THE SELF-CONCEPT OF HARD-OF-HEARING ADULTS AS MEASURED BY THE SEMANTIC DIFFERENTIAL TECHNIQUE

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ABSTRACT

THE SELF-CONCEPT OF HARD-OF-HEARING ADULTS AS MEASURED BY THE SEMANTIC DIFFERENTIAL TECHNIQUE

by Edward J. Hardick

The purpose of this research was essentially two-fold. The first purpose was to investigate the practicality of utilizing the semantic differential approach in the development of an instrument for obtaining self-judgments and to determine the relevant dimensions along which self-judgments are characteristically made. The second purpose was to evaluate and compare the self-concept and other self-related attitudes of the hard-of-hearing adult with those of normal hearing adults.

Nine self or personality related concepts were each evaluated on fifty bipolar adjectival scales by a group of fifty-five college students. The judgments were quantified and subjected to factor analysis, employing a principal axes solution followed by a varimax rotation. Each of the nine concepts was factor analyzed individually, and in addition, a factor analysis across all nine concepts was accomplished. The goals of the factor analytic studies were to determine the relevant orthogonal dimensions utilized by people to evaluate each concept and to determine the nature and extent of concept-scale interaction. The results of these studies indicated that any concept can be evaluated by means of a multifactor structure consisting of at least three rather well defined independent dimensions. The Universal factor-scale structure was chosen



Edward J. Hardick

to be utilized with each of the concepts in the subsequent study to determine whether the self-judgments of hard-of-hearing adults differed from those having normal hearing. The three dimensions utilized were labeled <u>Capability</u>, <u>Genuineness</u>, and <u>Toughness</u>.

The nine semantic differentials were then administered to 105 volunteer hard-of-hearing adults and to a control group of fifty-four volunteer normal hearing adults matched to the experimental group in terms of age, sex, and amount of formal education. The self-judgments were quantified and evaluated to determine whether: (1) the two groups differed from each other with respect to the concepts utilized; (2) age, sex, and amount of hearing loss were significant variables affecting responses; and (3) the judgments were reliably obtained and represented valid indices of self-feeling.

The results of this study indicated that the <u>Capability</u> factor provided most of the statistically significant discriminations between the two groups of subjects. The ratings obtained from the hard-ofhearing adults were significantly different from the normal group on the <u>Capability</u> factor for four of the nine concepts. The results also incicated that the hard-of-hearing adults tended to place some pairs of concepts closer together in three-dimensional space than did their normal hearing counterparts. The results relative to the effect of sex, age, and amount of hearing loss on judgments within the hard-of-hearing group revealed that few significant differences were noted between the dichtotomized groups.

The major findings were: (1) that hard-of-hearing adults do not differ in feelings of self-regard from normal hearing adults; (2) that certain adjustments to reality reflecting the altered self-environmental relationship are required for satisfactory adjustment to the sensory handicap; (3) that the amount of hearing loss, in excess of that associated with a Social Adequacy Index of seventy-five, is not a variable affecting self-concept; (4) that hard-of-hearing women and people over sixty years of age feel more "genuine" than hard-of-hearing men and people less than sixty years of age; and, (5) that the semantic differential technique can reliably and validly be utilized to evaluate the self-concept of certain people. THE SELF-CONCEPT OF HARD-OF-HEARING ADULTS

AS MEASURED BY THE SEMANTIC

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By

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CHAPTER I

INTRODUCTION

The subcommittee on Hearing Problems in Adults of the American Speech and Hearing Association¹ and the report of the Workshop on Identification of Researchable Vocational Rehabilitation Problems of the Deaf² have pointed out the need for the study of the psychological problems of the hard-of-hearing and development of approxpriate testing devices for the purpose of expanding or modifying knowledge and rehabilitative procedures.

Purpose of the Study

The research was oriented around two main purposes. One of these purposes was to evaluate and compare the self-concept and other self-related attitudes of hard-of-hearing adults with normal hearing adults. The other purpose was to develop an instrument utilizing the semantic differential³ technique to assess the attitudes of both

²"Workshop on Identification of Researchable Vocational Rehabilitation Problems of the Deaf," <u>American Annals of the Deaf</u>, 105 (4, 1960), pp. 335-370.

³C. E. Osgood, G. J. Suci, and P. H. Tannenbaum, <u>The Measurement</u> of Meaning (Urbana: University of Illinois Press, 1957).

¹R. Carhart (Chairman), "IX. Report of Subcommittee on Hearing Problems in Adults," <u>Journal of Speech and Hearing Disorders</u>, Monograph Supplement 5 (September, 1959).

populations. Specifically, the following questions were posed:

- 1. Do hard-of-hearing adults, as a group, differ in their self-concept from normal hearing people of the same age, sex, and level of education?
- 2. Do hard-of-hearing adults differ from one another with respect to their self-concept as a function of age, sex, and amount of hearing loss?
- 3. Can the semantic differential technique be reliably and validly employed as a means of obtaining self and related attitudes?

The ultimate goal, of which the studies presented here are but a beginning, is to develop a test instrument that can be employed to help determine the need for a counselling program and for evaluating counselling and therapy in the area of aural rehabilitation. The development of such a test is only the initial step in the refinement of an instrument of this nature. It is anticipated that many attitudes related to hearing loss could be measured best by test devices derived primarily for use with the hard-of-hearing and oriented toward their self-attitudes.

Importance of the Study

Many hard-of-hearing adults are seen each week in audiology clinics. Clinical services are rendered as necessary to aid in the rehabilitation of these clients. Sometimes this means the recommendation of a hearing aid and/or auditory training, and/or speechreading. The immediate goals of these programs are the improvement of communication skills. The common clinical procedure is to evaluate hearing first, and then follow with recommendations that may involve the use of a hearing aid and/or training leading to better utilization





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of auditory and visual clues. Generally, no formal psychological assessment is made, but subjective impressions may be recorded. As the client moves through the evaluation and aural rehabilitation aspects of the program, frequent testing is done to index the growth in auditory, visual, and perhaps combined communicative skills. In many cases, improvement in these receptive skills produces concomitant changes in attitude in the client. Although changes in performance on auditory or visual tasks during a rehabilitative program are measured and recorded, the changes in self-attitude or the psychological effect of improved communication ability are seldom measured.

Some people do not make noticeable progress in an aural rehabilitative program. The therapist may ascribe this to diverse factors, some of which may be physical, others psychological. It is possible that important variables in this type of situation are the pretherapeutic self-attitudes of the client that preclude or inhibit the learning process. The determination of any existing relationship between pre-therapeutic attitudes and progress in the rehabilitation program would be invaluable information for the purpose of predicting success.

It is anticipated that not all hard-of-hearing people follow the recommendation to obtain a hearing aid. The exact percentage of those not following the recommendation because of negative attitudes is not known, but it is anticipated that the percentage is high enough to cause the audiologist some concern. Perhaps if the audiologist had knowledge of certain relevant attitudes of the client during the evaluation procedure, he would be able to improve the chances of



a successful hearing aid recommendation through a counselling program.

The preceding comments can be summarized in the following manner. As professionals working toward the rehabilitation of hardof-hearing adults, audiologists and hearing therapists are constantly predicting--predicting that benefit can or should be obtained through lipreading, auditory training, the use of amplified sound, etc. It is anticipated that many times the predictions are not correct because an important variable, the psychological adjustment status of the client, is unknown. It is expected that certain characteristic modes of adjustment to physical handicap are available and that the specific mode of adjustment utilized by the hard-of-hearing adult necessitates certain modifications in attitude and choice of goals in order to maintain self-esteem with minimal devaluation of self, and that these attitudes and adjustments can yield invaluable information useful in a rehabilitative and counselling program.

Quite independent of the possible modifications of self-attitudes occurring as a result of the benefit derived from aural rehabilitation or a counselling program, is the question of whether the hard-of-hearing adult differs psychologically from the normal hearing as indexed by self-feelings. This is the area of immediate concern of the research summarized in this paper. The hope is that these initial studies will lead to the development of an instrument that will be clinically useful by yielding relevant attitudinal data.



Limitations of the Study

Before such a test to assess the attitudes of the hard-of-hearing can become a reality as a clinical tool in the armamentarium of the hearing clinic, a series of studies beyond those reported in this paper are required. Normative data will be required; cross-validation studies will have to be designed and run; and validity will have to be demonstrated.

The word "change" has been utilized in the discussion of selfconcept and the beneficial results of aural rehabilitation. This term denotes passage of time or the observed difference in a state-of-being through time that results in alteration of the fundamental characteristics of the object under attention. To measure "change in selfconcept" it would be necessary to obtain repeated measurements from the same individuals over time, the advent of hearing loss or therapy as one intervening variable. It is not within the limits of this study to ascertain "change" per se. This research was designed to evaluate differences between the self-concept of a hard-of-hearing population and a normal hearing control group at a given moment in time.

Organization of the Report

Chapter I was organized to provide an introduction to the problem regarding evaluation of the self-concept of the hard-of-hearing adult and the role of and need for such measurement in the evaluation, counselling, and rehabilitation of these people. The problem to be investigated was broadly defined and limited.

Chapter II consists of a comprehensive review of the literature pertaining to three areas of concern in this investigation. These



areas are: (1) the self-concept; (2) the psychological effect of hearing loss; and (3) the sematic differential.

Chapter III is concerned with the specifics of the designs for the two studies which were conducted. The subject samples, the method of data collection, and the methods of analysis will be outlined in detail. Because of the necessity for understanding the results of the first study (factor analysis) prior to detailing the design of the second study, the results of the factor analytic study will be presented in this Chapter. This will preserve chronology and minimize confusion.

Chapter IV consists of the presentation of the results of the study of self-concept of hard-of-hearing and normal hearing subjects. The results will be discussed in order to provide answers to the questions originally posed.

Chapter V is organized to present a summary of the research, a listing of the conclusions, and an enumeration of recommendations for further research.

CHAPTER II

REVIEW OF PERTINENT LITERATURE

Self-Concept

In much of the literature the self-concept is characterized as that portion of the personality system to which the individual has conscious awareness. It is in this sense that the term is utilized here. Many definitions of self-concept are available and the one offered by Rogers⁴ appears representative.

The self-concept or self-structure may be thought of as an organized configuration of perceptions of the self which are admissable to awareness. It is composed of such elements as the perceptions of one's characteristics and abilities; the percepts and concepts of the self in relation to others and to the environment; the value qualities which are perceived as associated with experiences and objects; and goals and ideals which are perceived as having positive or negative valence.

Sherif⁵ points out the self-concept is formed genetically and is not resultant from instinctive ego drives, and Mead⁶ states that the "self is something which has a development; it is not initially there, at birth." The structure of the self is the product of social

⁴C. R. Rogers, <u>Client-Centered Therapy</u> (Boston: Houghton-Mifflin Co., 1951), p. 136.

⁵M. Sherif and H. Cantril, <u>The Psychology of Ego Involvements</u> (New York: Wiley and Sons, 1947), p. 101.

⁶G. H. Mead (ed. C. W. Morris), <u>Mind, Self, and Society</u> (Chicago: University of Chicago Press, 1934), p. 135.



interaction between the organism and its environment. Mead⁷ points out that we develop an image of self by experiencing ourselves "not directly, but only indirectly, from the particular standpoints of other individual members of the same social group." We enter our own experience as a self only by becoming an object to ourselves as others are objects to us. Only by assuming the point of view of this "generalized other" can we develop some image of self. This "generalized other" may be one person or a social group, and as such, what goes to make up the organized self is the organization of the attitudes which are common to this "other."

The individual possesses a self only in relation to the selves of the other members of his social group; and the structure of his self expresses or reflects the general behavior pattern of this social group to which he belongs.⁸

Dai⁹ says, "The conception an individual forms of himself usually has a social reference. It generally takes the form of some kind of relation between the self and others." This is not to imply that all the values incorporated into an individual's self-concept are social values. Both Sherif and Cantril¹⁰ and Mead¹¹ indicate that each

⁷<u>Ibid</u>., p. 138. ⁸<u>Ibid</u>., p. 164.

⁹B. Dai, "Some Problems of Fersonality Development Among Negro Children," <u>Personality in Nature, Society, and Culture</u>, eds. C. Kluckhohn and H. Murray (New York: Knopf, 1959), p. 547.

10 Sherif and Cantril, op. cit., p. 98.

¹¹Mead, <u>op. cit</u>., p. 201.



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self-concept is unique and many component values of it are the result of specific environmental interactions derived from the individual's distinctive experiences. Thus it would appear that the foundations of the self-concept are established in life through the organism's intersction with all the aspects of the environment that the sensory modalities enable it to "discover."

Dembo et al.¹² studied the attempts of visually handicapped individuals to adjust to their handicap. They reported that the following efforts toward adjustment were ineffective using normal sighted people as their model: (1) strenuous effort to equal or surpass the normal in certain roles; (2) rejection of help; (3) avoidance of discussion of their handicap; (4) forgetting the disability; and (5) acting as if it did not exist. These efforts left the person imperfect in the end and thus self-devaluation was inevitable. The adjustment process called "acceptance of loss" was found to permit the handicapped to face the disability without devaluating himself.

The thesis of this discussion is that the self-concept would appear to develop through the interaction between the individual and his environment. This "interaction" might be thought more meaningfully of as "communication." The interest of this research is limited only to those changes in relationship that exist as a result of hearing loss, and therefore are most noticeably limited to the relationship between

^{12.} Dembo, G. Ladieu, and B. Wright, <u>Adjustment to Misfortune: A Study in Social-Emotional Relationships Between injured and Non-Injured People</u>, Final Report to the Army Medical Research and Development Board, Office of the Surgeon General, War Department (April, 1948). Typescript.

the self of the hard-of-hearing and that human portion of the environment with which he must interact by means of verbal communication. When in later life the relationship is altered because of sensory impairment, realistic adjustment to the change necessitates the selfacknowledgment of the deficit and its associated social problems. This acceptance of the deficit provides the basis for realistic modifications of the self-concept and the overt manifestations of it. This altered relationship between the self and the environment does not result in devaluation of self since the self-concept (and the overt manifestations of it) have been realistically adjusted to enable the person to function in the new relationship. It is anticipated that these people are able to maintain a quite normal, but altered relationship with the environment, and will be able to evaluate themselves and their environment in a favorable light. The amount of change and specific areas of change are dictated by the limitations imposed by the amount and type of deficit, along with the individual's reliance upon that particular sensory modality in his everyday functioning. The selection of any other mode of adjustment--as outlined by Dembo et al.--might be hypothesized to result in devaluation of self.

