDIX H

SCORES FOR TWO-PART ANALYSIS OF VARIANCE

Correct Responses Only

Speaker	Subject	Successive Utterances				
		1	2	3	4	5
		Group 1	Group 2	Group 3	Group 4	Group 5
1	A	18	21	21	17	9
	B	19	15	16	23	14
	C	10	5	25	16	16
	D	8	19	17	21	14
	E	6	17	18	15	15
	F	9	20	20	24	8
	G	4	14	15	17	10
	H	14	10	3	17	8
	I	15	17	12	8	15
	J	15	8	9	4	5
	Mean	11.8	14.6	15.6	16.2	11.4
		Group 6	Group 7	Group 8	Group 9	Group 10
2	A	14	23	13	11	21
	B	9	18	21	10	19
	C	18	10	21	9	15
	D	17	10	17	14	13
	E	8	18	11	17	15
	F	12	3	15	11	13
	G	8	13	11	13	10
	H	11	22	17	13	3
	I	14	8	7	10	17
	J	18	9	12	13	11
	Mean	12.9	13.4	14.5	12.1	13.7
		Group 11	Group 12	Group 13	Group 14	Group 15
3	A	14	15	11	13	25
	B	8	17	18	25	15
	C	18	11	11	18	18
	D	17	5	16	17	12
	E	19	6	30	12	17
	F	14	15	16	15	15
	G	19	22	20	9	20
	H	29	7	12	7	20
	I	20	14	5	17	19
	J	20	7	5	17	19
	Mean	17.8	11.9	15.0	14.2	17.9

APPENDIX H--Continued

Correct Responses Plus Homophenous Words

Speaker	Subject	Successive Utterances				
		1	2	3	4	5
		Group 1	Group 2	Group 3	Group 4	Group 5
1	A	18	24	25	19	10
	B	21	18	23	28	21
	C	11	7	29	22	19
	D	10	23	19	25	16
	E	9	19	21	19	16
	F	9	24	23	28	11
	G	6	14	18	19	11
	H	17	14	3	19	9
	I	18	18	12	13	17
	J	15	8	10	5	7
	Mean	13.4	16.9	18.3	19.7	13.7
		Group 6	Group 7	Group 8	Group 9	Group 10
2	A	17	24	16	16	24
	B	10	25	24	13	20
	C	20	12	23	11	19
	D	19	13	22	18	17
	E	12	21	12	18	15
	F	14	9	19	14	15
	G	8	14	12	14	10
	H	15	23	21	15	6
	I	18	11	8	11	19
	J	22	11	15	15	15
	Mean	15.5	16.3	17.2	14.5	16.0
		Group 11	Group 12	Group 13	Group 14	Group 15
3	A	17	18	13	14	25
	B	14	20	22	28	19
	C	19	11	13	21	22
	D	19	5	18	20	15
	E	21	7	31	15	22
	F	15	17	20	20	19
	G	22	23	23	10	24
	H	29	7	13	11	25
	I	26	17	17	9	24
	J	25	9	8	19	20
	Mean	20.7	13.4	17.8	16.7	21.5

APPENDIX I

SCORES FOR LINDQUIST'S TYPE-III ANALYSIS OF VARIANCE

Correct Responses Only

Speaker	Order	Subject	Successive Utterances		
			1	3	5
1	1	1A	18	16	15
		1B	19	22	21
		1C	10	16	17
		1D	8	10	9
		1E	6	11	13
		1F	9	13	12
		1G	4	5	5
		1H	14	17	11
		1I	15	15	14
		1J	15	14	11
		Mean	11.8	13.9	12.8
1	2	3A	18	21	18
		3B	14	16	16
		3C	24	25	26
		3D	19	17	13
		3E	15	18	13
		3F	16	20	15
		3G	13	15	17
		3H	9	3	9
		3I	14	12	13
		3J	10	9	10
		Mean	15.2	15.6	15.0
1	3	5A	16	15	9
		5B	19	17	14
		5C	14	14	16
		5D	16	20	14
		5E	10	8	15
		5F	12	14	8
		5G	17	12	10
		5H	3	7	8
		5I	19	20	15
		5J	4	7	5
		Mean	13.0	13.4	11.4

