LISTENING PERFORMANCE RELATED TO SELECTED ACADEMIC AND PSYCHOLOGICAL MEASURES

> Thesis for the Degree of Ph. D. MICHIGAN STATE UNIVERSITY Dorothy E. Dreyer 1969



This is to certify that the

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thesis entitled

LISTENING PERFORMANCE RELATED TO SELECTED ACADEMIC AND PSYCHOLOGICAL MEASURES

presented by

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has been accepted towards fulfillment of the requirements for

Ph.D. degree in Audiology & Speech Sciences

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Date___August 1, 1969

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ABSTRACT

LISTENING PERFORMANCE RELATED TO SELECTED ACADEMIC AND PSYCHOLOGICAL MEASURES

Bу

Dorothy E. Dreyer

Realizing that listening performance is basic to all educational processes and that listening performance is an essential part in the remediation of communication disorders, attempts have been made in the past to identify listening. The present study was undertaken in an effort to identify further the components of listening beyond that point that has been previously established. In addition, the study is concerned with the ability to predict listening performance.

Many of the previously identified components of listening are included in this study, such as reading comprehension and measures of academic achievement. In addition, a psychological measure has been included in an attempt to ascertain whether specific psychological factors or characteristics relate to listening performance.

Sixty college freshmen and sophomores enrolled in an undergraduate course in Audiology and Speech Sciences participated in this study. The Sequential Tests of

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Educational Progress-Listening and the <u>California Psycho-</u> <u>logical Inventory</u> were administered to the subjects. The results of the <u>College Qualification Tests</u> and the <u>Michigan</u> <u>State University Reading Test</u> were obtained from the University's records.

The data, in the form of raw scores, were submitted to Pearson Product Moment Correlation analysis and also to a Least Squares Regression Program to determine interand multiple relationships.

Results indicate that listening comprehension (as measured by the <u>Sequential Tests of Educational Progress</u>-<u>Listening</u>) and reading comprehension are highly related. Listening performance is also highly related to the measures of scholastic aptitude utilized in this study. The results of the psychological measure indicate that the psychological integrity of the individual appears to contribute to listening performance. It was possible to maximize the prediction of listening performance by the use of several measures in this study. A combination of reading comprehension, "Self-acceptance" and "Achievement via independence" (subtests of the <u>California Psychological</u> <u>Inventory</u>) allowed a more precise prediction of the criterion than did any single predictor alone.

The results of this study also indicate that the Sequential Tests of Educational Progress-Listening is



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not solely a measure of listening comprehension supported by the fact that almost fifty percent of the variance explained by the measures utilized in this study is explained by factors related to intelligence.

On the basis of this study it was concluded that much basic research is needed in order to identify the listening function in a meaningful manner.

LISTENING PERFORMANCE RELATED TO SELECTED ACADEMIC AND PSYCHOLOGICAL MEASURES

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Dorothy E. Dreyer

A THESIS

Submitted to Michigan State University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Audiology and Speech Sciences

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CHAPTER I

INTRODUCTION

Listening has long been of interest to the educator and the researcher. The importance of listening was highlighted by Rankin in 1926 when he showed that listening comprises 42 percent of an individual's communication time as compared with 15 percent spent in reading, 32 percent spent in talking and 11 percent spent in writing.¹ Subsequent investigations have confirmed Rankin's findings; but with the advent of television, it is possible that his estimate would no longer hold today. Listening time may be increased now.

The most casual perusal of the literature on listening reveals the fact that this topic is not solely the concern of the educator and researcher. Although some of the writing that has been done might be considered creative or descriptive, a common element is expressed, viz., that a wide and diverse segment of the population is concerned with listening as an important ingredient

¹Paul Rankin, "The Measurement of the Ability to Understand Spoken Language" (Ph.D. Dissertation, Ann Arbor, Michigan, 1926).

in the ultimate success or failure of the particular endeavors for which they are responsible, for example, medicine, government, social work, retailing or manufacturing to name but a few.

Of prime importance is the subject of listening as it pertains to the remediation of communication disorders. The speech pathologist, whether aware of it or not, is highly dependent upon the listening process. Indeed, ear training is a task of listening on the part of the speech defective person. Even later stages of correction have their roots in listening. Along the same lines, many of the techniques used by those concerned with the rehabilitation of the acoustically handicapped are directed toward effective use of "residual hearing" and therefore based in listening. Understanding the total listening process appears to be crucial to the speech pathologist and the audiologist.

Studies have shown that listening comprehension is correlated with academic achievement, intelligence and reading comprehension; however, there appear to be other factors associated with listening that are yet to be identified. Listening is a process; and when one studies a process associated with human behavior, he must deal with a dynamic organism that is affected by many pressures. Among the pressures are those that evoke an emotional response. Therefore, one could postulate that listening

could fluctuate with the emotional status of the organism. Investigation of psychological integrity as a component related to listening comprehension has largely been neglected.

It is important that listening ability be defined as completely as possible if listening is to be studied as an integral part of the communication process and effectively applied in the remediation of communication disorders. This study was undertaken in an effort to identify further the components of listening. In addition, it is concerned with the ability to predict listening performance.

Purpose of the Study

The purpose of this study is to determine the relationship existing between listening comprehension as measured by performance on a listening task and other selected measures.

This is done in an effort to expand the knowledge of the components of listening ability by seeking to determine whether there are other factors in operation besides those that have been identified by investigators in the past. Many of the previously identified factors are included in this study, namely reading comprehension and scholastic aptitude tests. In addition, this study will attempt to identify whether specific psychological factors or traits

as measured by the <u>California Psychological Inventory</u>¹ relate to listening ability and therefore serve to bring previously unidentified components of listening comprehension to the fore.

Another purpose is to determine whether some of these above mentioned factors in combination maximize the prediction of listening ability beyond the point of any one factor alone.

The criterion measure of listening comprehension employed in this study was derived from the <u>Sequential Tests</u> of <u>Educational Progress-Listening</u>.² The measures of academic achievement are the <u>College Qualification Tests</u>³ and the reading comprehension measure is the <u>Michigan State Univer-</u> <u>sity Reading Test</u>.⁴ The psychological measures were derived from the eighteen subtests of the <u>California Psychological</u> <u>Inventory</u>.

¹Harrison G. Gough, <u>California Psychological Inventory</u> (Palo Alto: Consulting Psychologists Press, Inc., 1964).

²Sequential Tests of Educational Progress (Princeton: Cooperative Test Division, Educational Testing Service, 1957).

³George K. Bennett, Marjorie G. Bennett, Wimburn L. Wallace, and Alexander G. Wesman, <u>College Qualification</u> <u>Tests</u> (New York: The Psychological Corporation, 1961).

^{4&}lt;u>Michigen State University Reading Test</u> (East Lansing: Michigan State University, 1963).

These data were obtained to answer the following questions:

- 1. What is the relationship between listening performance and reading comprehension?
- 2. What is the relationship between listening performance and scholastic aptitude?
- 3. Is there a relationship between listening performance and the trait "Dominance" as defined and measured by the <u>California</u> <u>Psychological</u> Inventory?
- 4. Is there a relationship between listening performance and the trait "Capacity for Status" as defined and measured by the California Psychological Inventory?
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- 20. Is there a relationship between listening performance and the trait "Femininity" as defined and measured by the <u>California</u> Psychological Inventory?

21. To what extent might the prediction of listening performance be improved through the utilization of a combination of the predictors employed in this study?

Importance of the Study

Research has shown that listening is not a unitary function. Investigators have studied listening relative to a number of variables, such as age, sex, intelligence and reading comprehension. Many of these studies have yielded similar results, namely, that a positive relationship has been shown to exist between listening and reading comprehension and listening and intelligence. But these factors in no way have been shown to account for the total identification of the listening act. Obviously, other factors operate that remain to be identified.

Some writers have postulated as to what comprises the listening act and as to what influences that act. Oyer¹ says ". . . listening ability is probably influenced by factors such as listeners' motivation, length of presentation of materials, distracting influences, psychological integrity of the listener, and so forth." He goes on to discuss what he considers may be barriers to good listening. These are identified as distractions, inadequate knowledge of results of practice, feelings of failure, lack of

¹Herbert J. Oyer, <u>Auditory Communication for the Hard</u> of <u>Hearing</u> (Englewood Cliffs: Prentice-Hall, Inc., 1966), p. 81.

motivation, poor habits, emotional problems, inappropriate materials, intelligence, lack of practice and inadequate understanding of the importance of good listening.¹ Others have also postulated as to the factors that may interfere with listening.^{2,3} Some of these factors have been investigated. And yet there are others whose observations must be labeled mere speculations. The emotional and psychological factors which may affect the listening act for the most part fall into this category. While references can be found relative to the emotional and psychological factors which may be linked to the listening act,⁴ this aspect has been singularly neglected.

As our society becomes more complex, as the life span is increased, as medical science is able to save more children who ordinarily would have died at birth and who must live their lives "handicapped," and as the world becomes smaller, the need for effective communication and effective listening increases. It can be fairly said that the need to understand the listening process is crucial to all aspects of life as we go about the business of day-to-day living, as

¹Ibid., pp. 83-85.

²Ralph G. Nichols and Leonard A. Stevens, <u>Are You</u> <u>Listening</u>? (New York: McGraw-Hill Book Company, Inc., 1957).

³Dominick A. Barbara, <u>The Art of Listening</u> (Springfield: Charles C. Thomas, 1958).

⁴<u>Ibid</u>., pp. 113ff.

well as in the educational process and in the remediation of communication disorders. The majority of listening research today is directed toward the training of listening ability. And while this study is in no way concerned with training, it is mentioned here because it serves to point up a major problem concerned with listening research as it is being conducted today. For as Dr. Charles Petrie points out:

> Until we know what abilities or skills are distinctly listening skills, we cannot be certain what skills should be taught to improve listening skills.¹

Thus, in this study, an expanded attempt has been made to . identify those factors that contribute to listening ability.