The phenomenological self-concept has received increasing attention from theorists and experimenters in the past twenty years. Wylie¹³ summarizes the theories, methods of evaluation, problems inherent in measuring this aspect of human organization, and a critical

¹³R. C. Wylie, <u>The Self-Concept</u> (Lincoln: University of Nebraska Press, 1961).


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review of many studies relating to the subject of self-concept. The most serious problem facing the investigator involves measurement. Problems of measurement arise primarily from three sources: construct validity, subjects, and the test instrument. Wylie¹⁴ states that construct validity is crucial to the development of such a test since self-concept theories explicitly require measurement of a class of variables, the subject's conscious processes, and these phenomenal fields are beyond the direct observation of the experimenter. Satisfactory validity can not be obtained from predictive or concurrent validity estimates, as test results may correlate with scores of another test without giving any clues as to why this occurs. The appropriate procedures involved in establishing construct validity are as follows:¹⁵ (1) determining what variables other than the construct in question might be influencing results; (2) determining intercorrelations among measures presumed to measure the same construct; (3) internal factor analyses; and (4) determining predictable relation of alleged selfconcept measures to other variables. Most of the studies in the literature have attempted to offer evidence regarding only the fourth criterion. As a result, Wylie reports that most of the instruments so far utilized have questionable validity.

Many different types of instruments have been derived to measure self-concept, depending on the orientation of the theorist. It is important to note, however, that all such instruments have relied upon

¹⁴Ibid., p. 23.

¹⁵L. J. Cronbach and P. E. Meehl, "Construct Validity in Psychological Tests," <u>Psychological Bulletin</u>, 52 (1955), pp. 281-302.



the subject's overt response either verbal or written, in the form of inventories, checklists, rating scales, open-ended tests, Q-sorts, etc. Wylie¹⁶ reports that a self-report response by the subject is necessary to index his phenomenal self, and the types listed above appear to be the only appropriate methods for measuring self-concept. She states that to obtain motor, autonomic, or projective responses make it impossible to determine whether responses relfect conscious or unconscious attitudes. Another difficulty arising from certain test instruments has to do with the nature of the instrument. When the subject's mode of reporting is limited, especially on forced-choice tests, one has no way of knowing to what extent the external limits imposed by the measuring instrument prevent an accurate report. For example, Jones¹⁷ found that the Q-sort technique introduces distortion into the results because the subjects are forced to produce quasi-normal distribution of item placements when in fact in a free-choice situation, subjects produced more nearly U shaped distributions.

The other major variable facing the experimenter is the subject, whose responses we would like to presume are valid indices of his self-concept. Wylie¹⁸ points out, however, that his responses may be influenced by (a) his desire to select what he reveals, (b) his intention to report attitudes he does not have, (c) his response habits, and (d) situational and methodological factors. For example, Jourard

¹⁶Wylie, <u>op. cit</u>., p. 24.

¹⁷A. Jones, "Distribution of Traits in Current Q-Sort Methodology," <u>Journal of Abnormal and Social Psychology</u>, 53 (1956), pp. 90-95.



and Laskow¹⁹ found that subjects reveal more of their attitudes, opinions, tastes, etc., than about areas more salient to self-esteem maintenance.

In summary, it appears that self-concept, by the common definition, must be measured by some type of self-report technique and that this necessity introduces three major obstacles, namely construct validity, subjects, and the test instrument, to valid measurement. Only rigorous planning and sound methodological approach can produce results of some validity.

Psychology of Hearing Loss

Many people concerned with the rehabilitation of hard-of-hearing adults have commented on the psychological problems that often accompany a loss of hearing acuity. The literature consists of many books and articles written about the deaf or hard-of-hearing and their problems. Many of these biographical writings are summarized in the review of literature by Brunschwig²⁰ and Wells.²¹ Brunschwig's review was limited to the writings of those who suffered hearing loss in childhood and contains statements from educational authorities in regard to the psychology of these individuals. Welles' reviewed

¹⁹S. M. Jourard and P. Lasakow, "Some Factors in Self-Disclosure," <u>Journal of Abnormal and Social Psychology</u>, 56 (1958), pp. 91-98.

²⁰L. Brunschwig, <u>Study of Some Personality Aspects of Deaf</u> <u>Children</u> (New York: Columbia University Press, 1936).

²¹H. H. Welles, "The Measurement of Certain Aspects of Personality Among Hard-of-Hearing Adults," <u>Teachers College Contributions</u> <u>to Education</u>, No. 545 (Bureau of Publications, Teachers College, Columbia University, 1932).



writings of several individuals who suffered severe loss of hearing as adults. These writings expressed many divergent views on the psychology of hearing loss. Some opinions indicated the hard-of-hearing have a "unique psychology" while others stated that there is no difference between normal hearing and hard-of-hearing people. Some opinions indicated the hard-of-hearing are despondent, egocentric, suspicious, brooding, apathetic, and have feelings of inferiority; while others reported few of these psychological manifestations. Some reported the hard-of-hearing as feeling socially inferior and as a result they tend to withdraw or become aggressive, while others felt their behavior does not differ from normal hearing individuals. Many autobiographical reports by individuals with auditory impairment further indicated that the psychological and social effects of hearing loss vary greatly. Meyerson's²² review contains an excellent bibliography including most of the biographical and research studies to date in the area of the psychology of deafness.

Numerous studies have been oriented toward the study of the psychological problems and behavior of hard-of-hearing and deaf children and adolescents. The use of paper and pencil personality inventories in investigations of psychological functioning has been questioned by Meyerson²³ and Barker.²⁴ Barker states that "Personality tests of the

²³<u>Ibid</u>., pp. 213-215.

24 R. G. Barker (ed.), "Introduction," <u>Adjustment of Physical</u> <u>Handicap and Jllness: A Survey of the Social Psychology of Physique</u>

²²L. Meyerson, "Somatopsychological Significance of Impaired Hearing," <u>Adjustment of Physical Handicap</u>: <u>A Survey of the Social Psychology of Physique and Disability</u>, ed. R. G. Barker (New York: Social Science Research Council, 1953).





inventory type are generally not suitable for use in comparing physically disabled and nondisabled persons," because of items of "different interpretive significance" and because the "validity of personality schedules depends upon the comparability of the life situations of the tested persons and those of the standardization groups." Meyerson specifically points out the difficulty in using the <u>Bernreuter Personality Inventory</u>, in addition to its limitations as enumerated by Barker. Meyerson states "that the traits, neurotic-tendency, introversion, and nondominance (submissiveness) are not well differentiated by the inventory." Very few studies have been designed to determine or evaluate the psychological problems of the hard-of-hearing adult. The first three studies to be mentioned utilized the <u>Bernreuter Personality</u> <u>Inventory</u> and the results must be considered with caution because of the validity characteristics of the test.

Welles²⁵ administered the test to 196 women who were members of organizations for the hard-of-hearing. No data were obtained regarding the amount of hearing loss. The test was also given to 131 normal hearing women who were friends of the experimental subjects. Some attempt was made to keep the ages, educational level, and socioeconomic status of the two groups the same. Thirty-one women were selected from the experimental group as they appeared to have exceptional adjustment to their loss. The results (r = .12 between neurotictendency and hearing in better ear; no relationship between neurotictendency and hours of lipreading instruction; no relationship between <u>and Disability</u> (New York: Social Science Research Council, 1953), pp.

²⁵Welles, op. cit.

neurotic-tendency scores and age at hearing loss) of the testing of these three groups led to the conclusions that the hard-of-hearing tend to be more neurotic, introverted, and less dominant than normal hearing people. The special group of thirty-one women who were termed "successful" did not differ significantly from the normal hearing friends. As a result Welles grouped the problems of the hard-of-hearing into three categories: (1) social inadequacies; (2) depressive tendencies; and (3) paranoid tendencies.

Pintner²⁶ tested ninety-four persons living in rural communities who belonged to a correspondence club for hard-of-hearing people. No data was presented as to degree of hearing loss. The control group consisted of friends chosen by the subjects who were of similar age, education and socio-economic status. The pattern of the results (no relationship between neurotic-tendency scores and age at hearing loss; no relation between neurotic-tendency and hours of lipreading instruction) was similar to those of Welles, but Pintner's group achieved slightly higher scores indicating more deviancy from normal.

Pintner, Fusfeld, and Brunschwig²⁷ tested 126 "deaf" persons from all parts of the country and fifty students attending Gallaudet College in an attempt to obtain a representative cross-section of the deaf population. No data were presented as to amount of hearing loss

²⁶ R. Pintner, "Emotional Stability of the Hard of Hearing," Journal of Genetic Psychology, 43 (1933), pp. 293-311.

²⁷R. Pintner, I. Fusfeld, and L. Brunschwig, "Personality Tests of Deaf Adults," <u>Journal of Genetic Psychology</u>, 51 (1937), pp. 305-327.

and no mention was made of the use of a control group. The results agreed with those quoted in the above studies of Welles and Pintner, revealing slight unreliable tendencies for the hard-of-hearing or deaf to be poorly adjusted.

There has been an attempt to assess the psychological problems of the hard-of-hearing utilizing the <u>Rorschach Test</u>. This study was done by Zucker²⁸ and the subjects consisted of a heterogeneous group of twenty-six people. They differed in color, education, occupation, amount of hearing loss, use of hearing aid, and age. She reported that the group showed a pattern of submissiveness, resignation, suppressed hostility, anxiety, and depression. Meyerson,²⁹ however, reported that these conclusions are not supportable by inspection of the data and the interpretations of responses were not in agreement with standard interpretations.

Two studies are reported in the literature in which the data were obtained by using psychiatric interview techniques. Both studies, by Ingalls³⁰ and Knapp,³¹ were completed during World War II at Army rehabilitation centers. The conclusions were based on only one or two interviews per subject, but their findings indicated that depressive

²⁸L. Zucker, "Rorschach Patterns of a Group of Hard-of-Hearing Patients," <u>Journal of Projective Techniques</u>, 11 (1947), pp. 68-73.

²⁹ Meyerson, <u>op. cit</u>., p. 218.

³⁰G. S. Ingalls, "Some Psychiatric Observations of Patients with Hearing Defects," <u>Occupational Therapy and Rehabilitiation</u>, 25 (1946), pp. 62-66.

³¹P. H. Knapp, "Emotional Aspects of Hearing Loss," <u>Psycholo-</u> <u>matic Medicine</u>, 10 (1948), pp. 203-222.

reactions were fairly common in these subjects and that parancid reactions were quite rare. There appeared to be no special psychology of deafness among this group of adventitiously deafened adults.

Ramsdell³² has written about the problems of the hearing impaired servicemen at rehabilitation centers and discusses the "characteristic depression" and "feeling of suspicion" so often identified with the adult who is experiencing deterioration of auditory function. He associates the presence of these psychological manifestations with the loss of hearing at the "primitive" level. Meyerson³³ doubts the validity of this theory, in that the logical results are not evidenced in most studies. If this theory were true then all of the hard-ofhearing people would be depressed and suspicious and the more loss they had the greater would be the degree of these attitudes.

Newby³⁴ states that another characteristic of the hard-of-hearing adult is his reluctance to admit to others the existing sensory deficit. These individuals may resort to bluffing and the desire to conceal a hearing aid if one is worn. These factors lead to frustration and withdrawal by the hard-of-hearing adult. The Heiders³⁵ have postulated

32 D. A. Ramsdell, "The Psychology of the Hard-of-Hearing and the Deafened Adult," <u>Hearing and Deafness</u>: <u>A Guide for Laymen</u>, ed. H. Davis (New York: Rinehart Books, Inc., 1953), Chap. 16.

33_{Meyerson}, <u>op. cit.</u>, p. 250.

34 H. Newby, Audiology: Principles and Practice (New York: Appleton-Century-Crofts, Inc., 1958), p. 220.

³⁵ F. Heider and G. Heider, "Studies in the Psychology of the Deaf, No. 2," <u>Psychological Monographs</u>, 53 (5, 1941), pp. 93-96.



that people with normal hearing consider the deaf more similar to themselves than the blind for at least two reasons: (1) blindness, but not deafness, is generally a readily discernible handicap; and (2) normal hearing people experience silence with less grief than they experience darkness.

Myklebust³⁶ carried out a study primarily oriented toward evaluation of the deaf, but he did utilize some adult hard-of-hearing subjects for comparative purposes. He found that the hard-of-hearing had high Depression (D), Schizophrenia (Sc), and Masculinity-femininity (Mf) scores on the <u>Minnesota Multiphasic Personality Inventory</u>.

Pintner, Eisenson, and Stanton³⁷ reported that the results of personality testing with the hard-of-hearing indicate:

. . . that in regard to all the traits so far studied, the differences between normal-hearing and hard-of-hearing are very slight. All of the studies agree in finding the hard-of-hearing somewhat more introverted than the normal hearing. Most of the studies find the hard-of-hearing less well emotionally balanced (more neurotic) than the normal hearing.

They conclude that the hard-of-hearing as a group are not very different from the normal hearing.

In summary, it appears that there may be some differences to be noted between normal hearing individuals and the hard-of-hearing. Most of the studies reviewed were accomplished with one or more of the following limitations: (1) small groups of subjects with some

36 H. Myklebust, "The Psychological Effects of Deafness," <u>American</u> <u>Annals of the Deaf</u>, 105 (4, 1960), pp. 372-385.

³⁷R. Pintner, J. Eisenson, and M. Stanton, <u>The Psychology of the</u> <u>Physically Handicapped</u> (New York: Crofts, 1941), p. 203.





deficiencies noted in procedures; (2) deficiencies in the utilization of control subjects; or (3) deficiencies in the nature of the test instrument employed. The studies indicate, however, that some changes in self-concept might be anticipated as a result of hearing deficiency in adults. They also indicate the need for the development of evaluative and research tools for investigation of these changes.

The Semantic Differential

This device was originally described by Osgood³⁸ as an objective means of measuring meaning using associative and psychological scaling techniques. In essence it consists of a series of seven-point rating scales with the polar ponts identified by a pair of adjectival opposites. The stimulus word or concept is rated on this series of scales. It was designed to yield information on the connotative meaning of a concept in respect to the associative dimension chosen for polar values. The logical basis of the semantic differential is as follows:

- The process of description or judgement can be conceived as the allocation of a concept to an experential continuum, definable by a pair of polar terms.
- Many different experential continua, or ways in which meanings vary, are essentially equivalent and hence may be represented by a single dimension.
- A limited number of such continua can be used to define a semantic space within which the meaning of any concept may be specified.