APPENDIX I--Continued

Correct Responses Only

Speaker	Order	Subject	Successive Utterances		
			1	3	5
2	1	6A	14	20	14
		6B	9	11	8
		6C	18	20	26
		6D	17	20	7
		6E	8	8	8
		6F	12	19	13
		6G	8	8	6
		6H	11	13	11
		6I	14	9	11
		6J	18	23	25
		Mean	12.9	15.1	12.9
2	2	8A	14	13	16
		8B	21	21	25
		8C	16	21	22
		8D	13	17	13
		8E	10	11	11
		8F	16	15	14
		8G	13	11	13
		8H	16	17	12
		8I	7	7	10
		8J	16	12	14
		Mean	14.2	14.5	15.0
2	3	10A	16	14	21
		10B	18	16	19
		10C	16	20	15
		10D	18	19	13
		10E	11	17	15
		10F	7	12	13
		10G	8	15	10
		10H	4	5	3
		10I	17	17	17
		10J	13	5	11
		Mean	12.8	14.0	13.7

APPENDIX I--Continued

Correct Responses Only

Speaker	Order	Subject	Successive Utterances		
			1	3	5
3	1	11A	14	15	18
		11B	8	12	18
		11C	18	12	14
		11D	17	20	23
		11E	19	21	24
		11F	14	19	24
		11G	19	24	29
		11H	29	25	24
		11I	20	17	23
		11J	20	26	26
		Mean	17.8	19.1	22.3
3	2	13A	19	11	22
		13B	27	18	25
		13C	15	11	16
		13D	18	16	15
		13E	37	30	34
		13F	14	16	19
		13G	25	20	21
		13H	9	11	15
		13I	17	12	16
		13J	8	5	6
		Mean	18.8	15.0	18.9
3	3	15A	20	25	25
		15B	15	13	15
		15C	22	23	18
		15D	12	16	12
		15E	22	22	17
		15F	17	14	15
		15G	18	22	20
		15H	23	23	18
		15I	21	22	20
		15J	17	17	19
		Mean	18.7	19.7	17.9

APPENDIX I--Continued

Correct Responses Plus Homophenous Words

Speaker	Order	Subject	Successive Utterances		
			1	3	5
1	1	1A	18	18	18
		1B	21	27	26
		1C	11	19	19
		1D	10	12	10
		1E	9	12	17
		1F	9	15	13
		1G	6	9	7
		1H	17	18	12
		1I	18	17	18
		1J	15	15	12
		Mean	13.4	16.2	15.2
1	2	3A	21	25	22
		3B	21	23	21
		3C	28	29	29
		3D	20	19	14
		3E	22	21	19
		3F	18	23	16
		3G	16	18	22
		3H	12	3	11
		3I	15	12	15
		3J	11	10	10
		Mean	18.4	18.3	17.9
1	3	5A	20	20	10
		5B	23	22	21
		5C	21	17	19
		5D	17	23	16
		5E	12	13	16
		5F	14	18	11
		5G	21	13	11
		5H	5	9	9
		5I	20	23	17
		5J	7	10	7
		Mean	16.0	16.8	13.7

APPENDIX I--Continued

Correct Responses Plus Homophenous Words

Speaker	Order	Subject	Successive Utterances		
			1	3	5
2	1	6A	17	22	19
		6B	10	14	10
		6C	20	23	30
		6D	19	21	12
		6E	12	14	15
		6F	14	22	17
		6G	8	11	6
		6H	15	17	13
		6I	18	10	13
		6J	22	27	28
		Mean	15.5	18.1	16.3
2	2	8A	20	16	19
		8B	21	24	25
		8C	17	23	25
		8D	17	22	17
		8E	12	12	13
		8F	20	19	20
		8G	16	12	15
		8H	20	21	14
		8I	7	8	10
		8J	20	15	18
		Mean	17.0	17.2	17.6
2	3	10A	19	19	24
		10B	21	21	20
		10C	18	24	19
		10D	23	23	17
		10E	15	22	15
		10F	9	14	15
		10G	10	17	10
		10H	5	6	6
		10I	21	21	19
		10J	13	7	15
		Mean	15.4	17.4	16.0