Definitions

Listening: Listening comprehension, listening ability and listening act are used interchangeably in this study. The term listening implies many things. Barbe² defines it "... as the process of relating the spoken language in terms of past experience." Johnson³ speaks of it as "... the ability to understand and respond effectively to

¹C. R. Petrie, "What We Don't Know About Listening," Journal of Communication, XXIV(1964), 248-251.

²Walter Barbe and Robert Meyer, "Developing Listening Ability in Children," <u>Elementary English</u>, XXXI(Feb., 1954), 82.

³Kenneth O. Johnson, "The Effect of Classroom Training Upon Listening Comprehension," <u>Journal of Communication</u>, I(May, 1951), 53.

oral communication." Hampleman¹ defines it as ". . . the act of giving attention to the spoken word, not only in hearing symbols, but in reacting and understanding."

It would appear that each of these definitions speaks to some aspect of listening, but none of them could be considered wholly complete.

Operationally defined, because of the limitation of the testing instrument employed and in terms of the criterion measure used in this study, listening is conceived of as a complex process composed of several sub-processes.

The first sub-process can be described as psychological. At this time the individual gets "set" to listen, he attends, he anticipates, he focuses his attention. Oyer² describes it as "cocking one's ear to receive acoustic stimuli much as one cocks one's eye to focus upon visual stimuli." This process of getting ready to receive acoustic stimuli implies that the individual in effect blocks out other acoustic stimuli that might be impinging upon the organism at the same time so that he may attend to that which he is about to receive. This, in turn, implies that the factor of attention is now present and that the

¹Richard Hampleman, "Comparison of Listening and Reading Comprehension Ability of 4th and 6th Grade Pupils," <u>Elementary English</u>, XXXV(Jan., 1958), 49.

²Oyer, <u>Auditory Communication for the Hard of Hearing</u>, p. 81.

individual anticipates the reception of acoustic stimuli. The organism is now ready to move on to the next subprocess of the listening act.

The second sub-process might best be described as the physiological, wherein the actual act of reception of the acoustic stimuli by the end organ of hearing takes place.

The third sub-process is the neurological and intellectual, in which, at the cortical level, there is reception, perception, discrimination and association of the acoustic stimuli. At this level judgments must be made relative to the stimuli within the individual's experiential framework if comprehension is to take place. Acknowledgement by some form of response indicates that the complete listening act has been accomplished.

Organization of the Report

Chapter I was organized to provide an introduction to the problem of listening that led to this study.

Chapter II consists of a comprehensive review of the literature relative to the topic of listening.

Chapter III presents a description of the equipment, subjects and procedures utilized in this study.

In Chapter IV the results of the statistical analyses are discussed in terms of the questions generated in Chapter I.

Chapter V summarizes the present study and presents conclusions that can be drawn. Recommendations for future research are suggested.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter will present a review of the literature relevant to this study. Beginning with a discussion of listening as it is perceived of as a unitary or complex skill, a discussion of listening and its relationship to reading will follow. The literature relative to listening and its relationship to intelligence is discussed and the chapter will conclude with a discussion of the literature relative to the psychological concomitants of listening.

Listening - Unitary or Complex Skill?

The statement that listening is not a unitary skill is commonly accepted. Listening should be viewed as a complex of skills, but it appears that this notion is not universally held. A number of studies have been done in an effort to isolate a "listening factor" thereby establishing the fact that listening is a unique, unitary skill. Factorial studies to this end were carried out by Hanley,¹

¹Clair Hanley, "A Factorial Analysis of Speech Perception," Journal of Speech and Hearing Disorders, XXI(March, 1956), 76-87.

Karlin¹ and Spearitt.² Kelly³ points out that both Hanley and Karlin were concerned with auditory acuity when they isolated a listening factor. Hanley tested such factors as pitch discrimination, loudness discrimination, sound discrimination and vocabulary. He identified a verbal facility factor but pointed out that it appeared to be unrelated to speech perception measures.⁴ Kelly hypothesizes that this one test of vocabulary was unrelated to the rest of his measures which dealt with auditory acuity under much different conditions than his vocabulary test. He points out that the vocabulary test as he used it was the only measure that was closely associated with listening when the listener is a member of an audience.⁵ Karlin used auditory and visual tests in his study. His "speed of closure" factor which he identified included two auditory tests and e visuel test (visuel memory spen). Auditory memory spen was not included in this factor. This led Karlin to conclude

4Hanley, "Speech Perception," p. 78. ⁵Kelly, "Listening: Complex or Unitary," p. 461.

¹John Karlin, "The Factorial Isolation of the Primary Auditory Abilities," (Ph.D. Dissertation, Chicago, Ill., 1942).

²Donald Spearitt, "A Factorial Analysis of Listening Comprehension," (Ph.D. Dissertation, Cambridge, Mass., 1961).

³Charles M. Kelly, "Listening: Complex of Activities and a Unitary Skill?" <u>Speech Monographs</u>, XXXIV(Nov., 1967), 461.

that, "This factor appears to be a form of mental alertness and ability to make best use of certain stimuli in a limited time."¹ This would seem to imply that the awareness of stimuli may come from factors quite separate from auditory ones indicating that auditory factors alone are not responsible solely for the reception or perception of stimuli presented acoustically. This also implies that the person with impaired auditory acuity may be a "listener" through the use of other sensory cues or channels. Had Karlin not used visual tests, Kelly points out, he may well have identified a "speed of auditory closure" factor which would have been more defensible as a unique listening skill.²

Spearitt's study identified a "listening comprehension" factor. The basis of his study was structured around specially modified listening tests and therefore comes closest to identifying a unique skill related to listening. He points out that the factor he identified ". . . was fairly closely related to verbal comprehension, induction and span of memory factors."³

These factorial studies notwithstanding, the majority of the research relative to listening would support the position that listening is a complex function, most likely

¹Karlin, "Isolation of Auditory Comprehension," p. 45.
²Kelly, "Listening: Complex or Unitary," p. 461.
³Spearitt, "Analysis of Listening Comprehension," p. x.

a combination of abilities working in association with one another. While many of the investigations have not always been consistent in their findings, they serve to support the position that listening is a complex function, not a unitary one. Even the factorial studies indicate that what was identified as listening was closely associated with other functions. To consider listening a unitary skill would appear to be an oversimplification of a very complex problem.

Listening Performance and Reading Comprehension

Keller, reviewing the research in listening done during the 1950's, concludes that the skills of listening and reading are not common one to the other and that listening involves a ". . . complex of skills separable from those involved in reading."¹ To support his assertion, he directs the reader to several studies.

Brown and Carlsen found relatively small correlations between their tests of listening (<u>Brown-Carlsen Listening</u> <u>Comprehension Test</u>) and tests of reading,² Blewett, using an author-devised test of listening comprehension found a

¹Paul W. Keller, "Major Findings in Listening in the Past Ten Years," <u>Journal of Communication</u>, X(March, 1960), 29-38.

²James I. Brown and Robert G. Carlsen, <u>Brown-Carlsen</u> Listening Comprehension Test (Yonkers: World Book Co., 1955).

correlation of .39 between it and reading.¹ Biggs also constructed a test of listening comprehension and concluded on the basis of her investigation that her test measured traits that were independent of those traits measured by a diagnostic reading test.²

The preponderence of research, however, show a positive relationship between listening and reading. Rankin concluded that listening and reading are closely associated, but he also notes that the correspondence is not a perfect one.³ Work done in the past shows correlations between reading and listening ranging from .50 to .89. At first glance, these correlations appear to be quite high, but a word of caution needs to be interjected here. For the most part, the results from the various studies to be reported in this section must be looked at for their individual findings. Comparisons across studies are difficult to make because seldom are the same measures employed from study to study. It will also be seen that there are obvious differences in the populations among the various studies. Ccgnizant of the inherent dangers of drawing generalizations from such differing aspects of these studies, a review of the results of

¹Thomas T. Blewett, "An Experiment in the Measure of Listening," <u>Journal of Communication</u>, I(May, 1951), 50-57.

²Mildred E. Biggs, "Construction, Validation, and Evaluation of a Diagnostic Test of Listening Effectiveness," <u>Speech Monographs</u>, XXXIII(March, 1956), 9-13.

³Renkin, "Spoken Language," p. 215.



previous investigations relating listening and reading is enlightening.

Larsen and Feder reported superior performance was demonstrated by reading over listening. They point out, however, that this appears to be a function of the level of difficulty of the material used. For students rated high scholastically they found that reading ability was superior but reported an overall correlation of .62 between listening and reading. The measures employed in this study were the <u>Nelson-Denny Reading Test</u> and the <u>Nelson-Denny Hearing Test</u>. They feel that comprehension is largely a centrally mediated process which operates independently of the mode of presentation of the material.¹ Gates, using his own reading test, reports a correlation of .78 between reading and listening.²

Jackson found a high relationship between listening as measured by the <u>Sequential Tests of Educational Progress</u>-<u>Listening (STEP-Listening)</u> and reading as measured by the <u>Gates Basic Reading Test</u> in fourth, fifth and sixth graders.³ Skiffington conducted a study based on listening

¹Robert P. Larsen and D. D. Feder, "Common and Differential Factors in Reading and Hearing Comprehension," Journal of Educational Psychology, XXXI(April, 1940), 241-52.

²Arthur I. Gates, <u>Manual of Directions for Gates</u> <u>Reading Readiness Tests</u> (New York: Bureau of Publications, Columbia University, 1940).