In the early studies the three continua were labeled (1) evaluative, (2) activity, and (3) potency. "These three factors are taken

³⁸C. E. Osgood, "The Nature and Measurement of Meaning," <u>Psychological Bulletin</u>, 49 (1952), pp. 197-237.

³⁹<u>Ibid</u>., p. 227.





as independent dimensions of the semantic space within which the meanings of concepts may be specified."40 Thus the polar adjectives are selected from words belonging to these three definitive categories. Osgood, et al. 41 began by postulating a semantic space of unknown dimensionality. It was assumed that if words of opposite meaning were attached to the ends of this scale, the scale would represent a straight line function of meaning passing through the origin of the space, and that several of these scales would represent a multidimensional space. Factor analysis was utilized to determine the number of independent dimensions of this space. Three such studies are described by Osgood, et al. 42 in which (a) the subject populations were varied, (b) the concepts judged were varied (eliminated altogether in one case), (c) the type of judgmental situation was varied, and (d) the factoring method was varied. The results of these factor analyses indicated the three primary dimensions of meaning mentioned above. Several other factors also appeared but accounted for little of the total variance. The evaluative factor accounted for about thirty-three per cent of the total variance and contained the greatest number of "pure" loadings. The activity and potency factors accounted for about one-half as much of the total variance as the evaluative factor. The findings indicate evidence of linearity between polar opposites in most cases. Additional

⁴⁰C. E. Osgood and G. J. Suci, "Factor Analysis of Meaning," <u>Journal of Experimental Psychology</u>, 50 (1955), pp. 325-338.

⁴¹Osgood, Suci, and Tannenbaum, <u>op. cit.</u>, p. 25.
⁴²Ibid., pp. 31-75.

factor analyses have recently been reported utilizing self-concept variables. Smith⁴³ reported the identification of five factors relating to self-concept that are useful in defining the semantic space. Osgood,⁴⁴ in attempting to develop a personality differential, utilized personality variables and the resulting factor analysis isolated six factors. The first three factors in both studies were most clearly isolated and all factors account for roughly the same proportion of variance as in the earlier factor analyses.

The term "meaning" has been mentioned without defining what is meant by it. Osgood, <u>et al.</u> spend considerable time discussing the theoretical concept of the process by which meaning is acquired. In brief the proposition is stated as follows in learning theory terms:

A pattern of stimulation which is not the significant is a sign of that significante if it evokes in the organism a mediating process, this process (a) being some fractional part of the total behavior elicited by the significate and (b) producing responses which would not occur without the previous contiguity of non-significate and significate patterns of stimulation.

The <u>significate</u> is defined as any pattern of stimulation which evokes reactions from the organism, and the <u>sign</u> is defined as any pattern of stimulation which is not the significate but evokes relevant reactions to the significate.

The meaning of a sign has been defined as a representational mediation process--representational by virtue of comprising some portion of the total behavior elicited by the significate

43 P. A. Smith, "A Factor Analytic Study of the Self-Concept," Journal of Consulting Esychology, 24 (1960), p. 191.

44 C. E. Osgood, <u>Studies of the Generality of Affective Meaning</u> <u>Systems</u> (Urbana: University of Illinois Press, 1961).

45 Osgood, Suci, and Tannenbaum, <u>op. cit.</u>, p. 7.





and mediating because this process, as a kind of self-stimulation, serves to elicit overt behaviors, both linguistic and non-linguistic, that are appropriate to the things specified. 40

Thus, "words represent things because they produce in human organisms some replica of the actual behavior toward these things, as a mediation process." 47

Osgood <u>et al</u>.⁴⁸ then state that there are now two definitions of meaning. One is the meaning of a sign to a particular person from the representational mediation process which it evokes, and the other is the meaning of a sign that has been defined as a point in a specified semantic space. But if the assumption can be made that there is a limited number of representational mediation reactions available and that the number of these reactions corresponds to the number of semantic space dimensions, then direction within the space corresponds to what reactions are elicited by the sign, and the intensity of the reactions is indicated by the distance from the origin. If this assumption is correct then the semantic differential can be utilized to measure meaning as defined by the mediation hypothesis.

The meaning of signs is crucial to the development and interpretation of the projective tests like the <u>Rorschach</u>, <u>Thematic Apperception</u> <u>Test</u>, etc., and indeed even the <u>Minnesota Multiphasic Personality Inven-</u> tory and <u>Bernreuter</u> scales are useful only because the meaning of signs varies from subject to subject as a result of their interaction with other people. The semantic differential appears to fit along the

⁴⁶<u>Ibid</u>., pp. 318-319.
⁴⁸<u>Ibid</u>., pp. 26-27.



continuum at a point somewhere between the projective tests and the question-answer tests. The semantic differential is more projective than the <u>Minnesota Multiphasic Personality Inventory</u> or <u>Bernreuter</u> because it is anticipated that semantic differential responses would reflect more degree of "affect" (defined as a specific subjective feeling or emotion attached to an object) than possible on either of the other tests. On the other hand the semantic differential is less projective than the <u>Rorschach</u> or <u>Thematic Apperception Test</u> because responses are limited by the structure of the scales.

It was mentioned previously that the meaning of signs varies, and the indication is that:

. . . the meanings which different individuals have for the same signs will vary to the extent that their behaviors toward the things signified have varied. This is because the composition of the mediation process, which is the meaning of a sign, is entirely dependent upon the composition of the total behavior occurring while the sign is being established.

This indicates that to change the meaning of signs, behavior with respect to objects must be changed. Thus it would appear that knowledge of word meaning could be utilized to infer psychological states and that personality deviations occur as a result of dis-ordered meanings attached to situations and/or persons. Osgood <u>et al</u>. point out that this is a valid assumption based on the learning-theory concept of the mediation process and that the typical procedure for investigation would either be:

(a) to make predictions (from some theory or model) about the differences in meanings of certain signs to be expected

^{49&}lt;u>Ibid</u>., p. 9.

between the two groups and then test the prediction against the semantic differential, or (b) measure differences in meaning of concepts with the differential, make predictions about overt behavior in certain situations from these measurements, and test the accuracy of these predictions.⁵⁰

In relation to obtaining information about self-concept, Osgood <u>et</u> <u>al.</u>, 51 point out several ways in which this information may be obtained using the semantic differential. One way is to obtain ratings of attitude regarding self as a measure against the coordinates of the differential. Another method would be to obtain ratings of MYSELF and a variety of personality traits thereby enabling one to determine those characteristics rated closest to MYSELF. Still another method would be to obtain ratings of MY IDEAL SELF, MY LEAST LIKED SELF, and MY ACTUAL SELF. This would enable one to index the evaluation along a scale and to allow inter-person comparison.

This test technique was chosen for the purpose of this study, then, because it was not felt that the interpretations of common instruments were necessarily applicable to the physically handicapped and because the semantic differential offered an objective method of indexing "affect." The <u>Minnesota Multiphasic Personality Inventory</u>, <u>Bernreuter</u>, and other scales, sample characteristic overt behavior of the individual and then by comparing results with normative groups make inferences regarding psychological states. This method should not, perhaps, be utilized with the physically handicapped as their overt behavior characteristics may not be reflections of the same psychological states but rather realistic adjustments of self-concept

⁵⁰<u>Ibid</u>., p. 220.

⁵¹<u>Ibid</u>., pp. 241-242.

imposed by the physical limitation. For example, to the question "Are you very talkative at social gathersings?," the hard-of-hearing person's "no" answer might be scored as indicating psychological withdrawal when, in effect, the answer might well be determined by the reality of the situation. It is anticipated that the semantic differential would enable one to obtain "feelings about" items that would allow for more accurate inferences, since the subject would not be reporting how he performs but how he "feels" about various concepts. He may "feel" the same about PEOPLE as a normal heaing individual does and yet not be talkative at social events. If his "feelings" about PEOPLE are quite different from the normal hearing individual, however, one may be able to infer some deviant psychological state. The semantic differential has been utilized in research in various areas of communications. It has been utilized in the measurement of personality both as an hypothesis testing instrument and as a means of quantifying subjective test instruments. The pertinent studies in the area of personality assessment will be discussed in addition to those studies important to the logic and validity of the semantic technique.

Bopp⁵² utilized the semantic differential to investigate whether the factorial bases of schizophrenic judgments differ from normals. The control group was selected to match the experimental group in terms of age, sex, and education. The findings indicated that the semantic frame of reference for schizophrenics does not differ from

⁵²J. Bopp, "A Quantative Semantic Analysis of Word Association in Schizophrenia" (unpublished Ph.D dissertation, University of Illinois, 1955).



normals. She also found that schizophrenics vary considerably in the use of scale positions in that they tend to utilize the more extreme scale values.

Kerrick⁵³ provided some evidence that IQ may be a factor in determining scale-checking style. She administered the semantic differential to high school students of known intelligence and the results indicated that low IQ students tended to be more polarized in response styles than brigher students. No difference was found in polarization as a function of anxiety-level as defined by the <u>Taylor Manifest Anxiety</u> <u>Scale</u>.

Osgood and Luria⁵⁴ described their use of the semantic differential in the analysis of a multiple personality in which they did not have free access to any other diagnostic information about the person. Their general assumption was that "mental illness" is essentially a disordering of meanings or ways of perceiving from those characteristic of people judged "normal" in our society. The concepts they utilized stressed supposed areas of conflict or concern, i.e., love, child, me, mother, sex, hatred, etc. They utilized fifteen concepts and ten scales from the three multiple personalities. Analysis of the responses compared with the therapist's description of the patient indicated a remarkable correspondence of the portraits. Cronbach⁵⁵ reports the

⁵³J. Kerrick, "The Effects of Intelligence and Manifest Anxiety on Attitude Change Through Communication" (unpublished Ph.D. dissertation, University of Illinois, 1954).

⁵⁴C. E. Osgood and Z. Luria, "A Blind Analysis of a Case of Multiple Personality Using the Semantic Differential," <u>Journal of Abnormal</u> and Social Psychology, 49 (1954), pp. 579-591.

⁵⁵ L. J. Cronbach, <u>Essentials of Psychological Testing</u> (New York: Harper and Bros., 1960), pp. 503-504.

semantic differential in this case added information about specific courses of conflict. Test-retest reliabilities were computed as the result of each personality having been tested twice. The coefficients ranged from 0.65-0.94 with a mean of 0.85.

Lazowick⁵⁶ has utilized the semantic differential to evaluate neurotic and normal identification of young adults with their parents. He used ten concepts presumed to be most representative of conditions existing in relation to identificaton, and nine scales chosen to represent each factor on the basis of having maximal loading on that factor and minimal loading on the other two. The neurotic and normal groups were chosen by taking the upper and lower ten per cent of 418 students on the <u>Taylor Manifest Anxiety Scale</u>. He concluded that the semantic differential may be used to investigate the nature of identification and that the results are convincing and meaningful. The results indicated good construct validity according to the author.

Semans⁵⁷ utilized the semantic differential to study changes in connotative meaning as a result of a transorbital lobotomy. The test (ten concepts and fifteen scales) was administered to severely ill psychotics before and after surgery. Significant changes in concept ratings resulted.

Grigg⁵⁸ utilized the semantic differential to measure meaning assigned to "self," "ideal-self," and "neurotic" on forty-two

⁵⁶L. Lazowick, "On the Nature of Identification," <u>Journal of</u> <u>Abnormal and Social Psychology</u>, 51 (1955), pp. 175-183.

⁵⁷C. B. Semans, "Use of the Semantic Differential with Lobotomized Psychotics," <u>Journal of</u> Consulting Psychology, 21 (1957), p. 264.

⁵⁸A. E. Grigg, "Validity Study of the Semantic Differential Technique," <u>Journal of Clinical Psychology</u>, 15 (1959), pp. 179-181.



under-graduate students. Two days later the subjects read a flattering article about a "Miss X" and rated their impression of her. Later thirty of the subjects read another article about "Miss X" indicating neurotic behavior. They then rated her again on the assumption that the students would now rate her closer to their previous ratings of neurotic. Results indicated that the "ideal-self" was significantly further from "neurotic" than was "self." The experimental group (rating "Miss X" as neurotic) shifted their ratings in the expected direction but the change was not statistically significant. These results were reported as being favorable to the validity of the semantic differential, indicating good construct validity.

Kleinmuntz⁵⁹ utlized the semantic differential technique to differentiate among types of psychotics. Previous factor analytic studies utilizing the <u>Minnesota Multiphasic Personality Inventory</u> and the <u>Bender-Gestalt</u> tests identified four types of paranoid schizophrenics. He employed ten concepts and eleven scales. Three concepts were included to represent the self and others (me-they-people); three concepts were chosen because they represented environmental objects that appeared meaningful to psychotics (friends-poison-the mind); the remaining four items were concepts from the <u>Minnesota Multiphasic Per-</u> <u>sonality Inventory</u> Pa Obvious and Pa Subtle items. The resulting semantic structures were then plotted in three-dimensional space. This study differentiated two types of paranoid schizophrenia and

⁵⁹B. Kleinmuntz, "Two Types of Paranoid Schizophrenics," Journal of Clinical Psychology, 16 (1960), pp. 310-312.



demonstrated that these two groups, although apparently similar, think differently about themselves and their environment. His conclusion suggested that the practice of grouping psychotics on the basis of symptoms was inadequate.

Smith⁶⁰ reported a factor analytic study of self-concept using the semantic differential with a group of young adult male psychiatric patients. He found five factors relating to self-concept that were useful in defining the semantic space. The five factors were:

Factor	1	Self-esteem
Factor	2	Anxiety-tension
Factor	3	Independence
Factor	4	Estrangement
Factor	5	Body Image

Smith reported that Factor 1 corresponded closely to Osgood's evaluative dimension and that Factor 5 appeared related to Osgood's potency dimension.

Helper⁶¹ reported a study of children's self-evaluation and their parents evaluation of them. Assessment was made of self-evaluation of eighth and ninth grade children and their parents utilizing the semantic differential technique, with the children rating concepts labeled "Actual Self" and "Ideal Self" while the parents rated concepts labeled "Actual Child Concept" and "Ideal Child Concept." The correlation between parental evaluations and self-evaluations by children tended to be small but consistently positive. Reliability coefficients ranged from 0.66 to 0.83.

⁶⁰Smith, <u>op. cit</u>.