APPENDIX I--Continued

Correct Responses Plus Homophenous Words

Speaker	Order	Subject	Successive Utterances		
			1	3	5
3	1	11A	17	17	21
		11B	14	15	28
		11C	19	15	20
		11D	19	25	26
		11E	21	22	27
		11F	15	23	27
		11G	22	24	32
		11H	29	30	30
		11I	26	24	27
		11J	25	33	32
		Mean	20.7	22.8	27.0
3	2	13A	20	13	25
		13B	30	22	29
		13C	19	13	18
		13D	22	18	20
		13E	41	31	40
		13F	20	20	23
		13G	26	23	24
		13H	17	13	20
		13I	20	17	22
		13J	11	8	11
		Mean	22.6	17.8	23.2
3	3	15A	24	28	25
		15B	17	18	19
		15C	27	29	22
		15D	19	19	15
		15E	27	27	22
		15F	20	14	19
		15G	21	24	24
		15H	28	29	25
		15I	22	25	24
		15J	20	19	20
		Mean	22.5	23.2	21.5

APPENDIX J

SUBJECTS

The subjects are categorized in the following manner:

Group: The group in which the subject was placed. Numbered from one to fifteen corresponding to the fifteen lists of words.

Subject: There are ten subjects in each group, designated by letters A through J.

Class: Refers to the course from which the subject was obtained. These are as follows:

- Speech 372 - Functional Speech Pathology
- Speech 454 - Hearing Conservation
- Speech 455 - Audiometry
- Speech 456 - Teaching of Lipreading
- Speech 874 - Seminar in Speech Therapy
- Speech 101 - Public Speaking
- Speech 108 - Voice and Articulation
- Speech 305 - Persuasion
- Speech 470 - Speech Correction for the Classroom Teacher
- Speech 810 - Introduction to Graduate Study in Speech
 - MA - Master's Degree students in speech therapy not enrolled in any of the above classes.
 - Ph.D. - Ph.D. students in speech therapy not enrolled in any of the above classes.
- Non-Speech - Students enrolled in courses outside of the speech department.

Status: Refers to year in college - Freshman, Sophomore, Junior, Senior, Master's Degree, Ph.D., Special Student.

Age: Refers to the age of the subject.

Sex: Male or Female

Seat: Refers to seat taken during the experiment. The seats are numbered in the diagram in Appendix F.

APPENDIX J--Continued

<u>Group</u>	<u>Subject</u>	<u>Class</u>	<u>Status</u>	<u>Age</u>	<u>Sex</u>	<u>Seat</u>
1	A	456	Senior	21	F	2
1	B	874	MA	22	F	3
1	C	MA	MA	25	F	3
1	D	MA	MA	25	F	3
1	E	455	Senior	22	F	4
1	F	305	Senior	26	M	5
1	G	305	Senior	22	F	4
1	H	101	Soph.	19	M	3
1	I	101	Soph.	20	F	2
1	J	108	Senior	22	M	2
2	A	454	Junior	21	F	5
2	B	454	Senior	20	F	4
2	C	454	Junior	23	M	2
2	D	MA	MA	22	F	3
2	E	PhD	Ph.D.	34	M	4
2	F	101	Senior	21	F	3
2	G	108	Senior	21	M	3
2	H	108	Junior	21	M	2
2	I	101	Junior	22	M	2
2	J	108	Soph.	19	F	3
3	A	454	MA	26	M	4
3	B	874	MA	24	M	10
3	C	874	MA	31	F	8
3	D	454	Senior	21	F	1
3	E	810	MA	23	M	2
3	F	470	Senior	21	F	5
3	G	470	Senior	19	F	2
3	H	470	Senior	42	F	2
3	I	101	Soph.	20	F	3
3	J	108	Junior	20	F	3
4	A	874	Ph.D.	33	F	4
4	B	454	Senior	20	F	2
4	C	454	Junior	21	F	4
4	D	454	Senior	21	F	5
4	E	MA	MA	27	M	8
4	F	470	Junior	33	F	3
4	G	108	Soph.	18	F	2
4	H	101	Soph.	20	M	3
4	I	108	Junior	21	M	7
4	J	108	Freshman	18	F	2