³Ann Elizabeth Jackson, "An Investigation of the Relationship Between Listening and Selected Variables in Grades 4, 5, and 6," <u>Dissertation Abstracts</u>, XXVII(1966), 27.

treining. As a part of his design he administered <u>STEP-</u> <u>Listening</u> and the <u>lows Silent Reading Test</u> in order to obtain a pre-test measure. The correlation between these two measures was .52 for the control group and .56 for the experimental group. The post-test correlations are interesting to note. They were .56 and .45 respectively for the two groups.¹ Hildreth reports a correlation of .79 between reading and listening.² Condon found that good readers performed significantly better on the <u>Brown-Carlsen</u> when it was administered to 874 secondary pupils.³ This is further indication that listening and reading share similar functions.

McConnell administered <u>STEP-Listening</u> and the <u>Metro-</u> <u>politan Reading Test</u> to 409 fourth graders and 168 sixth graders. She found a correlation of .59 between listening and reading at the fourth grade level and .73 at the sixth grade level. While the results obtained at the sixth grade level were significantly higher than those at the fourth grade level for listening, they were not as large as the

ljemes Skiffington, "The Effect of Auding Training on the Reading Achievement of Average Eighth-Grade Puplls," Dissertation Abstracts, XXVI(1966), 5308.

²Gertrude Hildreth, "Interrelationship Among Language Arts," <u>Elementary School</u> Journal, XLVII(June, 1948), 538-49.

³Edwyns Condon, "An Anslysis of the Differences Between Good and Poor Listeners in Gredes Nine, Eleven and Thirteen," Dissertation Abstracts, XXVI(1965), 3106.

differences she found for reading.1

Palmer studied the relationship between listening and reading in high school freshmen. He administered <u>STEP-</u> <u>Listening</u> and <u>STEP-Reading</u> to 329 pupils. He also administered the <u>Otis Tests of General Ability</u>. He reported a correlation of .62 between reading and listening. He divided his population according to mental age and found that the correlation between these two measures was .33 for the average group, .79 for his high intelligence group and .54 for the low intelligence group.²

Michael and others studied a college population. The study was actually directed at assessing three curricular program patterns relative to communication skills, but he reports a correlation of .70 between reading and listening as measured by <u>STEP-Listening</u> and <u>STEP-Reading</u>.³ Karraker in another study dealing with a college population found that there was a considerable spread between "A" and "C" students

Lethel Marie McConnell, "A Study of Listening at the Fourth and Sixth Grades Based Upon STEP: Listening, Including a Study of the Literature," in Listening Bibliography, Sam Duker, ed. (Matuchen, N.J.: Scarecrow Press, Inc., 1968), p. 176.

²Brother Michael Palmer, "A Study of the Relationship Between Reading Comprehension and Listening Comprehension of Selected High School Freshmen," unpublished Master's thesis in <u>Listening Bibliography</u>, Sam Duker, ed. (Metuchen, N.J.: Scarecrow Fress, Inc., 1968), pp. 207-08.

³Williem Michael <u>et al</u>, "Gains in Verious Measures of Communication Skills Relative to Three Curricular Patterns in College," <u>Educational and Psychological Measurement</u>, XXIII(Summer, 1963), 365-74.

in listening skills. However, she reports a correlation of .89 between listening and reading for her subjects. The reading measure used by Karraker was the <u>Triggs Test.</u>¹ The large difference, between the two correlations reported by Karraker and Michael could be explained by the difference in the reading test each used.

Fourth, fifth and sixth greders served as subjects for a study conducted by Bonner. Utilizing the <u>Stanford Achieve-</u> <u>ment Test</u>, the <u>Pintner General Abilities Test</u> and <u>STEP-</u> <u>Listening</u>, she obtained correlations of .50, .67 and .57 for the three grades respectively.² Charles Brown, using subjects from the same grades reported correlation of .81, .76 and .77 between listening and reading. He utilized the <u>Stanford</u> <u>Achievement Test</u> and the <u>ETS Test of Listening</u>.³ Ross obtained a correlation of .74 between reading and listening using <u>STEP-Listening</u> and <u>STEP-Reading</u>.⁴ Fawcett administered

¹Mary E. Kerraker, "An Evaluation of the Influence of Interest and 'Set' on Listening Effectiveness in the Basic Communication Class," <u>Speech Monographs</u>, XIX(June, 1952), 117-18.

²Myrtle Clara Stoddard Bonner, "A Critical Analysis of the Relationship of Reading Ability to Listening Ability," <u>Dissertation Abstracts</u>, XXI(1960), 2167-66.

³Cherles T. Brown, "Three Studies of Listening of Children," <u>Speech Monogrephs</u>, XXXII(June, 1965), 134-38.

⁴Remon Ross, "A Look at Listeners," <u>Elementary School</u> <u>Journal</u>, LXIV(April, 1964), 369-72.
<u>STEP-Listening</u> and the <u>Iowa Basic Skills Test</u> to 639 fourth, fifth and sixth graders. The overall correlation between these listening and reading measures was .58.¹

While the foregoing studies point out that there is a considerable difference in the magnitude of the relation between the measures of listening and reading, it is evident that some type of relationship does exist. There appears to be several explanations for the differences observed among these studies. First, very few of the studies employed the same measure of listening. Some used author-devised tests, others published tests. Therefore, consistency of a listening measure is lacking. Second. many different measures of reading were used in these studies. From the results, one would have to conclude that the various reading tests differed considerably as to level of difficulty of reading material. Necessarily, the relationship between listening and reading would be affected because of this. This problem confounds results of the measurement of listening. Last. the research in listening as it relates to reading was done with many different age groups. But even when similar populations were tested. the use of differing measures in the studies would tend to cause the results to be different as a function of the testing instruments used. Regardless of the

¹Annabel Elizabeth Fawcett, "The Effect of Training in Listening upon the Listening Skills of Intermediate Grade Children." Dissertation Abstracts, XXV(1965), 7105-09.

lack of consistency in the studies and regardless of the particular measures used in any of the studies, it is evident that as listening is defined by the instruments used to measure it in the majority of these studies, listening is related in some way to reading. As Beery points out:

Common to listening, speaking, reading and writing are certain fundamental elements of language. Among these are vocabulary, sentence patterns, organization of ideas, and adjustment to the function of language in any particular instance, . . 1

Listening and Intelligence

Keller states that the best correlate of listening is intelligence.² But with this measure as with reading, the same problem seems to exist. That is, a wide range of correlations is reported, and this appears to be dependent on the tests that are used and the subjects that were tested. Renkin, in his landmark study, says that "Intelligence is as closely related to listening ability, as measured by a single test, as it is to other school abilities. . . ." He reports a correlation of .56 between listening as measured by <u>Listening Test 31</u> and intelligence as measured by the Detroit Alpha Intelligence Test.³

¹Althes Beery, "Interrelationships Between Listening and Other Language Arts Areas," <u>Elementary English</u>, XXXI (1954), 164.

 $^{2}\mbox{Keller}$, "Møjor Findings in Listening in the Past Ten Years," p. 33.

3Rankin, "Spoken Language," p. 215.

Brown and Carlsen found moderate correlations between their test of listening and academic achievement. 1 Stromer.2 Haberland³ and McClendon⁴ all show a strong relationship between listening and various measures of intelligence. Blewett, using an author-devised test of listening, obtained a correlation of .51 between listening and intelligence. His listening test was designed to measure recall of factual material. details presented orally and the ability to draw inferences and conclusions from information presented orally.5 Brown feels the contention that listening is more closely related to intelligence, than to reading is not supportable. He states that the higher correlations obtained when testing elementary school children are either artifacts of the tests used or that listening becomes more of a learned ability and less of a native ability with maturity. In a study done with children in the fourth, fifth and sixth grades he found correlations of .75. .68 and .76 between listening and intelligence in the three grades respectively. The correlations he

¹Brown and Carlsen, <u>Comprehension Test</u>.

²Welter Stromer, "An Investigation Into Some of the Relationships Between Reading, Listening and Intelligence," Speech Monographs, XXI(August, 1954), 159-60.

³John A. Høberland, "Listening Ability in College Freshmen," <u>School and Society</u>, LXXXIV(December, 1956), 217-18.

4Psul I. McClendon, "An Experimental Study of the Effects of Speaking Rate upon Listenability," <u>Speech</u> Monographs, XXIV(June, 1957), 89-90.

⁵Blewett, "Measurement of Listening," pp. 50-57.

obtained between listening and reading were .81. .76 and .77 for the three grades. For sixth graders he reports a partial correlation of .45 between listening and reading with intelligence held constant and a partial correlation of .39 between listening and intelligence with reading held constant. The partial correlation between reading and intelligence with listening held constant was .60. The tests he used were the California Test of Mental Maturity, the Stanford Achievement Test (with reading), the Stanford Achievement Test with reading eliminated and the ETS Test of Listening.¹ Testing children of the same age range, Bonner used the Stenford Achievement Test, the Pintner Test of General Abilities and STEP-Listening to obtain correlations of .59, .42 and .38 for the same three grades respectively.² Karraker, in her study of college students found a correlation of .52 between listening and intelligence.³ Palmer administered STEP-Listening and the Otis to 329 pupils and obtained a correlation of .55 between listening and intelligence.⁴ McConnell, employing STEP-Listening and the California Test of Mental Maturity, obtained a correlation

¹Charles T. Brown, "Three Studies of Listening," p. 137.

²Bonner, "Relationship of Reading Ability to Listening Ability," <u>Dissertation Abstracts</u>, XXI(1961), 2167-68.

³Karraker, "Interest and 'Set' on Listening," pp. 117-18. ⁴Palmer, "Reading Comprehension and Listening Comprehension," p. 208.



of .54 for fourth graders and .62 for her sixth grade subjects.¹ Ross examined the relation between listening and intelligence. He administered the <u>California Short-Form</u> <u>Test of Mental Maturity</u> and <u>STEP-Listening</u>. His results indicate that listening and verbal ability as a measure of intelligence correlated .76. His non-verbal measure of intelligence resulted in a correlation of .28, and the total correlation between listening and intelligence was .51. He reports a coefficient of alienation of .46 between listening and intelligence, and therefore draws the conclusion that half of listening ability is something other than intelligence.²

Anderson and Baldauf studied a population of 420 fifth graders. They administered the <u>Stanford Achievement</u> <u>Test</u>, the <u>Otis Mental Ability Test</u> and <u>STEP-Listening</u>. They report that between listening and school achievement the correlation was .82 and between listening and mental ability the correlation was .58. With mental ability held constant, a correlation of .20 was obtained between listening and school achievement. They conclude that a general factor named verbal comprehension accounts for about half of the variance between listening and mental ability.³

¹McConnell, "Study of Listening at Fourth and Sixth Grades," p. 176.