⁶¹M. M. Helper, "Parental Evaluation of Children and Children's Self-Evaluations," <u>Journal of Abnormal and Social Psychology</u>, 56 (1958), pp. 190-194.



Korman⁶² investigated the personality theories of ten clinical psychology trainees, ten psychiatrists, ten social workers, and ten senior clinical psychologists utilizing the semantic differential. Each subject rated twenty concepts relating to diagnosis and therapy on nine scales representative of the three major dimensions of meaning. The results indicated significant intergroup differences in semantic structure and in degree of connotative similarity with social workers and clinical psychologists at opposite ends of the continuum and the psychiatrists in a medial position.

In addition to the above studies pertaining to evaluation of personality the semantic differential has been utilized to quantify subjective projective tests. Rabin, 63 Kamano, 64 and $2ax^{65}$ have applied the semantic differential to <u>Rorschach</u> inkblots and have indicated the feasibility of this approach. Reeves⁶⁶ administered the semantic

⁶²M. Korman, "Implicit Personality Theories of Clinicians as Defined by Semantic Structure," <u>Journal of Consulting Psychology</u>, 24 (1960), pp. 180-186.

⁶³A. Rabin, "Contribution to Meaning of Rorschach's Inkblots via the Semantic Differential," <u>Journal of Consulting Psychology</u>, 23 (1959), pp. 368-372.

⁶⁴D. Kamano, "Symbolic Significance of Rorschach Cards IV and VII," <u>Journal of Clinical Psychology</u>, 16 (1960), pp. 50-52.

⁶⁵M. Zax and R. H. Loiselle, "Stimulus Value of Rorschach Inkblots as Measured by the Semantic Differential," <u>Journal of Clinical</u> <u>Psychology</u>, 16 (1960), pp. 160-163.

⁶⁶M. Reeves, "An Application of the Semantic Differential to Thematic Apperception Test Materials" (unpublished Ph.D. dissertation, University of Illinois, 1954). differential and <u>Thematic Apperception Test</u> to undergraduate students. Her findings indicate that the direction of ratings agreed with expert evaluations of <u>Thematic Apperception Test</u> responses.

Messick⁶⁷ reported that the use of the semantic differential involved several assumptions: (1) "when an integer score is assigned as a concept's scale position on a particular scale, the property of equal intervals within that scale is assumed"; (2) "when a distance measure is taken over several scales, equal intervals between scales are assumed"; and (3) "application of factor analytic techniques to the assigned scores involves assumptions concerning the location of the origins, i.e., it is assumed that the zero-point falls at the same place on each scale, namely at the centroid." He used the psychophysical method of sucessive intervals applied separately to frequently employed scales and indicated an approximate equality of corresponding interval lengths from scale to scale and a similar placement of origins across scales. He concluded that the scaling properties implied by the differential have some basis other than mere assumption. Concerning the equality of intervals within a seven point scale, an important study has been reported by Cliff.⁶⁸ The semantic differential utilizes adverbial quantifiers at the intervals between the poles. The adverbs used are slightly, quite, and extremely. Cliff determined that these quantifiers yield almost equal increasing degrees of

⁶⁷S. J. Messick, "Metric Properties of the Semantic Differential," <u>Educational and Psychological Measurement</u>, 17 (1957), p. 200.

⁶⁸N. Cliff, "The Relation of Adverb-Adjective Combinations to Their Components" (unpublished Ph. D. dissertation, Princeton University, 1956).



intensity, 0.50, 1.00, and 1.50 respectively, when combined with adjectives.

The semantic differential has been hypothesized as a means of measuring attitude. Osgood <u>et al</u>.⁶⁹ report the reasonableness of identifying attitude with the evaluative dimension of the semantic space. They then report comparisons between this evaluative dimension and Thurstone and Gutman scales. The results indicated that whatever the Thurstone and Gutman scales measure, the evaluative dimension measured about as well. Since attitudinal measurement is done for predictive purposes, additional information is obtained and prediction improved by combining judgments from scales representing other dimensions than the evaluative factor.

The standard criteria for measuring instruments are objectivity, reliability, validity, sensitivity, and comparability. The previously discussed studies⁷⁰ indicate that the semantic differential meets the criteria fairly well. In particular, reliability data has been collected indicating that a shift of two scale units probably represents a significant change in meaning for one subject, and a shift of 1.00 to 1.50 scale units in factor score is usually significant at the five per cent level. Group data changes as small as 0.5 unit are significant at the five per cent level. Test-retest reliability coefficients of 0.85 have been obtained in several studies. Osgood <u>et al</u>.⁷¹ reported excellent "face" validity and good construct validity has

⁶⁹Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 190-198. ⁷⁰<u>Ibid</u>., pp. 125-188. ⁷¹<u>Ibid</u>., p. 141.





been reported in the literature. The studies relative to comparability indicate difficulty obtaining high loadings on factors that will hold constant for a series of concepts. Thus some concept-scale interaction has been evident. Only minimal subject-concept interaction has been found. Osgood⁷² discusses the presence of concept-scale interaction and speculates on the reasons for its existence. He believes the semantic differential is subject to "denotative contamination."

Most adjectival scale terms have variable denotative meanings as well as their affective connotation. The denotation of masculine-feminine is elicited by the concept ADLAI STEVENSON while its potency connotation is elicited by the concept DYNAMO: a denotation of the scale <u>hot-cold</u> is tapped by LAVA, whereas its activity connotation is tapped by concepts like JAZZ and FESTIVAL.⁷³

Another hypothesized cause of concept-scale interaction is what Osgood calls "factorial coalescence."⁷⁴ Each concept itself has some characteristic attribute. The concept MOTHER has intense evaluative meaning, therefore if a scale has some evaluative loading, it should become more evaluative when placed with this concept. If the same scale has some loading on the potency dimension and is then utilized with a concept having a potency attribute, its affective meaning should become more potent.

The presence of concept-scale interaction means that there is no one semantic differential with a unique and well defined set of factors.

⁷²Osgood, <u>Studies on the Generality of Affective Meaning Systems</u>, <u>op. cit</u>., p. 24.

⁷³<u>Ibid</u>., p. 28. ⁷⁴<u>Ibid</u>., pp. 28-29.
The presence of concept-scale interaction across a set of dissimilar concepts, however, does not mean that a specific instrument has to be made for each concept. Osgood⁷⁵ reports the initiation of research to determine the presence of concept classes within which concept-scale interaction is minimal. One of these classes is of personality concepts. Six personality concepts were rated by forty-five subjects against thirty scales to determine whether the factorial structure was stable across the concepts. Six separate factor analyses were run-one for each concept--and the results compared. The three factors most clearly and consistently revealed in all analyses were labeled as <u>morality</u>, <u>volatility</u>, and <u>toughness</u>. Three other factors which were present in all analyses, but less clearly isolated, were labeled sociability, uniqueness, and tangibility.

In one of the studies of the series, Osgood and his staff asked twenty married college adults to rate forty diverse personality concepts on each of forty scales. The results, across all concepts, were factor analyzed. The factors isolated in the previous study reappeared in this analysis along with a factor labeled <u>rationality</u> and an unnamed factor. The proportions of variance accounted for by these factors were essentially equal, accounting for fifty per cent of the total variance.

The fact that very similar factors keep appearing in these studies suggests that there may be a common semantic system within which personalities are described.⁷⁶

⁷⁵<u>Ibid</u>., pp. 24-26.
⁷⁶<u>Ibid</u>., p. 26.



Summary

It is anticipated that individuals who become hard-of-hearing undergo some modification of the relationship between the self and the environment, either positively or negatively. It is understandable why common psychological test instruments that sample behavior could indicate some neurotic tendencies in this group. It has not been possible to evaluate objectively the dynamic covert personality characteristics of an individual, except by inference from observation of behavior.⁷⁷ The danger of inferring psychological states from samples of overt behavior with the physically handicapped has already been pointed out, i.e., their overt behavior may not be a reflection of the psychological states one could infer with non-handicapped people, but rather realistic adjustments of attitude imposed by their physical limitations. The semantic differential was chosen for the purpose of this study because it appeared to offer a more objective method of measuring "affect." Also, as a result of the criticisms of current instruments used to evaluate self-concept the semantic differential was chosen, not because it eliminates all methodological and scaling problems, but because it eliminates some of the more critical problems inherent in other techniques.

77 Wylie, <u>op. cit</u>., p. 10.



CHAPTER III

TEST CONSTRUCTION AND DATA COLLECTION PROCEDURES

The experimental procedures outlined in this chapter are divided into two main areas. One is concerned with the development of an instrument to evaluate self-concept and the other with the collection of data from a hard-of-hearing population utilizing the semantic differential. These two areas are discussed separately in chronological order commencing with the development of a semantic differential instrument. All procedures leading to the collection of data from a hard-ofhearing population will be included in this chapter, even though this entails the presentation of some results.

Development of a Measuring Instrument

There has been a considerable amount of research effort expended in determining the semantic structure for a wide variety of concepts and scales. The results of numerous factor analytic studies were available in the literature from which an experimenter might draw scales which have been already identified as to their factor loading. An exhaustive study, for example, was reported by Osgood <u>et al</u>.⁷⁸ in which seventy-six adjective pairs were evaluated against each of twenty concepts. Because of the concept-scale interaction previously cited,

⁷⁸Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 47-66.



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⁷⁸Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 47-66.

the decision was made to initiate the research with a factor analytic study which would provide the most precise information relative to scale-factor relationships and the existing interaction.

Choice of Concepts and Scales

The choice of concepts to be rated appeared to be unlimited since the subject's task was to rate how they <u>feel</u> about the concepts as opposed to how they habitually <u>behave</u>. In many instances <u>feel</u> and <u>behave</u> might be synonomous but in others a discrepancy would be a anticipated. Therefore, it was not felt that the hard-of-hearing subjects would be penalized by choice of concepts as they are on paper and pencil personality tests that ask for samples of behavior. The concepts utilized were chosen on the following bases and arbitrarily limited to nine for economy of administration: (1) that they represented suspected areas of concern to the hard-of-hearing that would logically entail attitude differences because of alterations in communication ability in inter-personal situations; and (2) that they be applicable for use with both sexes and both experimental and control groups. As a result the following concepts were utilized:

1.	MYSELF	5.	STRANGERS
2.	FRIENDS	6.	MYSELF WITH A HEARING AID
3.	MY HAPPIEST SELF	7.	MYSELF IN THE FUTURE
4.	MYSELF WITH A HEARING	8.	PEOPLE OF AUTHORITY
	LOSS	. 9.	MYSELF AND FAILURE

The selection of adjectival scales stressed three criteria. The first criterion was their factorial composition--those having maximal loading on one factor and minimal loading on the other factors (as determined by previous factor analyses). The second criterion was relevance to the concepts being judged. The third criterion was



semantic stability for the concepts and subjects to eliminate denotative scaling as much as possible. Fifty scales were chosen from Osgood's Thesaurus analysis,⁷⁹ Osgood's Personality Differential analysis,⁸⁰ and from Smith's self-concept analysis.⁸¹ The scales chosen to be evaluated are as follows:

- 1. natural-strange 2. moral-immoral 3. lighthearted-depressed 4. clever-stupid large-small
 masculine-feminine 7. leader-follower 8. near-far 9. guick-slow 10. success-failure 11. kind-cruel unafriad-afraid
 mild-intense 14. full-empty 15. secure-insecure 16. emotional-unemotional 17. popular-unpopular 18. lenient-severe talkative-silent 19. 20. clear-confused 21. sociable-unsociable 22. relaxed-tense 23. happy-sad 24. calm-excitable
- 26. interesting-boring 27. true-false 28. sincere-artificial 29. strong-weak good-bad
 active-passive 32. refreshed-tired 33. easy-hard 34. apparent-unapparent 35. humorous-serious 36. liked-disliked complete-incomplete
 valuable-worthless 39. warm-cold 40. healthy-sick 41. superior-inferior 42. useful-useless 43. sharp-dull 44. confident-unsure 45. tender-tough
 46. optimistic-pessimistic 47. predictable-unpredictable 48. comofrtable-uncomfortable 49. positive-negative
 - 50. desirable-undesirable

However, the choice of scales by the above criteria did not ensure that the factor loadings obtained in the studies would remain stable across the concepts chosen to be employed in this study.

⁷⁹Ibid., pp. 53-61.

fair-unfair

25.

⁸⁰Osgood, <u>Studies on the Generality of Affective Meaning Systems</u>, <u>op. cit</u>., p. 26.

⁸¹Smith, <u>op. cit</u>.





In an attempt to minimize concept-scale interaction the concepts were structured so that the subjects were always rating their feelings about people. It was thought that individuals would rate themselves and others from essentially the same point of reference (even though the concept rated was located in a different environment) so that scales would more likely maintain their factor orientation and loading, than if they were rating different classes of concepts. Concepts 2, 5 and 8 would be rated from a different perspective than the reamining concepts, but again, it was not anticipated that the way a person evaluates others differs from the way he evaluates himself, i.e., people define themselves with the same yardstick they use to define others. It did not appear that the subjects would or could faithfully record their true feelings, especially negative self feelings, in a comparative situation -- MYSELF WITH FRIENDS, etc. Maintenance of selfesteem would necessitate subjects overestimating their standing on socially desirable characteristics when doing so in direct comparison with others.

What can be inferred about the rater's self-concept from his rating of others? Fortunately, there is considerable evidence⁸² that self-regarding attitudes can be inferred from knowledge about regard for others. The usual method for inferring self-regard is to utilize a MYSELF--IDEAL SELF discrepancy score, with increasing degrees of isomorphism indicating increased self-regard. This approach has been questioned by Wylie⁸³ for various reasons among which is the notion

⁸²Wylie, <u>op. cit.</u>, pp. 235-240. ⁸³<u>Ibid</u>., pp. 27-30.

that the IDEAL SELF rating is stereotyped by social desirability. In an attempt to utilize a discrepancy score as a possible source of additional self-concept information the concept MY HAPPIEST SELF was utilized. It was anticipated that rating this concept would approximate more a true reflection of what the individual's ideal was with a minimum of social desirability directly affecting the rating. It was assumed that most individuals have been happy at some time and can determine cognitively their definition of it. In the end, however, it might be found that this HAPPIEST state is socially prescribed to the point that it approximates an IDEAL value, or the discrepancy score may add little information to that obtained on the MYSELF rating. It was anticipated that the concepts as listed would yield the most valid judgments possible. The concepts, then, involved the subject rating himself in six different contexts and rating three other similar classes of individuals.