APPENDIX J--Continued

<u>Group</u>	<u>Subject</u>	<u>Class</u>	<u>Status</u>	<u>Age</u>	<u>Sex</u>	<u>Seat</u>
5	A	455	Senior	37	F	3
5	B	MA	MA	27	M	3
5	C	MA	MA	22	F	2
5	D	MA	MA	27	F	7
5	E	MA	MA	24	M	9
5	F	101	Junior	20	F	2
5	G	470	Senior	26	F	3
5	H	470	Ph.D.	27	M	4
5	I	305	Senior	26	M	1
5	J	470	Senior	21	M	8
6	A	874	MA	23	F	8
6	B	874	MA	25	M	9
6	C	455	Senior	21	F	9
6	D	MA	MA	22	F	6
6	E	MA	MA	23	M	7
6	F	470	Senior	20	F	5
6	G	470	Senior	21	F	2
6	H	470	Junior	21	F	3
6	I	108	Sophomore	20	F	2
6	J	Non-sp.	Junior	21	F	8
7	A	454	Senior	21	F	4
7	B	455	Senior	21	F	2
7	C	874	Ph.D.	35	M	6
7	D	455	Senior	21	M	4
7	E	454	Junior	21	F	3
7	F	101	Senior	26	M	5
7	G	101	Junior	19	F	2
7	H	Non-sp.	Senior	43	F	3
7	I	810	Ph.D.	26	M	5
7	J	810	Ph.D.	26	M	5
8	A	455	Senior	21	F	3
8	B	PhD	Ph.D.	27	M	1
8	C	372	Senior	35	F	3
8	D	456	MA	24	F	6
8	E	MA	MA	24	F	7
8	F	305	Sophomore	19	M	2
8	G	108	Sophomore	18	F	4
8	H	108	Junior	20	F	2
8	I	108	Senior	25	M	1
8	J	Non-sp.	Senior	21	F	3

APPENDIX J--Continued

<u>Group</u>	<u>Subject</u>	<u>Class</u>	<u>Status</u>	<u>Age</u>	<u>Sex</u>	<u>Seat</u>
9	A	874	MA	24	M	8
9	B	454	Junior	20	F	4
9	C	874	Ph.D.	27	M	10
9	D	455	Senior	21	M	6
9	E	454	MA	35	M	2
9	F	305	Senior	22	M	4
9	G	101	Junior	23	M	7
9	H	101	Junior	27	M	5
9	I	108	Freshman	17	M	3
9	J	108	Senior	21	M	5
10	A	874	MA	22	F	5
10	B	874	MA	23	F	3
10	C	455	Ph.D.	40	M	7
10	D	454	Junior	20	F	2
10	E	PhD	Ph.D.	30	F	9
10	F	470	Sp.Stud.	62	F	1
10	G	108	Sophomore	19	M	2
10	H	108	Senior	33	F	5
10	I	108	Senior	21	F	1
10	J	810	Ph.D.	41	M	3
11	A	454	MA	23	F	3
11	B	MA	MA	20	F	9
11	C	PhD	Ph.D.	32	M	9
11	D	MA	MA	28	F	4
11	E	MA	MA	24	F	5
11	F	305	Freshman	17	M	1
11	G	305	Junior	20	F	2
11	H	108	Junior	26	M	5
11	I	108	Sophomore	19	M	1
11	J	108	Junior	20	F	6
12	A	874	MA	22	F	10
12	B	874	Ph.D.	30	M	2
12	C	455	MA	44	F	7
12	D	874	MA	27	F	5
12	E	454	MA	51	F	2
12	F	101	Junior	21	F	4
12	G	305	Sophomore	20	M	2
12	H	108	Sophomore	20	F	1
12	I	108	Sophomore	20	F	4
12	J	108	Junior	21	F	5