²Ross, "A Look at Listeners," pp. 369-72.

³Harold Anderson and Robert J. Balduaf, "A Study of a Measure of Listening," <u>Journal of Educational Research</u>, LVII(December, 1963), 197-200.

Even though differing measures were used to obtain the various results between listening and intelligence, it is evident that some relationship exists as with reading. However, that such a relationship exists is not surprising when one considers that reading comprehension, in general, correlated highly with intelligence.

Listening and Other Psychological Factors Bakan wrote that:

Listening skills may be dependent on intellectual, motivational and personality variables. If this is true then it becomes important to determine to what extent differences among people in listening proficiency are due to differences in intellectual, motivational and personality variables. If much of the variation among individuals in listening ability can be attributed to these other psychological variables, then it is unlikely that big changes in listening proficiency can be brought about without taking these variables into consideration.

Thus far, the attempt to identify the psychological variables linked to listening has not been extensive, except with respect to intelligence. For example, attention is often mentioned in connection with listening. For the most part it has been taken for granted. In some cases it has been equated with "set." Attention can be defined as:

¹Paul Bakan, "Some Reflections on Listening Behavior," Journal of Communication, VI(Autumn, 1956), 108-112.

Focusing on certain aspects of current experience and neglecting others. Attention has a focus in which events are clearly perceived and a margin in which they are less clearly perceived.

Set has been defined as "A readiness to react in a certain way when confronted with a problem or stimulus situation."² Karraker looked at the question of calling set a component of attention. She investigated the influence of interest toward subject matter when that interest was expressed before administering the listening measure. Interest preference was determined by the <u>Kuder Preference Record</u>. Her results show that theoretical interest was not related to listening comprehension. She therefore concluded that "set" as a psychological factor in listening is ambiguous.³ Heath arrived at the same conclusion.⁴ Brown identified a factor he called "anticipatory set." He describes this factor by saying that ". . . good listening may require the ability to hypothesize, the ability to say to oneself as he listens, 'I imagine that what the speaker is trying to

¹Clifford T. Morgan, <u>Introduction to Psychology</u>, 2nd ed. (New York: McGraw-Hill Book Company, Inc., 1961), p. 665.

²Ibid., p. 689.

³Karraker, "Interest and 'Set' on Listening," pp. 117-18.

⁴Martha Heath, "A Study in Listening: The Relationship Between Interest, Educability and Score in an Objective Examination Over the Factual Content of an Informative Speech," Speech Monographs, XIX (August, 1952), 159-60.



say is this. . . .' This anticipating and comparing of expectation with outcome may cause the listener to pay attention in order to see if he is right." He arrived at this conclusion by administering the <u>STEP-Listening</u> to a group of college students under two different circumstances. With one group he included introductory remarks before each selection aimed at producing "expectation" or "set" regarding what was to come. No introductory remarks were used with the control group. He found a significant difference between groups favoring the group who received the introductory remarks or extra motivation.¹

These studies serve to show that this particular area as it relates to listening needs much more attention.

Several other investigators have looked at other psychological parameters of listening. Higgins investigated the relationship between listening and anxiety. He administered the <u>STEP-Listening</u> and the <u>Manifest Anxiety</u> <u>Scale</u> and obtained very low correlations between the two measures. He concluded that the results of his study did not reveal in any conclusive manner that listening is positively or negatively influenced by anxiety.²

¹Charles T. Brown, "Studies in Listening Comprehension," <u>Speech Monographs</u>, XXVI(November, 1959), 288-94.

²Ivan Duke Higgins, "An Empirical Study of Listening Related to Anxiety and to Certain Other Measures of Ability and Achievement," <u>Dissertation Abstracts</u>, XXV (1964), 745. Haberland found low but positive correlations between listening and temperament as measured by the <u>Thurstone</u> <u>Temperament Scale</u>. His subjects were college students.¹ Ross administered the <u>California Test of Personality</u> and <u>STEP-Listening</u> and reported the following correlations: .34 between personal adjustment and listening, .44 between social adjustment and listening and .42 between the total personality measure and listening.² Jackson, using the same measure of personality, concluded that individual adjustment may have a direct influence on the ability of the individual to use listening skills effectively.³ Brown utilizing the <u>ETS Listening Test</u> and the <u>Allport, Vernon</u>, <u>Lindzey Scale of Values</u> found, as did Karraker and Heath, that theoretical interests of college students were not significantly related to listening.⁴

Although very little work has been done in this area, the psychological components of listening bear closer scrutiny. For example, emotional stability has not been investigated, nor have many of the other psychological traits that may or may not have an important relationship to listening.

¹Haberland, "Listening Ability in College Freshmen," pp. 217-18. ²Ross, "A Look at Listeners," pp. 369-72. ³Jackson, "Relationship Between Listening," p. 27. ⁴Brown, "Studies in Listening," pp. 288-94.



CHAPTER III

SUBJECTS, EQUIPMENT, MATERIALS AND PROCEDURES

An explanation of the equipment, materials, subjects and test procedures is presented in this chapter.

A total of sixty subjects participated in this study. The subjects were freshmen and sophomores enrolled in Audiology and Speech Sciences 108 (Voice and Articulation) at Michigan State University. All subjects were given the <u>Sequential Tests of Educational Progress-Listening</u> and the <u>California Psychological Inventory</u>. In addition, several other scores were obtained for each subject from other sources to include the results of the <u>College</u> <u>Qualification Tests</u> and the results of the <u>Michigan State</u> <u>University Reading Test</u>. Each student must take these latter tests upon entrance to the University and the scores were obtained from the students' records on file at the Testing Office of the Counseling Center at Michigan State University.

Subjects

Students enrolled in Audiology and Speech Sciences 108 (Voice and Articulation) Winter quarter, 1968 at Michigan

State University served as subjects for this study. Any students above the level of sophomore standing who were enrolled in the course were eliminated from the study. This was necessary because the <u>STEP-Listening</u> has been adjudged too easy for levels above the fourteenth grade. It was also necessary to eliminate some subjects because their records were incomplete or unavailable. Each subject who participated in the study stated that he had no hearing problems or had ever experienced problems with his hearing. There were no other requirements established for participation in this study.

Equipment

The following list constitutes the major instruments employed in this study.

Tape Recorder (Ampex AG 350) Tape Recorder (Magnecord 1022) Tape Recorder (Ampex 601) Speaker Amplifier (Ampex 620) Mixer (Ampex MX-35) Microphone (Electrovoice 654) Level Recorder (Bruel & Kjaer 2305) Noise Generator (Grason-Stadler 901B) Audio Oscillator (Central Scientific Company) Sound Level Meter (Bruel & Kjaer 2203) Commercial Test Room (Industrial Acoustic Company, Inc., single-walled booth, series 400)

Materials

The following list constitutes the materials that were employed in this study.

Sequential Tests of Educational Progress-Listening

California Psychological Inventory

Michigan State University Reading Test

College Qualification Tests

Subtests of the College Qualification Tests

Verbal

Numerical

Information

Audio Recording Tape (Scotch Magnetic Tape, Dynarange Professional Series 201)

Sequential Tests of Educational Progress-Listening.

The <u>Sequential Tests of Educational Progress-Listening</u> (<u>STEP-Listening</u>) was designed to measure the individual's skill in comprehending, interpreting, evaluating and applying material to which he is required to listen.¹

The test is available in four forms, graded in difficulty starting at the fourth grade level extending through the

^LSequential Tests of Educational Progress: Manual for <u>Interpreting Scores: Listening</u> (Princeton: Cooperative Test Division, Educational Testing Service, 1957), p. 9.



fourteenth grade, or the sophomore level in college. The form employed in this study was form 1A.

Reliability estimates for the <u>STEP-Listening</u>, as for the other Sequential Tests of Educational Progress, are based on a single administration of the tests; therefore they are actually estimates of internal consistency. The median reliability reported for <u>STEP-Listening</u>, Form 1A, is .90 with a Standard Error of 3.62.¹

There is another published test of listening available which is frequently used; the <u>Brown-Carlsen Listening</u> <u>Comprehension Test.</u>² The stated purpose of this test is to measure the individual's ability to comprehend spoken language. As defined by the creators of this test, listening comprehension means ". . . the aural assimilation of spoken symbols in face-to-face speaker-audience situation with both oral and visual cues present."³ The test covers the areas of immediate recall, following directions, recognizing word meaning and lecture comprehension.⁴ The <u>Brown-Carlsen</u> was

¹Sequential Tests of Educational Progress: Technical Report (Princeton: Cooperative Test Division, Educational Testing Service, 1957), pp. 9-10.

²Brown and Carlsen, <u>Brown-Carlsen Listening Comprehen</u>sion Test.

³Robert I. Brown and Robert G. Carlsen, <u>Manual of</u> <u>Directions for the Brown-Carlsen Listening Comprehension</u> <u>Test</u> (Yonkers: World Book Co., 1957), p. 1.

⁴Ibid., p. 109.



devised for use with secondary school students but can be used through the thirteenth grade.

For this study, the <u>Sequential Tests of Educational</u> <u>Progress-Listening</u> was used because of the fact that this test was designed with a level of difficulty enabling participation of college sophomores.

California Psychological Inventory.