Considerable care was exercised in choosing scales in order to mimimize concept-scale interaction, but rather than assume that adequate control of this variable had been achieved by careful selection procedures, a factor analytic study was designed to determine the specific relationships.

Data Collection Procedures

The purpose of this study was to obtain judgments on each of the fifty scales for each of the nine concepts. The test booklet was made up consisting of eighteen pages. Page 1 had Concept 1 <u>MYSELF</u> typed

⁸³<u>Ibid</u>., pp. 27-30.

across the top. Twenty-five of the fifty scales were then arranged below the above caption. Page 2 contained the same heading, MYSELF, with the word "continued" typed beneath. The reamining twenty-five scales were below. The exact format for Concept 1 can be seen in Table 1. The carrier phase "How do I feel about: " was employed to introduce each concept to help the subjects retain the same perspective as they moved from page to page of the booklet. The adjectival opposites were separated by a seven alternative scale with the scales arranged in random order under each concept with the placement of the polar opposite on the left side of the scale also determined randomly for each concept. The remaining sixteen pages of the booklet were arranged similarly with respect to the random arrangement of scales. Concept 2 FRIENDS occupied pages 3 and 4, and so on, with Concept 9 MYSELF AND FAILURE on pages 17 and 18. The same carrier phrase was employed on all pages except those for Concept 4 MYSELF WITH A HEARING LOSS and Concept 6 MYSELF WITH A HEARING AID. The carrier phase was modified to "How do (or would) I feel about so that normal hearing people could respond without ambiguity. Appropriate instructions were written and clipped to the front of the booklet. These instructions (Appendix B) were derived from those utilized by Osgood, et al. ⁸⁴ Their instructions were modified however. to state the directions more simply because the populations to be sampled in subsequent aspects of this study were going to consist of people representing diverse educational and intellectual levels. The

⁸⁴Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 82-84.



TABLE 1

CONCEPT-SCALE FORMAT EMPLOYED IN FACTOR ANALYSIS STUDY

How do I feel about: MYSELF

boring	:	_:					interesting
false		_:					true
artificial						:	sincere
strong							weak
good		_:					bad
passive		_:					active
refreshed		:		:	:		tired
hard	:	:	:	:		:	easy
apparent	:	:		:	:	:	unapparent
serious	:	:	:	:	:		humorous
disliked	:	:	:	:	:	:	liked
incomplete	:	:	:	:	:	:	complete
valuable	:		:	:	:	:	worthless
cold	:	:	:	:	:	:	warm
sick	:	:	:	:	:	:	healthy
inferior	:	:	:		:	:	superior
useful							useless
dull							sharp
confident							unsure
tender							tough
pessimistic							optimistic
unpredictable						:	predictable
comfortable							uncomfortable
excitable							calm
desirable							undesirable



TABLE 1 Continued

.

natural		_:					strange
immoral	: .	:	:	:	:		moral
ighthearted					:		depressed
clever		_:				_:	stupid
small_						:	large
masculine		_:					feminine
leader			:				follower
far	_:						near
slow		_:					quick
success							failure
kind	:	-		:	:		cruel
afraid			_:	_:		_:	unafraid
intense			_:	_:			mild
ful1					_:		empty
insecure							secure
unemotional	_:	_:	_:	_:	:		emotional
unpopular		_:	_:	_:	_:	_:	popular
lenient	_:	_:	_:	_:		_:	severe
talkative		_:	_:	_:		_:	silent
clear_	_:	_:		:	_:	_:	confused
sociable	_:	_:		_:	:		unsociable
relaxed	_:	_:	_:	_:	_:	_:	tense
happy	_:	_:	_:	_:	_:	_:	sad
negative	_:		_:	_:	_:	_:	positive
unfair	:	:	:			_:	fair

nine differentials were administered to all subjects in the same numerical sequence in which they are listed on page 38. No attempt was made to randomize or counter-balance concept order since Aiken⁸⁵ reports that no significant differences in scalar locations of concepts occurs as a function of the context in which they are embedded.

Sixty mimeographed test booklets were produced and administered to fifty-five college students at Michigan State University. The tests

⁸⁵Ibid., p. 84.



were given under usual classroom conditions, to students enrolled in speech courses. Two of the classes met during the day and one met at night. The utilization of an evening class tended to widen the age range of the subject population. This population is statistically summarized in Table 2. Each subject made 450 judgments. Approximately forty minutes were required to complete the task.

Treatment of the Data

The data were quantified by assigning a value from one to seven to the seven scalar locations. The value "one" was arbitrarily assigned to one end of each scale and "seven" to the other end. The quantified judgments were transferred to IBM data processing cards. All the data from one subject for one concept was punched on one eighty column card. The combination of scales, concepts, and subjects utilized generated a 50 x 9 x 55 cube of data (N = 24,750). A 50 x 50 Pearson Product-Moment correlation matrix was obtained for each concept. In addition a 50 x 50 correlation matrix was computed across all subjects and concepts. Thus a correlation coefficient was obtained indicating the relationship between each and all scales with every other scale for each concept individually and across all concepts. These intercorrelations were calculated with IBM equipment. Each correlation matrix was then subjected to factor analysis, utilizing an IBM 709 computer.

A correlation matrix can be factor analyzed in a variety of ways. The decision as to the most appropriate method to provide for statistical simplicity and psychological meaningfulness was made through the





TABLE 2

Age	•	Frequency Males	Distribution Females
17		0	1
18		1	1
19		1	2
20		4	4
21		9	4
22		7	2
24		0	1
25		3	0
26		1	0
27		2	0
28		2	0
30		2	0
32		2	0
33		2	0
39		0	1
41		1	0
42		0	1
56		0	1
	Total	38	17

THE NUMBER OF SUBJECTS PARTICIPATING IN THE FACTOR ANALYSIS STUDY SUMMARIZED BY AGE AND SEX

cooperation extended to this investigator by the Communication Research Center of Michigan State University. Dr. Malcolm McLean of the Center not only provided counsel regarding the recommended factor analytic procedure, but also provided the clerical staff required to prepare the data for the computer. The principle axes solution method⁸⁶ was utilized to produce an initial solution. Harman⁸⁷ reports that this method is the statistically optimal solution, but that generally it is not acceptable to psychologists because it lacks meaningful factor solutions. Two common analytical methods employed after the initial solution has been obtained to provide an objective solution to the problem of psychological meaningfulness are the quartimax method⁸⁸ and the varimax method.^{89, 90} Both of these methods are rotational procedures "for transforming any initial solution to a simple-structure solution."⁹¹ These methods also require orthogonality, i.e., that the factors be uncorrelated,⁹² or in geometric terms, at right angles to one another. The rotational procedure, in the varimax method, involves the rotation

⁸⁶H. Hotelling, "Analysis of a Complex of Statistical Variables into Principal Components," <u>Journal of Experimental Psychology</u>, 24 (1933), pp. 417-441, 490-520.

87. H. Harman, <u>Modern Factor Analysis</u> (Chicago: University of Chicago Press, 1960), p. 4.

⁸⁸<u>Ibid</u>., pp. 294-300. ⁸⁹<u>Ibid</u>., pp. 301-308.

90. H. F. Kaiser, "The Varimax Method of Factor Analysis" (unpublished Ph.D. dissertation, University of California, 1956).

⁹¹Harman, <u>op. cit.</u>, p. 289.
⁹²<u>Ibid.</u>, p. 309.

of all orthogonal axes of the three dimensional space to arrive at simple-structure. The five conditions for simple-structure are:

- 1. Each row of the factor matrix should have at least one zero.
- 2. If there are m common factors, each column of the factor matrix should have at least m zeros.
- 3. For every pair of columns of the factor matrix there should be several variables whose entries vanish in one column but not in the other.
- 4. For every pair of columns of the factor matrix, a large proportion of the variables should have vanishing entries in both columns when there are four or more factors.
- 5. For every pair of columns of the factor matrix there should be only a small number of variables with non-vanishing entries in both columns.

Osgood <u>et al</u>.⁹⁴ state that a rotational procedure producing a multiplefactor solution is required to isolate more than the three dominant factors of his earlier studies. The varimax method was chosen as the rotational procedure to be utilized following the initial solution provided by the principal axes method. This choice was made because Harman says the varimax criterion "does a better job of approximating the classical simple-structure principles,"⁹⁵ and because Osgoot <u>et</u> <u>al</u>.⁹⁶ felt the quartimax method yielded factors difficult to interpret.

Results of Factor Analysis

4

The complete results of factor analysis are contained in Appendix A. For present purposes an abbreviated summary of the results is presented. The purpose, at this point, is to evaluate and compare factor structure from concept to concept so that scale-factor-concept relationships might be observed. In order to accomplish this, the

⁹³<u>Ibid.</u>, p. 113.
⁹⁴Osgood, Suci, and Tannenbaum, <u>op.cit</u>., p.51.
⁹⁵_{Harman}, <u>op. cit</u>., p. 289.

⁹⁶Osgood, Suci, and Tannebaum, <u>op. cit</u>., p. 52.

following tables were constructed so that only the scales having the highest loadings on each of the factors are presented. Most of the factors have been labeled. These labels were derived arbitrarily by attaching a name to the value, that in most cases, was suggested by the scales measuring that value.

Concept-scale interaction is evident in the data of Tables 3-12, with certain scales changing from factor to factor as a function of concepts. Inspection of the data, however, reveals that the same, or similar, factors seem to appear on many of the concepts. In general, the first factor of each concept appears to be an evaluative-type dimension. In some cases, this evaluative aspect has been broken down into two or more factors, variously labeled as Capability, Popularity, Sociability, Alertness, Assurance, or Gravity. Another consistent appearing factor is one labeled <u>Toughness</u>. A third consistent factor is related to honesty-morality and is generally labeled as Genuineness. A fourth factor is related to emotionality and is referred to as Excitability or Anxiety-Tension. Other factors appear with specific concepts but their generality across more than a few concepts is lacking. It should be noted that on Concept 8 PEOPLE OF AUTHORITY there appears to be a combining of the Capability and Genuineness dimensions producing a Genuineness-Capability factor on that concept alone.

Considerable similarity in factor structure can be seen between these factor analytic results and those presented by Osgood⁹⁷ during the development of his personality differential. His factors were

⁹⁷Osgood, <u>Studies of the Generality of Affective Meaning Systems</u>, <u>op. cit.</u>, p. 26.



ო	
TABLE	

DING ON ISOLATED FACTO	cepts)
N	Con
SCALES	ver-all
HIGHEST	lysis0
SHOWING	sal Anal
ANALYSIS	(Univer
FACTOR	
5	
SUMMARY	

•			
Factor 1	<u>Capability</u>	Factor 4	ě
58.09%	Common Variance	8.262	Con
30.94%	Total Variance	A. 40Z	Tot
useful-useless	. 80	relaxed-tense	
valuable-worth1	.ess .80	lighthearted-depr	essed
success-failure	. 79	humorous-serious	
contident-unsur	е .77		
sharp-dull	.76	Factor 5	Exc
desirable-undes	irable .75		
superior-inferi	or .74	8.262	Con
quick-slow	.74	207-7	Tot
clear-confused	.72	calm-excitable	
leader-follower	71	emotional-unemoti	onal
		mild-intense	
Factor 2	Genuineness	•	
14.20%	Common Variance	Factor 6	
7.562	Total Variance	4.39%	Con
true-false	.68	2.34%	Tot
sincere-artific	ial .56	masculine-feminin	a
moral-immoral	.55	predictable-unpre	dictab
Factor 3	Toughness	apparent-unappare	Jt
2.692	Common Va riance		
5.162	Total variance		
tender-tough	67		
lenient-severe	64		
easy-hard	63		

on Variance	l Variance	.59	56	747.	
Commo	Tota	ble	nemotional	9	
262	40 2	lm-excita	otional-u	1d-intens	

.45 .42 .41

Excitability

Common Variance Total Variance

Anxiety-Tension

ctor 6

numon Varíance tal Varíance	.48	ble .35	.37
1.397 Co	asculine-feminine	oredictable-unpredicta	ipparent-mapparent





TABLE 4

SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS (CONCEPT 1--MYSELF)

actor 1	Popularity	Factor 4	Toughness	Factor 7	Predictability
3.82%	Common Variance	9.85%	Common Variance	6.94%	Common Variance
6.20%	Total Variance	6.70%	Total Variance	4.72%	Total Variance
iked-dislik	ced75	easy-hard	73	predictable	-unpredictable .68
nteresting-	-boring73	tender-tough	63	strong-weak	58
uperior-inf	ferior69	kind-cruel	58	masculine-fe	eminine .50
ctive-passi rue-false	Lve69 69	Factor 5	Capability	Factor 8	
harp-dull	68	8.62%	Common Variance	6.127	Common Variance
		5.86%	Total Variance	4.16%	Total Variance
actor 2	Anxiety-Tension	useful-useles	.64	desirable-ur	ndesirable .55
1. 05%	Come Veriance	good-bad	.79	clear-confus	sed73
102	Total Variance	valuable-wort	chless .58		
al avad-tone	77			Factor 9	
1ghthearted	1-depressed .76	Factor 6	Excitability	5.502	Common Variance
appy-sad	.72	7.16%	Common Variance	3.74%	Total Variance
		4.84%	Total Variance	apparent-una	apparent .71
actor 3	Dependency	calm-excitabl	.e70		
262.1	Common Variance	emotional-une	motional .56	Factor 10	
8.02%	Total Variance			5.412	Common Variance
eader-follc	.77			3.687	Total Variance
uccess-fail	lure .65			large-small	78
ull-empty	.63				



Factor 1	Sociability	Factor 4	Orientation	Factor 7	
19.56%	Common Variance	9.58%	Common Variance	7.23%	Common Variance
12.98%	Total Variance	6.36%	Total Variance	4.80%	Total Variance
sociable-un.	sociable .82	clear-confus	ied74	mild-intens	. 74
confident-u	nsure .76	refreshed-ti	.red71	predictable	-unpredictable .59
talkative-s.	ilent .75	unafraid-afr	60		
secure-inse	cure .71	kind-cruel	48	Factor 8	
strong-weak	.68				
		Factor 5	Genuineness	200.0	Common Variance
Factor 2	Capability	9.46%	Common Variance	4.42% sharp-dull	TOTAL VARIANCE
15.16%	Common Variance	6.28%	Total Variance		
10.06%	Total Variance	warm-cold	76	Factor 9	
useful-usel.	.75	sincere-arti	ificial64		
interesting	-boring .75	moral-immore	62	240°0	Common Variance
desirable-u	ndesirable .71			4. 34%	10tal Variance
Factor 3	Fulfillment	Factor 6	Toughness	caim-excita emotional-u	nemotional62
10. 432	Common Variance	9.31%	Common Variance		
6 977	Total Variance	6.18%	Total Variance	Factor 10	
complete-in.	complete .73	easy-hard	76	6.06%	Common Variance
popular-unp	opular .68	reiner - rougi	10	4.02%	Total Variance
optimistic-	pessimistic .67			apparent-un	apparent .60
relaxed-ten	se .61			near-far	.58
				and the same	10/