APPENDIX J--Continued

<u>Group</u>	<u>Subject</u>	<u>Class</u>	<u>Status</u>	<u>Age</u>	<u>Sex</u>	<u>Seat</u>
13	A	454	Junior	19	F	3
13	B	454	Junior	20	F	4
13	C	454	MA	29	F	6
13	D	MA	MA	22	F	1
13	E	MA	MA	24	F	7
13	F	101	Freshman	18	F	2
13	G	101	Senior	37	F	1
13	H	101	Junier	22	M	4
13	I	108	Sophomore	19	F	3
13	J	108	Sophomore	32	F	6
14	A	874	MA	28	F	5
14	B	874	MA	22	F	3
14	C	874	MA	23	F	1
14	D	874	MA	23	M	6
14	E	455	MA	22	F	3
14	F	101	Junior	21	M	9
14	G	108	Sp. Stud.		M	5
14	H	108	Senior	19	F	4
14	I	108	Sophomore	19	F	3
14	J	108	Freshman	17	M	2
15	A	874	Ph.D.	36	M	3
15	B	874	MA	22	F	2
15	C	454	Senior	20	F	2
15	D	874	MA	24	M	3
15	E	456	Senior	51	F	1
15	F	470	MA	28	F	4
15	G	470	Junior	23	M	5
15	H	108	Senior	22	F	2
15	I	101	Sp.Stud.	21	F	4
15	J	810	MA	30	M	9

APPENDIX K

RESPONSE FORMS FOR THE PILOT STUDY

DIRECTIONS - List 1

You will be viewing on the screen 45 words, each appearing once. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. Be careful to write each word after the appropriate number.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX K--Continued

DIRECTIONS - List 2

You will be viewing on the screen 45 words, each appearing 2 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 2 times. Be careful to write each word after the appropriate number. Do not start writing until you have seen both presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX K--Continued

DIRECTIONS - List 3

You will be viewing on the screen 45 words, each appearing 3 times in succession. After viewing each presentation you will record in the proper place the word you think was spoken. If you are not sure of what a word is, guess. If you have no answer, draw a line through the space following the number of the item. If a word has more than one spelling, use any one you wish. When recording the word, write it only once, even though it is repeated 3 times. Be careful to write each word after the appropriate number. Do not start writing until you have seen all 3 presentations of the word.

Name: _____

A1 _____	C1 _____	E1 _____
A2 _____	C2 _____	E2 _____
A3 _____	C3 _____	E3 _____
A4 _____	C4 _____	E4 _____
A5 _____	C5 _____	E5 _____
A6 _____	C6 _____	E6 _____
A7 _____	C7 _____	E7 _____
A8 _____	C8 _____	E8 _____
A9 _____	C9 _____	E9 _____
B1 _____	D1 _____	
B2 _____	D2 _____	
B3 _____	D3 _____	
B4 _____	D4 _____	
B5 _____	D5 _____	
B6 _____	D6 _____	
B7 _____	D7 _____	
B8 _____	D8 _____	
B9 _____	D9 _____	

APPENDIX L

RAW SCORES FOR PILOT STUDY

Group	Successive Utterances		
	1	2	3
1	27	24	27
	17	18	22
	34	30	37
	30	34	39
	11	9	19
	Mean	23.8	23
2	15	5	6
	17	21	20
	10	12	12
	27	28	30
	18	17	22
	Mean	17.4	16.6
3	6	8	9
	12	18	17
	4	3	9
	27	23	22
	9	2	4
	Mean	11.6	10.8

Group 1 - Memorized original list of words.

Group 2 - Studied list before viewing film.

Group 3 - No exposure to word lists.

APPENDIX M

ANALYSIS OF PILOT STUDY SCORES

Two-Part Analysis of Variance
For Pilot Study¹

Source of Variation	Sum of Squares	df	Mean Square	F
Utterances	64	2	32	.42
Familiarity with words	1409	2	704	9.26**
Interaction	45	4	11	.14
Between Groups	1518	8	2.47	2.47*
Within Groups	2763	36	76.75	
Total	4281	44		

* Significant at 5% level of confidence.

** Significant at 1% level of confidence.

Differences between Individual Means²

One Utterance			
Mean 1 - 23.8	M2	M3	
Mean 2 - 17.4	M1	6.4*	11.2*
Mean 3 - 11.6	M2		5.8*
Two Successive Utterances			
Mean 1 - 23.0	M2	M3	
Mean 2 - 16.6	M1	6.4*	12.2*
Mean 3 - 10.8	M2		5.8*
Three Successive Utterances			
Mean 1 - 28.8	M2	Me	
Mean 2 - 18.0	M1	10.8*	16.6*
Mean 3 - 12.2	M2		5.8*

*Equal to or greater than the critical difference of 5.15.

¹ Edwards, Op.Cit., pp. 340-347.² Lindquist, Op.Cit., pp. 93-94, and p. 214.

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