The California Psychological Inventory (CPI) was developed in order to assess personality characteristics that are related to positive and favorable aspects of personality, rather than to the morbid and pathological. The inventory was designed for the "normal" individual, not the emotionally disturbed. The various scales are intended to tap personality characteristics deemed important for social living and social interaction.

The test consists of 480 items and requires true or false responses. It resembles the <u>Minnesota Multiphasic</u> <u>Personality Inventory</u>, and some two hundred items of the <u>California Psychological Inventory</u> originally appeared in the <u>MMPI</u>. There are eighteen subtests or scales that are particularly relevant to the "normal" individual. These subtests are grouped into four broad categories based on common psychological clusterings.¹

^LGough, <u>California Psychological Inventory: Manual</u>, p. 5.



Six scales make up the first broad category (Class I: "Measures of Poise, Ascendency, and Self-Assurance"). As defined by this test, these scales are:

- Dominance (Do): To assess factors of leadership ability, dominance, persistence, and social initiative.
- Capacity for Status (Cs): To serve as an index of an individual's capacity for status (not his actual or achieved status). The scale attempts to measure the personal qualities and attributes which underlie and lead to status.
- 3. Sociability (Sy): To identify persons of outgoing, sociable, participative temperament.
- 4. Social Presence (Sp): To assess factors such as poise, spontaneity, and selfconfidence in personal and social interaction.
- 5. Self-acceptance (Sa): To assess factors such as personal worth, self-acceptance, and capacity for independent thinking and action.
- 6. Sense of Well-being (Wb): To identify persons who minimize their worries and complaints, and who are relatively free from self-doubt and disillusionment.

These scales deal principally with feelings of interpersonal and intrapersonal adequacy.²

Class II is labeled "Measures of Socialization, Maturity, and Responsibility." They are concerned with social norms and values and with one's disposition to accept

¹Ibid., p. 10.

²<u>Ibid</u>., p. 7.

or reject such values.¹ There are six scales within this general classification.

- 1. Responsibility (Re): To identify persons of conscientious, responsible, and dependable disposition and temperament.
- 2. Socialization (So): To indicate the degree of social maturity, integrity, and rectitude which the individual has attained.
- 3. Self-control (Sc): To assess the degree and adequacy of self-regulation and self-control and freedom from impulsivity and selfcenteredness.
- 4. Tolerance (To): To identify persons with permissive, accepting, and non-judgmental social beliefs and attitude.
- 5. Good impression (Gi): To identify persons capable of creating a favorable impression, and who are concerned about how others react to them.
- 6. Communality (Cm): To indicate the degree to which an individual's reactions and responses correspond to the modal ("common") pattern established for the inventory.²

The scales in Class III ("Measures of Achievement

Potential and Intellectual Efficiency") have as their common denominator, matters of academic and intellectual endeavor.³ There are three scales.

 Achievement via conformance (Ac): To identify those factors of interest and motivation which facilitate achievement in any setting where conformance is a positive behavior.

¹<u>Ibid</u>. ²<u>Ibid</u>., pp. 10-11. ³<u>Ibid</u>., p. 7.



- 2. Achievement via independence (Ai): To identify those factors of interest and motivation which facilitate achievement in any setting where autonomy and independence are positive behaviors.
- 3. Intellectual efficiency (Ie): To indicate the degree of personal and intellectual efficiency which the individual has attained.¹

The final grouping of scales (Class IV: "Measures of Intellectual and Interest Modes") is comprised of three scales. The scales in this class vary rather independently of each other and of the other previously defined scales. These scales are said to reflect attitudes toward life of broad and far-reaching significance.² These scales are:

- 1. Psychological-mindedness (Py): To measure the degree to which the individual is interested in, and responsive to, the inner needs, motives, and experiences of others.
- 2. Flexibility (Fx): To indicate the degree of flexibility and adaptability of a person's thinking and social behavior.
- 3. Femininity (Fe): To assess the masculinity or femininity of interests. (High scores indicate more feminine interests, low scores more masculine.)³

Interpretations of the scales for high and low scores are presented in the manual. Reliability coefficients were obtained for high school students. Typical reliability coefficients are in the .60 range for both males and females. The lowest reliability coefficient is on the "Cm" scale

¹<u>Ibid</u>., p. 11. ²<u>Ibid</u>., p. 7. ³<u>Ibid</u>., p. 11. (r=.41) and the highest on the "Ie" scale (r=.75). Cross validation studies were done for each of the scales on a variety of groups. Several validity coefficients are reported for each scale of the Inventory and are presented in the manual.

College Qualification Tests.

The <u>College Qualification Tests</u> (<u>CQT</u>) are a group of tests of scholastic achievement.¹ They are administered as a part of a battery of tests to all incoming students at Michigan State University. The <u>College Qualification</u> <u>Tests</u> are power tests that are broadly predictive of college success, especially so for the first semester of college work.

There are several subtests that comprise the <u>College</u> <u>Qualification Tests</u>. The "Verbal Test" (CQT-V) is based on vocabulary. The "Numerical Test" (CQT-N) is designed to test the understanding of concepts and manipulation of ideas rather than computational proficiency. The "Information Test" (CQT-I) was devised to measure the educational background of the student and provide an over-all indication of the student's range of knowledge. In addition, a Total Score (CQT-T) is provided which sums the scores of the CQT-V, the CQT-N and the CQT-I.²

¹Bennett <u>et al. College Qualification Tests: Manual</u>. ²<u>Ibid</u>., pp. 3-5.

The reliability was determined with groups ranging from grade eleven through college freshmen. Reliability estimates range from .91 to .97. Validity has largely been obtained relative to grade point average. This was done on various groups of students in various parts of the country in various types of institutions. Validity estimates range from .07 to .73 with the majority of the validity coefficients falling between .30 and .73. Complete reliability and validity information are available in the test menual.

Michigan State University Reading Test.

This test was designed to measure the student's ability to comprehend material expressed in written passages. The test is representational of textual materials found in several academic areas.

New norms are derived for the test each year from the incoming class at the university.

Preparation of Materials

The <u>Sequential Tests of Educational Progress-Listening</u>, Form LA, was recorded in the Speech Science Laboratory at Michigan State University. The stimulus material was

¹<u>Michigan State University Reading Test</u>, "Comparative Standings of the Various College and Curriculum Groups on the Orientation Week Examinations for the Fall of 1968," (Office of Evaluation Services, Michigan State University, 1968), p. 1.

recorded by a male speaker with a General American dialect. The initial recording was made on an Ampex AG 350 tape recorder with the speaker in a single-walled sound treated booth. The tape of this recording was then edited to eliminate errors and dubbed onto another tape utilizing the Magnecord 1022 in conjunction with the Ampex AG 350. The material was recorded in two parts (<u>STEP-Listening</u> Part I and Part II). The same division that is used in the test booklet was used here in dividing the test into two parts.

It was necessary to play the tapes of ongoing speech through the Level Recorder in order to determine the intensity needed for the calibration tone. This intensity was determined by averaging the peak rms values obtained from the readout of the Level Recorder. The resultant average was used as a reference for the calibration sound placed on the tape. One minute of white noise was recorded at the specified level. This calibration sound was spliced onto the tape and a master copy was dubbed using the procedure previously described.

Procedure

Subjects participated on two occasions during regularly scheduled class meetings. At the first meeting, Part I of STEP-Listening, Form 1A was administered via

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¹The speaker was Mr. William Haas, a graduate student in Audiology and Speech Sciences at Michigan State University.

tape recorder. Presentation level of the tape was determined by taking sound pressure level readings of the white noise calibration tone at three separate points in the room at approximately ear level. The intensity was then adjusted so that the stimulus material was presented at 68dB SPL.



Figure 1. Schematic representation of classroom with points where sound pressure level readings were taken marked "X," and position of the tape recorder.

Before the tape was played, instructions were given to the subjects by the investigator. These consisted of reading the instructions for <u>STEP-Listening</u> aloud to the subjects. These instructions are contained in the test booklet and are the standardized procedure prescribed for the test. After completion of the taped presentation of Part I of the test, the booklets were collected and the <u>California Psychological Inventory</u> booklets and answer sheets were distributed. The subjects were instructed to complete the <u>California Psychological Inventory</u> according to the instructions contained in the test booklet. This test was to be completed at home and returned at the next class meeting.

The second session was devoted to the administration of Part II of <u>STEP-Listening</u>. Calibration procedures as previously described were again carried out before the presentation of the tape recording. Scoring of <u>STEP-</u> <u>Listening</u> and the <u>California Psychological Inventory</u> was done by hand, utilizing the keys provided for the two tests.

Scores of the test results of the <u>College Qualification</u> <u>Tests</u> and the <u>Michigan State University Reading Test</u> were obtained from the student's record on file at the Testing Office of the Counseling Center.

The data for this research were in the form of raw scores obtained on each of the individual subtests of the <u>California Psychological Inventory</u>, the combined raw scores for Parts I and II of <u>STEP-Listening</u>, the raw score results of the four subtests of the <u>College Qualification Tests</u> and the raw score of the <u>Michigan State University Reading</u> <u>Test</u>. (See Appendix A.)

CHAPTER IV

RESULTS AND DISCUSSION

This chapter includes a presentation of the correlation coefficients among the variables of the study. It also contains the result of the multiple correlation coefficients obtained from the same data. In addition, a discussion of the findings in relation to the questions generated is included.

The data were in the form of raw scores obtained by the 60 subjects on the listening criterion (<u>STEP-Listening</u>), the eighteen subtests of the <u>California Psychological Inventory</u>, the <u>College Qualification Tests</u> (three subtests and a total raw score) and the <u>Michigan State University Reading Test</u>. Therefore, the data were analyzed on the basis of twentythree variables and the criterion measure.

Simple Correlation Coefficients: Results and Discussion

Correlations were calculated on a Control Data Corporation 3600 Digital Computer employing the program



"Calculation of Besic Statistics on a BASTAT Routine."¹ Mean scores, standard deviations and correlations between the variables and the criterion are shown in Table I. The complete correlation matrix will be found in the appendix. (See Appendix B).