0 80 49 e positive-negative

52

TABLE 5

•					
actor 1	Capability	Factor 4	Passivity	Factor 7	
3.22 %	Coumon Variance	8.07%	Common Variance	5.362	Common Variance
3.04%	Total Variance	5.60%	Total Variance	3.72%	Total Variance
nteresting	-boring .82	active-passi	ve .63	natural-str	
:lever-stup	id .82	success-fail	ure .63	5	
efreshed-t.	ired .81	valuable-wor	thless .56	Factor 8	Annrehensi wenese
<pre>harp-dull</pre>	.80				
seful-usel	ess . 80	Factor 5	Body Image	5.22%	Common Variance
secure-inse	cure .79			3.62%	Total Variance
	k 1	8.04%	Common Variance	unafraid-af	fraid75
actor 2	Popularity	5.58%	Total Variance	predictable	e-unpredictable.68
		masculine-fe	minine .81		
18.17%	Common Variance	tender-tough	70	Factor 9	
12.60%	Total Variance	large-small	. 66		
liked-disli	ked .81)		4.90%	Common Variance
opular-unp	opular .81	Factor 6	Excitability	3.402	Total Variance
sociable-un	sociable .74	8		good-bad	.60
destrable-u	ndesirable 61	1.35%	Common Variance		
) () ; ; ;)		5.10%	Total Variance		
Partor 3		emotional-un	emotional .79		
	Port augement	calm-excitab	le77		
9.062	Common Variance	mild-intense	. 60		
6.70%	Total Variance				
true-false	.69				
near-far	. 69				
apparent-ur	apparent .68				

TABLE 7

SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS (CONCEPT 4--MYSELF WITH A HEARING LOSS)

actor 1	Capability	Factor 3	Genuineness	Factor 5	Interestingnes	00
29.06%	Common Variance	14.38%	Common Variance	13.24%	Common Varianc	e
20.24%	Total Variance	10.02%	Total Variance	9.22%	Total Variance	
ıseful-usel	ess .79	true-false	80	interesting-	boring .7	6
raluable-wo	rthless .76	good-bad	68	success-fail		7
inafraid-af	raid .74	clever-stupid	63	quick-slow	J.	8
nealthy-sic	. r3	fair-unfair	60	I		
active-pass	i ive .72			Factor 6	Excitability	
:lear-confu	12 . 71	Factor 4	Toughness	10 1.0		
ositive-ne	gative .70			0./3%	Common Varianc	9
superior-in	iferior .70	13.26%	Common Variance	0.08%	Total Variance	L
1		9.24%	Total Variance	emorional-un	lemorional ./	∩ (
Ractor 2	Sociability	tender-tough	86	mild-incense		7 4
		lenient-sever	e83	relaxed-cens		, t
15.02%	Common Variance	easy-hard	66	calm-excitad		ø
10.462	Total Variance	kind-cruel	66			
complete-ir	scomplete64	warm-cold	63	Factor 7	Body Imag	al
sociable-un	sociable64					
numorous-se	irious61			6.32%	Common Varianc	e
talkative-s	vilent61			4.40%	Total Variance	
comfortable	:-uncomfortable56			mas culine-fe	minine .(2
				large-small		5

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TABLE 8

SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS (CONCEPT 5--STRANGERS)

Factor 1	Alertness	Factor 3	<u>Capability</u>	Factor 5		
26.25 %	Common Variance	17.41%	Common Variance	9.122	Common Varian	ce
16.98 %	Total Variance	11.26%	Total Variance	5.90%	Total Varianc	e
quick-slow	83	useful-usele	. 79	mild-intens		65
sharp-dull	78	valuable-wor	cthless .75	masculine-f	eminine	63
strong-weak	76	interesting-	-boring .65			
popular-unpo	pular68	sociable-uns	sociable .58	Factor 6	Gravi	ty
clever-stupi	d - 68					:
		Factor 4	Toughness	0.236 5 364	COMMON VALIAN Total Varian	e S C
Factor 2	Estrangement	13.14%	Common Variance	humorous-se	rious variant.	د 76
20.07%	Common Variance	8.50%	Total Variance	confident-u	nsure.	47
12.98%	Total Variance	easy-hard	.70			
natural-stra	nge87	tender-tough	ı	Factor 7		
comfortable-	uncomfortable83	lenient-seve	ere .63			
moral-immora	167	kind-cruel	.61	3.70%	Common varian Total Varianc	e C
				leader-foll	ower	55
				refreshed-t	ired .	47

55

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Zantor 1		Bartor 2			
ACLOF 1	Capability	ractor J	Genuineness	FACTOF 2	Fopularity
25.07%	Common Variance	14.28%	Common Variance	10.37%	Common Variance
17.562	Total Variance	10.00	Total Variance	7.25%	Total Variance
sharp-dull	.84	good-bad	.81	liked-dislike	ed71
valuable-wor	thless .78	true-false	.75	popular-unpo	oular67
useful-usele	.75	moral-immoral	.64	interesting-l	poring62
superior-inf	erior .72))
clever-stupi	ld71	Factor 4	Estrangement	Factor 6	Severity
Factor 2	<u>Optimism</u>	11.34% 7.94%	Common Variance Total Variance	9.54 % 6.68 %	Common Variance Total Variance
23.162	Common Variance	near-far	.79	lenient-seven	re86
16.22%	Total Variance	predictable-u	npredictable .68	easy-hard	78
healthy-sick	c72	complete-inco	mplete .60	fair-unfair	54
optimistic-1	pessimistic71				
active-pass	ive67			Factor 7	Body Image
humorous-se	rious66			6 254	Common Variance
comfortable	-uncomfortable65			4 387	Total Variance
relaxed-ten	se63			masculine-fer	ninine .74
				tender-tough	63

SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS (CONCEPT 6--MYSELF WITH A HEARING AID)

Factor 1	Gravity	Factor 4			Factor 7	
20.98%	Common Variance	10.68%	Common Var	iance	7.942	Common Variance
14.58%	Total Variance	8.42%	Total Vari	ance	5.52%	Total Variance
humorous-se:	rious80	confident-u	nsure	82	happy-sad	.87
fair-unfair	78	refreshed-t	ired	76	emotional-un	emotional82
popular-unp	opular74	masculine-f	eminine	.67	sociable-uns	ociable .60
useful-usel	ess74					
success-fai	.lure68	Factor 5	Excitab	ility	Factor 8	
Factor 7	Comfortablanaes	9.87%	Common Var	iance	7.71%	Common Variance
FACLUL &	COMITOT LAD TELIESS	6.86%	Total Vari	ance	5.36%	Total Variance
16.41%	Common Variance	warm-cold		.66	active-passi	ve72
11.40%	Total Variance	calm-excita	tb le	.70	positive-neg	ative57
comfortable	e-uncomfortable.83	lighthearte	ed-depressed	.58	,	
superior-in	iferior .81				Factor 9	
secure-inse	scure .66	Factor 6			1 CO9	
good-bad	.62	9.562	Common Var	i ance	3.262	Common Variance Total Variance
	•	6.64%	Total Vari	ance	mild-intense	. 56
Factor 3	Optimism	sincere-art	ificial	. 65		
12.15%	Common Variance	unafraid-af	fraid	.76		
8.447	Total Variance					
optimistic.	-pessimistic .81					
easv-hard	.76					
valuable-w	orthless .59					
near-far	.59					

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SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS (CONCEPT 7--MYSELF IN THE FUTURE)

		(CONCEPT 81	PEOPLE OF AUTHORITY)			
Pactos 1	Genuineness-	1 1 1 1	E	U 4		
FACLUE L	CAPADILLEY	FACLOF J	Tougnness	FACTOR D		
33.56%	Common Variance	14.95%	Common Variance	8.07%	Common Vari	lance
21.86%	Total Variance	9.74%	Total Variance	5.26%	Total Varia	ance
true-false	.85	easy-hard	77	emotional-u	nemotional	72
desirable-u	undesirable .80	leader-foll	ower .75	sociable-un	sociable	62
strong-weak	80	lenient-sevo	ere69			
useful-usel	less .79	tender-toug	h69	Factor 6	Depressive	eness
valuable-wo	orthless .77			7 897	Common Vari	ance
good-bad	.77	Factor 4	Predictability	5.14%	Total Varia	ance
clever-stup	77. bid	10.22%	Common Variance	lighthearte	d-depressed	60
full-empty	. 74	6.66%	Total Variance	unafraid-af	raid	53
sincere-art	tificial .74	predictable	-unpredictable72	humorous-se	ríous	52
interesting	3-boring .72	complete-in	complete61			
moral-immor	ral .72	apparent-un	apparent52	Factor 7		
Factor 2	Comfortableness			6.91% / 50%	Common Vari	lance
10 207	Common Variance			4.JU% larca.emall	TOLAL VALIA	ance 61
11.98%	Total variance			natural-str	ange	56
comfortable	<pre>s-uncomfortable+.78</pre>)	
liked-disli	lked70					
relaxed-ten	1se - 69					
optimistic-	-pessimistic6/					

-.67 -.64

positive-negative

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SUMMARY OF FACTOR ANALYSIS SHOWING HIGHEST SCALES LOADING ON ISOLATED FACTORS



Factor 1	Assurance	Factor 3	Estrangement	Factor 5	Excitability
31.59%	Common Variance	16.97%	Common Variance	6.852	Common Variance
21.48%	Total Variance	11.54%	Total Variance	4.66%	Total Variance
confident-un	sure .80	natural-stra	nge .79	emotional-u	nemotional .56
relaxed-tens	е .80	strong-weak	. 73	calm-excita	ble51
superior-inf	erior .80	near-far	.71		
secure-insec	ure .79	complete-inco	omplete .65	Factor 6	
optimistic-p	essimistic .74				•
valuable-wor	thless .71	Factor 4	Toughness	0.03% 4.52%	Common Variance Total Variance
	Genuineness-	8.74%	Common Variance	mot al-immor	al69
Factor 2	Capability	5.95%	Total Variance		
29.21%	Common Variance	easy-hard	79		
19.86%	Total Variance	lenient-seve	re70		
good-bad	76	tender-tough	67		
positive-neg	ative70				
useful-usele	70				
desirable-un	desirable69				
warm-cold	69				
large-small	68				
full-empty	67				


labeled <u>Morality</u>, <u>Rationality</u>, <u>Uniqueness</u>, <u>Excitability</u>, <u>Sociability</u>, <u>Toughness</u>, and <u>Tangibility</u>, with one factor unnamed.

Since certain factors appearing in the factor analysis results obtained across all concepts and subjects (Universal factors) tend to appear with some regularity from concept to concept, the decision was made to utilize the Universal factors in the development of the instrument to evaluate self-concept. Even though concept-scale interaction is evident to an appreciable extent even when all precautions have been taken to ensure semantic stability by careful choice of concepts and definition of the perspective from which the rating should be made, there are substantial reasons for choice of the Universal factors for further study. The first three factors isolated in the analysis overall concepts serve as an excellent summary of the factors isolated on the specific concepts. These factors (Capability, Genuineness, and Toughness), or variations of them, are revealed quite consistently across all the analyses. Except for specific factors for individual concepts the Universal factors appeared to provide a convenient way to summarize the semantic structure revealed from concept to concept. There are also certain statistical reasons for choosing the Universal factors to be employed with the concepts. If each concept were to be judged only on the factors and scales derived from its own factor analysis, the semantic structure of the concepts would differ as the factor relationships varied from concept to concept. If the factor-scale structure of the concepts differed then questions regarding concept relationships could not be satisfactorily answered. Utilization of the factors and scales will enable statistical comparisons between



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subjects or groups on the same concept, as well as making possible statistical and graphical evaluation of concept relationships.

The Test Instrument

As a result the following factors and scales were chosen from the Universal analysis (Table 13) to be utilized with all concepts in the subsequent study. The measurement instrument was built in the manner previously described on page 42. Each concept was placed at the top of a page in capitals preceded by the appropriate carrier phrase. The above scales were arranged beneath the concept in random order with polar direction also determined randomly. The instrument, as administered, is presented in Appendix B. It should be noted that additional scales beyond those listed were derived from the specific

TABLE 13

FACTORS AND SCALES CHOSEN TO BE EMPLOYED WITH ALL CONCEPTS

Factor 1	Capability	Factor 2	Genuineness
	useful-useless valuable-worthless success-failure		true-false sincere-artificial moral-immoral
	Factor 3	Toughness	
		tender-tough	

factor analysis for the concept involved and represent one or more specific factors in addition to the Universal factors. They were included before the decision was made to restrict the evaluation of

easy-hard



self-concept to the Universal factors. Each test was contained in a nine by twelve inch plain manila envelope that could be sealed shut when the test was completed and replaced. An appropriate cover letter was included with each test. These letters will be discussed more fully as the various subject populations are discussed.

Study of Self-Concept

The semantic differential instrument was developed to be utilized in a study of the self-concept of hard-of-hearing adults. The review of the literature suggests that adjustment problems are prevalent among hard-of-hearing adults, and that certain adjustment modes are available to the physically handicapped. It has been theorized that unless one specific mode of adjustment is utilized, the result would be devaluation of self.

Purpose

The purpose of this study was to investigate the self-concept of a population of hard-of-hearing adults as compared to the self-concept of normal hearing adults. It was hoped that tapping the phenomonological self would provide information consistent with the adjustment model as presented, and would serve as an initial step toward the refinement of a test of self-concept that could be utilized clinically to evaluate the adjustment problems of the adult hard-of-hearing.

Subjects

To meet the purpose of this study it was necessary to determine whether the attitudes expressed by the hard-of-hearing were different from those of a normal hearing population. To evaluate these



relationships it was necessary to utilize an experimental group of hard-of-hearing adult subjects and a control group of normal hearing adult subjects.