For 58 degrees of freedom a coefficient of 0.25 or greater was significantly different from zero at the 0.05 level. Of the 23 correlations presented in Table I, nine were statistically significantly different from zero at the selected level. Five of the significant correlations were obtained between subtests of the California Psychological Inventory and the listening criterion. The other four significant correlations to the criterion were measures of scholastic aptitude. The highest correlation obtained was between the criterion and reading comprehension. This finding is consistent with many of the studies cited in Chapter II. Although the same reading measures were not employed and although the population age under test in the various studies differed, it is still evident that a positive relation exists between reading comprehension and listening as it is defined operationally by the criterion.

An inspection of Table I also reveals that three other measures of scholastic aptitude have moderately high

l"Celculation of Basic Statistics on the BASTAT Routine," <u>STAT Series Description Number 5</u>, (East Lansing: Michigan State University, Agricultural Experiment Station, March, 1966).

Table I. Mean scores and standard deviations for each of the measures used and correlations of each test to the criterion.

Variable	М	SD	r					
California Psychological Inventory								
<pre>1. Dominance (DO) 2. Capacity for Status (Cs) 3. Sociability (Sy) 4. Social Presence (Sp) 5. Self Acceptance (Sa) 6. Sense of Well-being (Wb) 7. Responsibility (Re) 8. Socialization (So) 9. Self-control (Sc) 10. Tolerance (To) 11. Good impression (Gi) 12. Communality (Cm) 13. Achievement via conformity (Ac) 14. Achievement via independence (Ai) 15. Intellectual efficiency (Ie) 16. Psychological mindedness (Py) 17. Flexibility (Fe)</pre>	27.75 20.28 38.78 38.53 28.45 32.60 32.63 32.63 32.63 32.63 32.63 32.63 32.63 32.63 32.63 32.63 32.63 23.64 23.63 23.64 23.63 24.68 20.63 20.23 24.68 20.23 22.53 2.53	566986543110035036 53463558442435234 53463558442435234	*0.28 *0.28 0.00 0.15 *0.31 0.13 0.16 -0.05 0.02 0.21 0.08 0.07 0.04 *0.33 *0.29 0.22 -0.02 0.00					
College Qualification Tests								
19. CQT-V 20. CQT-N 21. CQT-I 22. CQT-T	55.77 27.62 45.07 128.53	13.25 9.12 10.64 27.22	*0.54 0.15 *0.39 *0.47					
Reading Comprehension								
23. MSU Reading Comprehension	32.93	7.37	*0.64					
Listening Comprehension								
24. STEP-Listening	5 3. 53	7.54						

*Significant from zero at the 0.05 level

correlations with listening. However, an inspection of Table II indicates that these same measures (CQT-V, CQT-I and CQT-T) are highly correlated with each other as well as with reading comprehension. This would indicate that a common factor exists among all these measures. The implication to be drawn from the correlations presented here is that of the measures employed in this study, reading comprehension appears to be the single best indicator of listening ability as measured by <u>STEP-Listening</u> by virtue of the fact that there was a correlation of 0.64 obtained between these two measures.

	CQT-V	CQT-N	CQT-I	CQT-T	RC	STEP
CQT-V CQT-N CQT-I CQT-T RC	-	*0.30 -	*0.70 *0.52 -	*0.86 *0.68 *0.91 -	*0.73 *0.36 *0.75 *0.77	*0.54 0.18 *0.39 *0.47 *0.64

Table II. Intercorrelations between measures of scholastic ability and listening.

*Significant from zero at the 0.05 level

Multiple Correlation Coefficients: Results and Discussion

In order to maximize the prediction of the criterion most efficiently, the data were submitted to a multiple correlation program. The "Calculation of Least Squares"¹ was computed by the Control Data Corporation 3600 Digital Computer. This program utilized a stepwise deletion of the variables² in order to arrive at the final multiple correlation coefficient. In this program a multiple correlation coefficient is computed for all the variables relative to the criterion. The variable with the largest significance probability is then deleted and the least squares equation is recalculated. This procedure is repeated until the significance criteria for each of the remaining variables is equal to or greater than the significance criteria specified for the study.

Table III presents a key of the variables submitted to the multiple correlation program. It is presented in such a manner that the last variable listed (variable 24) is the first deleted and so forth. Table IV contains the multiple correlation coefficients (R) that were obtained. In addition, the variance (R²) that is accounted for by each of the multiple correlation coefficients is also displayed in Table IV.

¹"Calculation of Least Squares (Regression) Problems on the LS Routine," <u>STAT Series Description Number 7</u>, (East Lansing: Michigan State University, Agricultural Experiment Station, April, 1968).

²"Stepwise Deletion of Variables from a Least Squares Equation (LSDEL Routine,)" STAT Series Description Number 8, (East Lansing: Michigan State University, Agricultural Experiment Station, November, 1968).


NUMBER	TEST OR SUBTEST		
1	STEP-Listening		
2	Reading Comprehension (RC)		
3	Achievement via independence (Ai)		
4	Self acceptance (Sa)		
5	Communality (Cm)		
6	Sociability (Sy)		
7	CQT-I		
8	Good impression (Gi)		
9	Self-control (Sc)		
10	Psychological mindedness (Py)		
11	Flexibility (Fx)		
12	Capacity for Status (Cs)		
13	Tolerance (To)		
14	CQT-N		
15	Social Presence (Sp)		
16	Sense of Well-being (Wb)		
17	CQT-V		
18	Dominance (Do)		
19	Femininity (Fe)		
20	Intellectual efficiency (Ie)		
21	Socialization (So)		
22	Achievement via conformity (Ac)		
23	Responsibility (Re)		
24	CQT-T		

Table III. Key for first multiple correlation coefficient program with all variables included.



VARIABLES	R	R ²
R1.2-24	0.82	0.68
R1.2-23	0.82	0.68
R1.2-22	0.82	0.68
R1.2-21	0.82	0.68
R1.2-20	0.82	0.68
R1.2-19	0.82	0.68
R1.2-18	0.82	0.68
R1.2-17	0.82	0.68
R1.2-16	0.82	0.67
R1.2-15	0.82	0,67
R1.2-14	0.82	0.67
R1.2-13	0.81	0.66
R1.2-12	0.81	0.66
R1.2-11	0.81	0.65
R1.2-10	0.80	0.64
R1.2-9	0.80	0.64
R1.2-8	0.79	0.63
R1.2-7	0.79	0.62
R1.2-6	0.78	0.60

Table IV. Multiple correlation coefficients and explained variance for the first multiple correlation program.



Results of First Multiple Correlation Program

When all the variables are taken into account, a multiple correlation coefficient of 0.82 results. This correlation explains 0.68 of the variance. The first observable difference occurs after eight variables have been deleted. The multiple correlation is not affected at this point, but the percent of variance explained is reduced 0.01 to 0.67. The first change in the multiple correlation coefficient occurs after eleven variables have been deleted, when R becomes 0.81. The corresponding R^2 is reduced to 0.66. Further deletion of variables produces no reduction in either factor until the variable "Tolerance" is deleted. While R is not effected. R^2 is reduced from 0.66 to 0.65. With the deletion of one more variable, both the multiple correlation coefficient and the variance reflect change. They become 0.80 and 0.64 respectively. The deletion of sixteen of the variables results in an R of 0.79 and an R^2 of 0.63. One additional variable is deleted before the criterion for the program is met. The multiple correlation coefficient is not reduced further, but the explained variance becomes 0.62. The final multiple correlation coefficient reveals that five variables remain which meet the significance criteria. These variables produce an R of 0.78 and an \mathbb{R}^2 of 0.60. Four of the remaining variables ("Sy," "Sa," "Cm" and "Ai") are subtests of the California Psychological Inventory. The fifth variable which remains



is reading comprehension, which was shown to have the highest relationship with listening according to the Pearson Product Moment Correlations computed and reported previously.

The subtests of the <u>Californie Psychological Inventory</u> that remain in the final multiple correlation program are representative of certain traits or characteristics in a person. The "Sy" scale ("Sociability") was designed to identify those persons who are outgoing, sociable and of a participative temperament.¹ The subjects in this study, as a whole, scored above the mean on this subtest. This would indicate that they can be considered as "... outgoing, enterprising and ingenious; as being competitive and forward; and as original and fluent in thought."²

The "Sa" scale ("Self-acceptance") was devised to identify and assess such characteristics as sense of personal worth, self-acceptance and one's capacity for independent thinking and action.³ The sample in this study scored well above the mean on this subtest, therefore, they would tend to be seen as "Intelligent, outspoken, sharp-witted, demanding, aggressive and self-centered; as being persuasive and verbally fluent; and as possessing self-confidence and self-assurance."⁴

lGough, <u>California Psychological Inventory: Manual</u>, p. 10. 2<u>Ibid</u>. 3<u>Ibid</u>. 4Ibid.



The "Cm" ("Communality") scale has as its purpose the indication of ". . . the degree to which an individual's reactions and responses correspond to the modal ("common") pattern established for the inventory."¹ The subjects in this study fall only slightly below the mean on this subtest, but the results are not nearly low enough to endanger the results of the <u>California Psychological Inventory</u>. Were the scores very low on this particular subtest, the possibility would exist that the answers had been given in a random or unmeaningful way.² The "Cm" scale is best interpreted in its relation to the entire profile if there is serious deviation.