The experimental group consisted of 105 people within the age range from twenty-six to eighty-seven. They had all ben aduiologically evaluated at either the Michigan State University Speech and Hearing Clinic, the Hearing and Speech Department of the Rehabilitation Medical Center located in E. W. Sparrow Hospital in Lansing, or the Hearing and Speech Center of Grand Rapids, Michigan. To ensure that the subjects acquired their hearing loss as adults, the subject population was further restricted to include only those acquiring a hearing loss since the age of eighteen. The decision to include any person as a subject was determined by their recollection since no other suitable means was available for ascertaining the duration of loss. The subject population was further restricted to include only those whose audiometric test results indicated a hearing loss primarily sensori-neural in origin. Sensori-neural was operationally defined as a hearing loss characterized by diminished auditory acuity for pure tones for both air and bone conduction, with an air-bone gap of not more than ten decibels at 500 cps and 1000 cps. Only those individuals having sufficient hearing loss to interfere with communication were utilized as subjects. Since the amount of communication difficulty could not be directly inferred from results of pure tone audiometric testing or from the speech reception threshold or speech discrimination separately, the criteria for choice was a Social Adequacy Index score of seventy-five or below. The Social Adequacy



Index score is a measure based on the results of speech audiometry which represents the degree of handicap so far as hearing and understanding speech are concerned. According to Davis⁹⁸ a SAI score indicates difficulty in communication under certain conditions. Difficulty increases as the SAI value becomes smaller. The SAI criterion value was determined by utilizing the binaural free-field speech reception threshold using recorded CID W-1 spondaic word lists, and discrimination score using recorded CID W-22 PB words administered at SRT + 40 db or at the maximum intensity limits of the audiometer, whichever was less.

The experimental subject population that responded on the semantic differential is summarized statistically in Tables 14 and 15. Distributions according to sex, age, amount of education, amount of hearing loss, and proportion using hearing aids are presented. Inspection of the data of Table 14 reveals a fairly normal distribution of subjects as a function of amount of education. Seven per cent of the population had six or less years of education, twenty-five per cent had between seven and nine years, thirty-seven per cent had between ten and twelve years, twenty-seven per cent between thirteen and sixteen years, and six per cent had more than seventeen years or more of formal education. The distribution by age appeared skewed in the direction of the older subjects. The median age was 59.46 years. The experimental group was evenly divided into two groups: those who utilized a hearing aid; and those who did not (Table 15). The median Social Adequacy Index

⁹⁸H. Davis, "The Articulation Area and the Social Adequacy Index for Hearing," <u>Laryngoscope</u>, 58 (1948), pp. 761-778.



TABLE 14

SUMMARY OF HARD-OF-HEARING GROUP PARTICIPATING IN SELF-CONCEPT STUDY INDICATING THE NUMBER OF SUBJECTS BY AGE, SEX, AND AMOUNT OF FORMAL EDUCATION

	Age														
	21	-30	31-	-40	41	-50	51	-60	61.	-70	71	-80	80	+	
Amt. of Education	м	F	M	F	M	F	M	F	M	F	M	F	M	F	Total
1-6 years								1	2	1	2	1			7
7-9 years	1				1		3	4	7	1	5	2	1		25
10-12 yrs	2	1	3	2	5	1	5	7	1	3	1	4		4	39
13-16 yrs		1	1	2	3	2	3	4	2	4	1	5			28
17 + yrs	-					1	1		3		1				6
Total	3	2	4	4	9	4	12	16	15	9	10	12	1	4	105
Total per age group		5		8	1	3	2	8	2	4	2	2		5	

TABLE 15

NUMBER OF HARD-OF-HEARING SUBJECTS UTILIZING A HEARING AID AS A FUNCTION OF AMOUNT OF HEARING LOSS DEFINED BY SOCIAL ADEQUACY INDEX

Hearing Aid		Socia	al Adequac	y Index		
Users	0-15	16-30	31-45	46-60	61-75	Tot al
Yes	6	3	11	11	21	52
No	3	3	8	19	20	53
Total	9	6	19	30	41	105





was 54.54. The experimental group consisted of fifty-three males and fifty-two females.

The decision was made to obtain semantic differential judgments from a control group half the size of the experimental group made up of normal hearing adults matched with the members of the experimental group in terms of the following variables: education, age, and sex. The attempt was made to maintain the same distribution of age, sex, and amount of education as exhibited in the experimental group. If this could be achieved, then statistical comparisons could be made between the two groups. Table 16 contains the statistical summary of the control group.

TABLE 16

SUMMARY OF NORMAL HEARING CONTROL GROUP PARTICIPATING IN SELF CONCEPT STUDY INDICATING THE NUMBER OF SUBJECTS BY AGE, SEX, AND AMOUNT OF FORMAL EDUCATION

	Age														
	21	-30	31.	-40	41	-50	51	-60	61	-70	71	-80	80	+	
Amt. of Education	M	F	M	F	M	F	м	F	м	F	M	F	M	F	Total
1-6 years															0
7-9 years							1	2				1			4
10-12 yrs	1	1	3	2	4	3	5	4		1		1		1	26
13-16 yrs	1	1		2	5	1	1	4	3	2		2			22
17 + yrs						1					1				2
Totals	2	2	3	4	9	5	7	10	3	3	1	4	T	1	54
Total per age group		4		7	1	4	1	7		6		5		1	

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Some differences in the distribution of the age, sex, and education variables can be observed when compared to the total experimental group. The control group consisted of fifty-four normal hearing people, twenty-nine females and twenty-five males. The distribution of amount of education is skewed toward the higher levels of education with no subjects in the one-to-six year level. The distribution of age also differs from the experimental group. The median age was 52.08 for the control group, which reflects a decrease in the skewness of the age distribution. As a result of these differences in distribution of the variables utilized to match the control subjects with the experimental subjects, comparison between the two groups was not possible. Therefore, in all subsequent presentations of data comparisons will be made only between the control group and the equal sized group of experimental subjects to whom they were matched.

The intention was to utilize control subjects who had "equal" amounts of education and age. Since "equal amount of education" cannot be assured by matching the number of years of formal schooling, it was decided to break the years of formal schooling down into periods and to match on this basis. The effect of a given number of years of formal schooling is variable, depending in part on achievement, native intelligence, post-school life experiences, and the quality of the school system itself. As such, it was felt that no less precision in matching would be obtained by period grouping than by precise matching of number of years attended. The following five groups were chosen to serve as the basis for matching subjects in terms of amount of education: (1) one-to-six years; (2) seven-to-nine years;



(3) ten-to-twelve years; (4) thirteen-to-sixteen years; and (5) seventeen or more years. There is nothing absolute about the number of years lived. That there are different physical and mental growth rates to maturity and different points and rates of aging or decline are obvious. As such, it was not felt that any greater precision in matching would be achieved by obtaining control subjects of the same chronological age, as would be gained by matching within a six year age span from the given chronological age of the experimental subject. As a result the control subjects were chosen so that their age was within plus or minus three years of the person to whom they were being matched.

Procedure

The semantic differential instrument was administered individually to each of the 159 subjects (105 hard-of-hearing and 54 normal hearing people). The test was administered to the entire hard-ofhearing population before any data were collected from the control group. People meeting the criteria for inclusion as experimental subjects, i.e., onset of loss after age eighteen, sensori-neural hearing loss, Social Adequacy Index score of less than seventy-five, were asked to participate in this study. A test booklet was given to them. Each booklet contained a cover letter which explained the purpose of the study and outlined what was being asked of them. This letter is located in Appendix C (Letter #1). The subjects were obtained in one of two ways. Some test responses were obtained as the hard-of-hearing people came through hearing evaluation services of the three clinics

mentioned earlier. Twenty per cent of the subject population were obtained in this manner. Some subjects were obtained by reviewing the files of the clinics to derive a list of people who met the criteria. These people were contacted by telephone and asked if they would be willing to participate in a research project. Those that indicated they would participate were administered the test either at their home or at the clinic. Another twenty per cent of the total experimental population were obtained in this manner. The experience with the instrument to this point indicated that the test was adequately self-contained with no further instructions required by the subjects in order to complete the task. Since the test, in addition, was selfadministered, the decision was made to allow people meeting the criteria for inclusion as subjects to complete the test at home and return it via the mails. The list of prospective subjects derived from clinic files was enlarged to include people not living in the immediate community. The test booklet with the enclosed cover letter was mailed out to approximately 200 hard-of-hearing people. Of this number 31.5 per cent (sixty-three people) responded by completing the instrument and returning it. Thus, most of the experimental subjects were volunteers. The effect of this on the group self-concept is unknown, as is the representativeness of the obtained self-concept of the hard-of-hearing in general.

Following the completion of the data gathering from the hard-ofhearing population, the test was administered to the normal hearing control group. A list detailing the required characteristics of each normal hearing subject was drawn up. This list consisted of 105

definitions (age, sex, amount of education) of people--one per experimental subject. As normal hearing people meeting the criteria for matching were found, they were asked to participate in the study. They were given the same test booklet to complete as the hard-ofhearing subjects. The cover letter, however, was different. It is presented in Appendix C (Letter #2). Eighty per cent of these subjects completed the test at home and mailed or otherwise returned the instrument. An exact count of the normal hearing subjects who refused to complete the test is not known. This occurred as a result of the different circumstances surrounding their inclusion as a subject. There were no "clinic" files or other means of compiling a list of prospective subjects from which a percentage of responses could be computed. The location of these subjects was accomplished by asking questions of colleagues, neighbors, etc., regarding themselves, their friends, relatives, acquaintances. In many instances the contacted person did not have certain information regarding the required criteria and had to ascertain whether the friend, relative, etc., met the criteria. In the process of doing this, it was assumed by the investigator, that certain prospective subjects excused themselves from participating. The indication was that the normal hearing control group was also substantially made up of willing volunteers.

Reliability of Measurement

As indicated by Osgood <u>et al</u>.⁹⁹ reliability statements may be made about individual scales, about factor scores, or about concept

99 Osgood, Suci, and Tannebaum, op. cit., p. 126.



meaning, with regard to the semantic differential. Cronbach¹⁰⁰ indicates that reliability may be measured utilizing test-retest methods (coefficient of stability) or by utilizing two forms of the test (coefficient of equivalence). Thorndike¹⁰¹ states that reliability statements may be made in terms of absolute consistency (standard error of measurement) or in terms of relative consistency (correlation coefficient).

The number of possible ways of evaluating reliability can be seen to be large in the present case. In an attempt to obtain as many estimates of reliability as possible, the following procedures were followed.

A measure of relative consistency over time (coefficient of stability) was obtained by re-administering the test to a random sample of the hard-of-hearing experimental group. There was a three month lapse of time between the first test and the retest. The experimental subjects were numbered from 1 through 105. A table of random numbers was entered and the first forty numbers encountered (without replacement) within those limits indicated the subjects who were asked to repeat their judgments. Each of these subjects was supplied with a new test booklet, set of instructions and a cover letter (Appendix C, Letter #3) indicating the purpose of the task repetition. Thirty-two of these people returned the completed test. The test-retest correlation coefficient was computed between mean

100 Cronbach, <u>op. cit.</u>, pp. 136-142.

¹⁰¹R. L. Thorndike, "Reliability," <u>Educational Measurement</u>, ed. E. F. Lindquist (Washington: American Council on Education, 1951), pp. 560-561.



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concept scores (across all scales and factors) per subject. This yielded an estimate of concept reliability over time. This procedure was accomplished for each concept.

A measure of absolute consistency was also derived from this test-retest data. The standard error of measurement, a method sometimes utilized to define absolute consistency, was not employed because of ambiguity of interpretation which is derived from its relationship to the subject's "true" score. Osgood <u>et al</u>.¹⁰² has employed the average error of measurement as a means of investigating reliability. The utilization of a measure of this type makes it possible to make statements in terms of the unit of measurement involved. They report, however, that this method still does not "provide us with a set of confidence limits beyond which we could say that a deviation is significant."¹⁰³ They go on to say:

Perhaps the most useful way of treating our test-retest data is in terms of the number of responses which yield absolute deviations of each given magnitude. If a subject-item matrix is formed and the cells of this matrix are filled with the obtained absolute deviations of each subject on each item, the number of instances of each size deviation may be counted. If subjects and items are considered to be representative, then statements regarding the probability of obtaining deviations of certain size can be made. 104

This procedure was followed by computing the absolute deviations between test and retest for each factor for each subject. This provided an estimate of factor reliability over time in scale units that

¹⁰²Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 129-132.
¹⁰³<u>Ibid</u>., p. 132.
¹⁰⁴Ibid., p. 132.



provided a means of making probability statements about degree of confidence with which a conclusion could be made that a given change on a factor is significant.

The third estimate of reliability employed was a measure of relative consistency. A coefficient of equivalence was obtained for each factor of each concept across all hard-of-hearing subjects. The same procedure was accomplished across all normal hearing control subjects. The internal consistency procedure employed was as follows. The three factors that were employed to evaluate each concept were each represented by three scales. The three scales representing a given factor are, connotatively, synonyms to the extent that their loading on the factor is "high" and "pure." The fact that the three scales are correlated with the factor indicates they are intercorrelated to an extent that makes the development of an equivalent forms test possible. An equivalent forms test was developed by using one of the scales of each factor as an item on one form of the test and another scale of each factor as the item on the other form of the test. Thus, a split-half method was employed that made possible the determination of a coefficient of equivalence for each factor of each concept. The obtained correlations were corrected for length with the Spearman-Brown formula.¹⁰⁵ Two scales per factor were chosen to be employed out of the three scales available. Since the three scales measuring each factor differed in their loading on that factor the decision was made to obtain a conservative estimate of reliability with this method.

105 Thorndike, <u>op. cit</u>., p. 581. This was accomplished by choosing the scale having the highest loading for one form of the test and the scale having the lowest loading for the other form of the test. Table 17 lists the scales utilized to index each factor on the two forms. The criterion values were the raw scores per scale per subject.

TABLE 17

THE SCALES OF EACH FACTOR UTILIZED TO DETERMINE EQUIVALENT FORMS RELIABILITY WITH COEFFICIENTS COMPUTED BETWEEN FORM X AND FORM Y

		Factors	
Forms	<u>I</u>	II	III
x	useful-useless	true-false	tender-tough
Y	success-failure	moral-immoral	easy-hard

Analysis of the Data

The data derived from ratings on the semantic differential consist of numerical values of from one to seven along each of three independent dimensions. Thus, an individual's semantic profile of a concept can be given as the median scalar value for each dimension. Quick observational comparisons between concepts are not possible unless a "measure of relation that takes into account profile covariation and the discrepancies between the means of the profiles, thereby reflecting more fully the information available in the data"¹⁰⁶ are utilized. Since three dimensional space is involved in this situation

106 Osgood, Suci, and Tannenbaum, op. cit., p. 191.

such a measure is provided by the generalized distance formula of solid geometry, $D = \sqrt{2} d^2$, ¹⁰⁷ where d is the difference in allocation of two values on the same dimension or factor. This value, D, indicates a difference in meaning between concepts or scales or subjects and reflects the distance between the two positions in space.