The final subtest appearing as a part of the multiple correlation coefficient is "Ai" ("Achievement via independence"). This scale has as its purpose to ". . . identify those factors of interest and motivation which facilitate achievement in any setting where autonomy and independence are positive behaviors."³ The subjects as a group scored above the mean on this subtest. High scores on this subtest tend to indicate maturity, forcefulness, strength, dominance, and persons who are demanding and

¹<u>Ibid</u>., p. 11. ²<u>Ibid</u>., p. 16. ³<u>Ibid</u>., p. 11.



foresighted. High scores are also a sign of independence and self-reliance. Persons who score high here are seen as having superior intellectual ability and judgment.¹

Two of these scales, "Sy" and "Sa," are members of the same general class of the <u>California Psychological</u> <u>Inventory</u> (Class I: "Measures of Poise, Ascendency, and Self-Assurance").² Therefore, it is possible to use only one of these subtests when testing without losing efficiency in a resultant prediction as they purport to measure much the same thing, being a measure of a common factor.

A perusal of Table V points out a problem encountered with the multiple correlation program just discussed. In order to explain as much of the variation of the dependent variable as possible, the independent variables should be relatively unrelated to each other, but they should have at least a moderately high correlation with the criterion.³ Table V reveals that not only are moderately high correlations observed between some of the independent variables, "Sy" and "Sa", but it also reveals that some very low correlations exist between the independent variables and the criterion ("Sy" and "Cm"). This is explained by the

l_{Ibid}.

²<u>Ibid</u>., p. 5.

³Hubert M. Blalock, "Multiple and Partial Correlation," <u>Social Statistics</u> (New York: McGraw-Hill Book Company, Inc., 1960), p. 348.



fact that spurious results can be obtained in such a program when a number of very low or negative factors in relation to the criterion explain some unique portion of the variance regardless of the fact that they show no relation to the criterion or dependent variable. When this happens, these variables will not be deleted from the multiple correlation program, but will remain because of that unique factor reflected in the variance.

Table V. Intercorrelations of the five variables of the final multiple correlation coefficient and their relation to the criterion.

	Sy	Se	Cm	Ai	RC	STEP	
Sy Se Cm Ai RC	-	*0.55 -	*0.25 *0.25 -	0.04 -0.20 -0.08 -	0.05 0.18 -0.22 *0.30 -	0.00 *0.31 0.07 *0.33 *0.64	

*Significant from zero at the 0.05 level

Therefore, in an effort to eliminate such spurious results, a second multiple correlation coefficient program was run using only those variables whose simple correlations with the criterion were significantly different from a zero correlation. This meant that five subtests of the <u>California Psychological Inventory</u>, three subtests of the <u>College Qualification Tests</u> and reading comprehension which were previously identified as significant in relation to the criterion were included in this second program. These



variables were "Do" ("Dominance"), "Cs" ("Capacity for Status"), "Ai" ("Achievement via independence"), "Ie" ("Intellectual efficiency") from the <u>California</u> <u>Psychological Inventory</u>, CQT-V, CQT-I, and CQT-T subtests of the <u>College Qualification Tests</u> reading comprehension were included in this analysis.

Results of Second Multiple Correlation Program

The second program with nine variables and the criterion resulted in a multiple correlation coefficient of 0.72 which explained 0.52 of the variance (Tables VI and VII). Further inspection of Table VII reveals that although one variable is deleted in each recalculation, there is no change in R or R^2 until the final multiple correlation coefficient is obtained. The final multiple correlation coefficient results in an R of 0.70 which explains 0.49 of the variance. An inspection of Table VIII shows the intercorrelations of the independent variables and their relation with the dependent variables.

Ideally, the multiple correlation would be expected to be substantially larger than the correlation of any one factor to the criterion. This multiple correlation exceeds the reading comprehension-listening performance correlation by only 0.08. The fact that the addition of the other two predictors increased the correlation by only this amount is explained by the fact that the three independent variables are intercorrelated to a higher degree than might be



Table VI. Key for second multiple correlation coefficient program including only those variables that reached significance (0.05) with the criterion.

NUMBER	TEST OR SUBTEST
1	STEP-Listening
2	Reading Comprehension (RC)
3	Achievement via independence (Ai)
4	Self-acceptance (Sa)
5	CQT-I
6	CQT-V
7	Capacity for Status (Cs)
8	Intellectual efficiency (Ie)
9	CQT-T
10	Dominance (Do)

Table VII. Multiple correlation coefficients and explained variance for variables reaching significance (0.05) to the criterion.

VARIABLES	R	R2
^R 1.2-10	0.72	0.52
^R 1.2-9	0.72	0.52
R1.2-8	0.72	0.52
R1.2-7	0.72	0.52
^R 1.2-6	0.72	0.52
^R 1.2-5	0.72	0.52
R1.2-4	0.70	0.49



desired (see Table VIII). In other words, the fact that the three predictors apparently have some commonality explains the relatively small change in the precision of the prediction. Of the variables employed in this study, however, the most economical but highest degree of prediction is obtained with these three variables.

Table VIII. Intercorrelations of the independent variables and their relation to the criterion in the second multiple correlation program.

	Sa	Ai	RC	STEP
Se Ai RC	_	-0.20	0.18 *0.30 -	*0.31 *0.33 *0.64

*Significant from zero at the 0.05 level

Legend - Sa-Self-acceptance

Ai-Achievement via independence RC-Reading Comprehension

The results of this multiple correlation program indicate that the best combination of predictors of the criterion are the subtests of "Self-acceptance" and "Achievement via independence" as measured by the <u>California</u> <u>Psychological Inventory</u> in combination with the <u>Michigan</u> <u>State University Reading Test</u>. Using these predictors one must be willing to accept a multiple correlation of 0.70 on which to base a prediction of listening performance. Using this combination of predictors, it is possible to describe the characteristics of the individual with good listening



ability. He could be said to be intelligent, mature, dominant, demanding and foresighted. In addition, he would possess the qualities of self-reliance, self-confidence and self-assurance. This person is independent, outspoken, sharp-witted, self-centered, persuasive and verbally fluent. He is capable of independent thinking and action with a sense of personal worth and the ability to achieve in any setting where autonomy and independence are positive behaviors.¹

If, however, a more precise prediction is desired, then all the variables included in this study would maximize the prediction of listening performance. The difference is a multiple correlation coefficient of 0.82 as compared to the final multiple correlation coefficient of 0.70 which was obtained as a final multiple correlation coefficient on the second program. In light of the findings of this research, if one did not have the time to administer the complete battery of tests used here or if all measures or tests as employed in this study were not available, then a test of reading comprehension stands as the best single indicator or predictor of listening performance as measured by the Sequential Tests of Educational Progress-Listening.

¹Gough, <u>California Psychological Inventory: Manual</u>, pp. 10-11.



Discussion

Taking the results of this study into account along with those cited in Chapter II, it is painfully evident that a major portion of listening performance still remains to be identified.

The addition of a psychological measure has added perhaps in some measure to the understanding of listening, but it has not been successful in filling in all the blanks. It is, of course, possible that the particular psychological measure used here did not tap those aspects of listening that some other measure might tap, but it appears that another explanation may have more relevance. Heretofore, listening has been viewed almost totally as an act of comprehension, a measure not far removed from that of intelligence. Indeed, up to this time, listening has been measured largely relative to measures of academic achievement, of which reading comprehension is a part. The positive relationships between listening and reading might even be an artifact. Looking at this listening test which is frequently used today, it is difficult to mount a convincing case for even face validity for this test unless it were to be called a listening-reading test. For in order to respond to the oral stimuli of this listening test, reading is required to complete the task. This confounds the attempt to measure and define listening.



Further, it is possible that the listening function is actually not as it has been defined operationally in this study. The term is too all-inclusive and needs to be broken down or refined in order to separate it from the perceptual and intellectual connotations it now has. This notion will be elaborated upon in Chapter V in the discussion concerned with further research.

Summary

It is now possible to propose some answers to the questions that were posed in Chapter I.

1. What is the relationship between listening performance and reading comprehension?

A positive relationship between these two measures has been demonstrated in this study. The explanation for this relationship would appear to rest upon the similarity of these two measures. As <u>STEP-Listening</u> is operationally defined and constructed, reading is necessary in the final analysis and is therefore an integral part of this listening measure. The material is presented orally, but the response relies on reading, therefore the relationship between these two measures is marked.

2. What is the relationship between listening performance and scholastic aptitude?

The <u>College Qualification Tests</u> were utilized as the measure of scholastic aptitude in this study. With the exception of the "Numerical" subtest, where no relationship was displayed between listening performance and numerical



ability, all other measures were found to be positively related to listening performance. These positive relationships were between listening and verbal ability, general information and the total score of the College Qualification Tests. Again, this might be explained by the fact that vocabulary is closely related to reading ability, thus its relation to listening. The "Information" subtest is based on a range of knowledge so that it resembles an intelligence test. Intelligence and reading comprehension have long been known to be related, hence it would be expected that it would also be related to listening as it is measured by STEP-Listening. Indeed, STEP-Listening is constructed in such a manner that the student is exposed to a variety of subject matter not unlike that contained in the "Information" subtest of the College Qualification Tests. Therefore, by extension, the positive relationship that was demonstrated in this study would be expected.

The failure of the "Numerical" subtest to show a positive relationship to listening performance is not surprising. Even though this test is not a computational one, the subject matter is highly specialized to a specific ability that has not been shown to relate highly with reading ability. Further, while there are numbers as a part of one selection of <u>STEP-Listening</u>, the specialized reasoning of this ability is not necessary for successful completion of the <u>STEP-Listening</u>.



The questions generated relative to the California

Psychological Inventory were as follows:

- 3. Is there a relationship between listening performance and the trait "Dominance" as defined and measured by the <u>California</u> Psychological Inventory?
- 4. Is there a relationship between listening performance and the trait "Capacity for Status" as defined and measured by the California Psychological Inventory?
- 5. Is there a relationship between listening performance and the trait "Sociability" as defined and measured by the <u>California</u> <u>Psychological</u> Inventory?
- 6. Is there a relationship between listening performance and the trait "Social Presence" as defined and measured by the <u>California</u> Psychological Inventory?
- 7. Is there a relationship between listening performance and the trait "Self-acceptance" as defined and measured by the <u>California</u> Psychological Inventory?
- 8. Is there a relationship between listening performance and the trait "Sense of Wellbeing" as defined and measured by the California Psychological Inventory?
- 9. Is there a relationship between listening performance and the trait "Responsibility" as defined and measured by the <u>California</u> Psychological Inventory?
- 10. Is there a relationship between listening performance and the trait "Socialization" as defined and measured by the <u>California</u> <u>Psychological Inventory</u>?
- 11. Is there a relationship between listening performance and the trait "Self-control" as defined and measured by the <u>California</u> Psychological Inventory?



- 12. Is there a relationship between listening performance and the trait "Tolerance" as defined and measured by the <u>California</u> Psychological Inventory?
- 13. Is there a relationship between listening performance and the trait "Good impression" as defined and measured by the <u>California</u> Psychological Inventory?
- 14. Is there a relationship between listening performance and the trait "Communality" as defined and measured by the <u>California</u> <u>Psychological Inventory?</u>
- 15. Is there a relationship between listening performance and the trait "Achievement via conformance" as defined and measured by the California Psychological Inventory?
- 16. Is there a relationship between listening performance and the trait "Achievement via independence" as defined and measured by the California Psychological Inventory?
- 17. Is there a relationship between listening performance and the trait "Intellectual efficiency" as defined and measured by the California Psychological Inventory?
- 18. Is there a relationship between listening performance and the trait "Psychologicalmindedness" as defined and measured by the California Psychological Inventory?
- 19. Is there a relationship between listening performance and the trait "Flexibility" as defined and measured by the <u>California</u> Psychological Inventory?
- 20. Is there a relationship between listening performance and the trait "Femininity" as defined and measured by the <u>California</u> Psychological Inventory?

Of the eighteen subtests of the <u>California Psychologi</u> <u>cal Inventory</u>, only five of the subtests showed a relationship to listening performance as measured by <u>STEP-Listening</u>. These five subtests were "Dominance," "Capacity for Status,"



"Self-acceptance," "Achievement via independence" and "Intellectual efficiency." None of the relationships could be considered strong ones, but all five were significant, positive relationships. A perusal of the traits each of these subtests measures reveals that there is a commonality among them. The subtests of "Dominance," "Capacity for Status" and "Self-acceptance" are said to identify persons who are verbally fluent and who are effective communicators. One would expect that good listeners might possess this quality. The other two subtests ("Achievement via independence" and "Intellectual efficiency") also reveal a common element. Both of these subtests were designed to identify persons of intelligence, and the relationship between intelligence and listening performance has been demonstrated.

The final question asked was:

21. To what extent might the prediction of listening performance be improved through the utilization of a combination of the predictors in this study?

The results of this study have shown that the prediction of listening performance can be maximized to some extent by using a combination of three of the measures employed in this study. These three measures are reading comprehension, "Achievement via independence" and "Selfacceptance," the latter two being subtests of the <u>California</u> <u>Psychological Inventory</u>. The problem that this combination of predictors presents is perhaps legion. This is because



the two subtests of the <u>California Psychological Inventory</u> are not self-contained entities but are interwoven throughout the entire Inventory. Therefore, in order to make use of these two subtests, it is almost imperative that the entire <u>California Psychological Inventory</u> be administered, which of course includes those parts of the Inventory that have not been demonstrated to add to the efficiency of the prediction of listening performance.


CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This study was concerned with the identification of the components of listening performance. The relationship between listening and certain selected measures of scholastic aptitude and psychological traits was investigated. Another purpose was to ascertain whether or not the prediction of listening performance could be maximized by the use of some combination of the variables utilized in this study over the prediction that could be made by the use of only one variable.

Summary

Sixty college freshmen and sophomores enrolled in an undergraduate course in Audiology and Speech Sciences participated in the study. The <u>Sequential Tests of Educa-</u> <u>tional Progress-Listening</u>, Form IA, and the <u>California</u> Psychological Inventory were administered to the subjects. In addition, results of the <u>College Qualification Tests</u> and the <u>Michigan State University Reading Test</u> were obtained for each subject. These latter measures were obtained from the students' records as these tests were taken upon entrance to the University.



The results indicated that listening performance, as operationally defined in this study is highly correlated with reading comprehension. Except for the "Numerical" subtest of the College Qualification Tests, listening performance was shown to correlate positively with all other measures of scholestic eptitude. Of the eighteen subtests of the California Psychological Inventory, five were significantly related to listening performance. However, while the correlations obtained were significant, the relationship demonstrated was not of a magnitude as great as that of the relationship between reading comprehension and listening performance. It was possible to demonstrate that the prediction of listening performence could be improved to some extent through the use of a combination of the predictors employed in this study. The factors of the final multiple correlation coefficient included reading comprehension and two subtests of the California Psychological Inventory, "Self-acceptance" and "Achievement via independence."

Conclusions

Within the limits of the design of this study, the following conclusions appear warranted:

1. <u>Reading comprehension and listening performance</u> (as measured by the <u>Sequential Tests of Educational</u> <u>Progress-Listening</u>) are highly related. Reading comprehension appears to be the single best predictor of listening performance. However, this finding might be considered



misleading because of the dependence upon reading when taking this particular listening test. Reading comprehension is built into this test'of listening, as it is necessary to read the available choices after the oral presentation in order to select a response. This indicates that the high correlation between listening performance and reading comprehension occurs because the same general skills are being tested.

2. Listening performance (as measured by the Sequential <u>Tests of Educational Progress-Listening</u>) is highly related <u>to scholastic aptitude</u>. The measures of scholastic aptitude are highly related to reading comprehension (with the exception of numerical ability); therefore, by extension they would be related to listening performance as it is measured by the test employed in this study.

3. The psychological integrity of the individual appears to contribute to listening performance. While a high degree of relationship has not been demonstrated between listening performance and the psychological variables measured by the <u>California Psychological Inventory</u>, some relationship has been demonstrated. It is possible that the measure used in this study did not tap the specific psychological variables in such a manner as to demonstrate definitely their relationship to listening performance. Some other psychological test might demonstrate this relationship more dramatically.



4. <u>The prediction of listening performance (as</u> <u>measured by the Sequential Tests of Educational Progress-</u> <u>Listening) can be maximized by using a combination of the</u> <u>variables utilized in this study, namely reading comprehen-</u> <u>sion, "Self-acceptance" and "Achievement via independence,"</u> <u>the last two being subtests of the California Psychological</u> <u>Inventory</u>. This combination of variables results in a more precise prediction of listening performance than does any one single variable by itself.

5. It appears that the Sequential Tests of Educational Progress-Listening is not solely a measure of listening performance. The fact that almost fifty percent of the variance derived in this study is explained by reading and intelligence factors supports this conclusion.

Recommendations for Further Research

Research in the area of listening needs to return to basic considerations. The investigation of the psychological aspects of listening performance should not be abandoned but should be encouraged. Measures of motivation, attention, set and personality should be considered in the measurement of the listening process.

But before this can be done, much basic research needs to be done relative to listening. In fact, it may be necessary to engage in laboratory research with animals in order to identify the correlates of listening that heretofore have eluded researchers. It would appear that, on the



basis of this study and others that have preceded it, that an important part of listening must be explained by what happens before an acoustic stimulus is even delivered. The research up to this time has been concerned with the reception and interpretation of an acoustic stimulus, with the intellectual processes concerned with listening. This type of research has been relatively unproductive and leaves unexplained a large part of the listening act. Ιt would appear that a part of the listening act might take place before the acoustic stimulus is ever delivered. The physiological components, such as arousal, in addition to attention, set and anticipation, should be investigated.

There is need for a listening test that will take into account the factors previously mentioned. It is possible that this will mean that a test must be devised that in part incorporates tasks that do not require delivering an acoustic stimulus, but which will in some way measure the organisms' readiness to receive acoustic stimuli. In this way, it may be possible to separate out and assess those factors that seem to be confounding the measurement of the listening process.



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APPENDIX A

RAW DATA FOR ALL VARIABLES UTILIZED IN THE STUDY



APPENDIX A: RAW DATA FOR ALL VARIABLES UTILIZED IN THE STUDY

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APPENDIX A--Continued

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APPENDIX A--Continued

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Sy	26	27	29	28	26	
Cs	16	22	24	24	17	
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APPENDIX B

CORRELATION MATRIX OF PEARSON PRODUCT MOMENT CORRELATIONS FOR ALL VARIABLES IN THE STUDY



APPENDIX B: CORRELATION MATRIX OF PEARSON PRODUCT MOMENT CORRELATIONS FOR ALL VARIABLES IN THE STUDY

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Re	*37	*40	.17	:35	*37	*32	10.	.18	.22	.13	.16
ЧМ	÷44	*57	*39 *39	1 07	-07	.20	•06	.22	.20	יער .	• 13
а С	-20	60•	- 02	- 02	10 -	.21	÷03	• ol	.11	.18	*31
Sp	.22	• 32	-21 •	<u>.</u> 49	117	.08	• 0. 0.5	51.	.10	.11	۲. ۲
Sy	+10 •	*27	.12	.24	÷06	- 03	.08	.01	.02	• 05	00•
C s	*29 *29	*43	.16	*31	•06	*27	.00	.08	.16	.20	*28
Do	.10	*29	.20	.08	.02	.27	.06	. 12	.19	.16	* 58 *
	Aî	В Н	Py	ЧX	ы Ч	Þ	z	н	EH	RC	ES
	Achievement via inde- pendence	Intellec- tual effi- ciency	Psycholog- ical mind- edness	Flexibility	Femininity	CQT-Verbal	CQT- Numerical	CQT-Infor- mation	CQT-Total	Reading Compre- hension	STEP- Listening

*Significant from zero at the .05 level. (df=58)

APPENDIX B--Continued