Since the distribution of D is unknown and not assumed to be normal, the recommended tests are non-parametric procedures. In the case of raw score data obtained as above, the usual t-test methods could be applied to the means of the independent dimensions in comparisons with other concepts, if it could be demonstrated that scale judgments were normally distributed. This generally does not happen, as Osgood <u>et al</u>.¹⁰⁸ indicate that examination reveals that the seven scalar alternatives tend to be utilized with almost equal frequency. Therefore, the best estimate of central tendency is the median and the statistics of choice with raw score data are non-parametric and applied to each independent dimension.

The following null hypotheses were derived to be evaluated upon completion of the data gathering process:

 There are no significant differences between the hard-ofhearing subject's ratings for each concept and the normal hearing control subject's ratings for the same concepts.

2. There are no significant differences between the distances between any two concepts in three dimensional space of the hard-ofhearing subjects as compared to the normal hearing subjects, i.e.,

¹⁰⁷<u>Ibid., pp. 85-104.</u> ¹⁰⁸<u>Ibid., p. 85.</u>



the normal hearing subjects do not perceive FRIENDS closer in meaning to MYSELF than do the hard-of-hearing subjects, etc.

3. There are no significant differences among median concept ratings within the hard-of-hearing group as a function of age, sex, or amount of hearing loss.

The statistical procedures utilized to test these hypotheses were as follows:

<u>Hypothesis 1</u>. Since these analyses involve data obtained from matched subjects, the Wilcoxon Matched-Pairs Signed-Ranks Test was utilized to test for significant differences. The criterion values were the median judgments taken over the three scales of each factor per subject, resulting in a total of twenty-seven tests. A onetailed test was employed at the 0.05 level of significance.

<u>Hypothesis 2</u>. Analysis of this data required tests of significance of differences between concepts. Since these analyses involve data obtained from matched subjects, the Wilcoxon Matched-Pairs Signed-Ranks Tests was utilized. The criterion values were the D's computed between any two and all pairs of concepts. A D matrix for the hardof hearing group and one for the normal hearing group were produced, and a D from one matrix was compared with the corresponding D of the other matrix to determine whether these two values were drawn from the same population. This resulted in thirty-six Wilcoxon tests. A two-tailed test of this hypothesis was made at the 0.05 level of significance.

<u>Hypothesis 3</u>. There are three questions to be answered in this case. The hard-of-hearing experimental group were grouped according

to the three criteria: age, sex, and amount of hearing loss. The groups were then dichotomized producing two sex groups (male-female), two age groups (twenty-to-sixty years and more-than-sixty years), and two hearing loss groups (zero-to-fifty SAI and fifty-one-to-seventyfive SAI). The N's in the dichotomized groups were equalized by randomly eliminating nine subjects, thus controlling the other two variables when the hypothesis regarding the third variable was being tested. The limits of the age groups and the hearing loss groups were arbitrary and set only to produce equal sized groups. The two sex groups were then compared statistically to determine the effect of sex on self-concept. The same procedure was followed with the two age groups and the two hearing loss groups. The statistical comparisons were made for each of the three dimensions of Concept 1 MYSELF. The Mann-Whitney U Test was employed to test the hypothesis that the two independent groups were drawn from the same population. This resulted in nine Mann-Whitney tests. These significant tests were two-tailed and were evaluated at the 0.05 level of significance.



CHAPTER IV

RESULTS AND DISCUSSION

This chapter is divided into five sections. The first three sections are devoted to the presentation of the results of the study relative to the hypotheses which were tested. The fourth section presents data on the reliability of the instrument, and a general discussion of the results is presented in the fifth section.

Differences in Self Concept Between Hardof-Hearing and Normal Hearing Adults

Interest was focused on determining whether the hard-of-hearing group differed in median rating from the normal hearing group on each factor of each concept. The median rating over the three scales for a given factor was obtained for each of the fifty-four normal hearing subjects and their matched hard-of-hearing experimental subjects. The medians for each factor, across all subjects within a group, are presented in Table 18. The possible range of the medians was from one to seven. On Factor I the "capable" end of the continuum would have a one rating and the "incapable" end would have a seven rating. On Factor II the "genuine" end of the continuum would have the one rating, while on Factor III the "tough" end of the continuum would be the seven end.





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TABLE 18

c	oncepts	I Capability	Factors II Genuineness	III Toughness
1.	MYSELF	2.83	1.44	3.28
		2.30	1.70	3.37
2.	FRIENDS	2.05	1.75	2.83
		2.21	2.08	2.38
3.	MY HAPPIEST SELF	2.40	1.66	2.04
		2.16	1.53	2.02
۰.	MYSELF WITH A	3.62	2.18	3.20
	HEARING LOSS	3.15	2.00	3.16
5.	STRANGERS	3.50	2.62	3.80
		3.46	2.75	3.66
i.	MYSELF WITH A	3.08	2.21	3.39
	HEARING AID	2.75	2.28	3.50
	MYSELF IN THE	3.14	1.75	3.14
	FUTURE	2.30	1.80	2.75
3.	PEOPLE OF	2.42	2.31	3.80
	AUTHORITY	2.22	2.28	3.86
э.	MYSELF AND	3.66	2.32	3.80
	FAILURE	3.41	2.36	4.04

MEDIAN RATING ON EACH FACTOR OF EACH CONCEPT OBTAINED FROM MATCHED ADULT HARD-OF-HEARING (Top number) AND NORMAL HEARING (Bottom number) SUBJECTS

Statistical Results

The medians, as derived for the individual subjects, were placed in a table having fifty-four rows and two columns for each factor of each concept. Thus twenty-seven of these 2 x 54 tables were produced. A Wilcoxon Matched-Pair Signed-Rank test was performed on each factor of each concept. The procedure, as outlined by Siegel¹⁰⁹ for use when N > 25, was followed.

Since some evidence has been published indicating that the hardof hearing might differ in self-concept from the normal hearing, the assumption was made that if this were true the ratings derived from the hard-of-hearing would reflect more negative self-feelings. The following hypothesis was then tested:

- H₀: there is no significant difference between the ratings for a given concept derived from the hard-of-hearing group and those derived from the matched normal hearing control group.
- H₁: the ratings by the hard-of-hearing group for a given concept are more negative than the ratings of the normal hearing control group.

The test of this hypothesis was made at the .05 level. Since the direction of the difference was predicted, the region of rejection was one-tailed. A difference score (d) was obtained for each pair of matched subjects. A negative prefix was added to each d in all cases where the hard-of-hearing subject's median rating was higher than his matched normal hearing counterpart. A positive sign was recorded for each d under the reverse conditions. The d's were then ranked according to their absolute value and the smaller of the sums of the liked-signed ranks (T) was obtained. If the statistical difference was in the predicted direction, T would be the sum of the ranks of the positive d's.¹¹⁰ When N > 25, T is practically normally distributed with zero mean and unit variance, thus a table of the normal distribution

110<u>Ibid</u>., p. 81.

¹⁰⁹ S. Siegel, <u>Nonparametric Statistics</u> (New York: McGraw-Hill Book Co., Inc., 1956), pp. 79-83.



was consulted to determine the probability associated with the occurrence under H_{h} of values as extreme as the obtained z's.

Table 19 summarizes the results of the Wilcoxon tests performed on each factor of each concept. Inspection of Table 19 reveals that the null hypothesis of "no difference" may be rejected for the <u>Capability</u> factor of Concepts 1 (MYSELF), 3 (MY HAPPIEST SELF), 7 (MYSELF IN THE FUTURE), 8 (PEOPLE OF AUTHORITY); and for the <u>Toughness</u> factor of Concept 5 (STRANGERS). No other differences were significant, although the <u>Toughness</u> factor of Concept 1 (MYSELF) approached it at the .09 level. Thus five significant differences were found between the two groups of subjects and inspection reveals that in each case the alternate hypothesis may be accepted (since T is the sum of the positive ranks).

The conclusions can be drawn that hard-of-hearing adults judge themselves to be less capable than do normal hearing adults; that hard-of-hearing adults judge themselves at their happiest as being less capable than do normal hearing adults; that hard-of-hearing adults judge themselves in the future as being less capable than do normal hearing subjects; that hard-of-hearing adults judge people of authority as less capable than do normal hearing adults; and the hard-of-hearing adults judge straingers as being tougher than do normal hearing adults.

Graphical Results

The ratings obtained from a subject on the three factors of a semantic differential serve to orient the involved concept in three dimensional space. The three dimensions of this space are defined by


TABLE 19

SUMMARY OF THE WILCOXON TESTS PERFORMED FOR EACH FACTOR OF EACH CONCEPT TESTING THE HYPOTHESIS OF NO DIFFERENCE BETWEEN THE HARD-OF-HEARING GROUP AND THE NORMAL HEARING GROUP

	1	2	m	4 Conc	cepts 5	9	7	Ø	6
*	50	48	43	52	49	50	47	51	50
	+453.0	-586.5	+326.0	+548.0	+599.0	+584.0	+293.5	+400.0	+554.5
	- 1.78	- 0.02	- 1.77	- 1.28	- 0.13	- 0.52	- 2.86	- 2.46	- 0.80
	.04	.49	.04	.10	.45	.30	.002	.007	.21
	45 -466.0 - 0.58 .28	48 +568.5 - 0.20	44 +484.0 - 0.13 .45	48 +551.5 - 0.37 .36	44 +470.5 - 0.30 .38	45 +499.5 - 0.20 .42	43 +445.5 - 0.33 .37	46 +451.0 - 0.98 .16	45 -492.5 - 0.28 .39
	51	51	44	50	49	48	48	52	48
	-519.0	+604.0	+462.5	.614.0	+451.0	+569.0	+510.5	-591.0	-532.5
	- 1.35	- 0.55	- 0.38	- 0.23	- 1.61	- 0.19	- 0.79	- 0.89	- 0.57
	.09	.29	.35	.41	.05	.42	.21	.19	.28

The + or - sign only indicate whether T is the sum *Wilcoxon T which serves as the test statistic. of the positive or negative ranks.

**One-tailed probability associated with the given z value.



the factors utilized and it is assumed that these factors are independent of one another. Thus many concepts can be arrayed in space and their relationships viewed pictorially. In Figure 1 the concept placement in three dimensional space for the fifty-four hard-of-hearing subjects is presented. In Figure 2 the concept placement of the fiftyfour matched normal hearing control subjects is presented. These concepts were plotted utilizing the median judgment across all subjects within the group for each factor. Thus, utilizing the data from Table 18, it can be seen that the hard-of-hearing group had a median rating of 2.83 on the <u>Capability</u> dimension, and this is graphically portrayed in Figure 1. These two figures present, in a different manner, the data contained in Table 18.

Inspection and comparison of the two figures reveals that the measures of central tendency of the concepts as rated by the hard-ofhearing subjects appear moved more toward the seven end of the <u>Capability</u> factor than the normal hearing subjects. This relationship is not detected on the other two factors. A similarity in placement on all three factors can be noted for Concept 8 PEOPLE OF AUTHORITY, even though a significant statistical difference in placement along Factor I has been found. Within the hard-of-hearing group a clustering of Concepts 4 MYSELF WITH A HEARING LOSS, 5 STRANGERS, and 9 MYSELF AND FAILURE can be noted primarily on the <u>Capability</u> factor. The normal hearing subjects would appear to feel more optimistic toward 4 MYSELF WITH A HEARING LOSS, even though statistically the two groups do not differ in location of this concept. The relationship of Concept 6 MYSELF WITH A HEARING AID to Concept 7 MYSELF IN THE FUTURE and the











normal hearing subjects matched to the subjects portrayed in Figure 1.

comparison between groups is interesting. The hard-of-hearing find similarity between these two concepts on the Capability and Toughness factors while the normal hearing place these two concepts differently. The normal hearing group placed Concept 6 MYSELF WITH A HEARING AID and Concept 4 MYSELF WITH A HEARING LOSS half-way between strangers and failure on one hand and the remaining concepts on the other, along all three dimensions. In general they agreed that a hearing aid would tend to move them along the Capability continuum. The hard-of-hearing placed Concept 4 MYSELF WITH A HEARING LOSS and Concept 6 MYSELF WITH A HEARING AID similarly but these two concepts do not stand alone as the normal hearing group indicated. Concept 4 MYSELF WITH A HEARING LOSS is clustered with "failure" and "strangers" on the Capability factor while Concept 6 MYSELF WITH A HEARING AID is clustered with Concept I MYSELF and Concept 7 MYSELF IN THE FUTURE along the same factor. Thus the hearing aid appears more meaningfully related to self and to the future with the hard-of-hearing group than with the normal hearing group. To be noted in the placement of concepts by the normal hearing group is the clustering of Concept 1 MYSELF, 2 FRIENDS, 3 MY HAPPIEST SELF, and 7 MYSELF IN THE FUTURE. This clustering is not at all apparent in the hard-of-hearing group data, with some distance between concepts along the <u>Capability</u> dimension noted. The normal hearing subjects regard themselves, at their happiest, to be slightly more capable than their friends. This appears to be quite different in the hard-of-hearing group. As a group they rate themselves as considerably less capable than their friends under any circumstances.

The data portrayed in Figures 1 and 2, while not presenting any new information, provides visual evidence of the statistical findings presented earlier and provides increased insight into the self-concept and attitude structure of the aurally handicapped.

Figure 3 presents the three dimensional concept placement for the complete group of hard-of-hearing subject from whom ratings were obtained. Since the data derived from the total group is utilized in subsequent analyses the pictorial summary is presented. It can be seen that the placement in space by the fifty-four hard-of-hearing subjects (Figure 1) is quite similar to the placement of the whole group of 105 hard-of-hearing subjects.

Differences Between the Hard-of-Hearing and Normal Hearing Groups in Inter-Concept Distances

As indicated in Chapter III, page 76 this analysis required tests of significance of differences in concept location in three-dimensional space. The criterion values were a D computed for each subject of each group between all possible pairs of concepts. The utilization of D allowed summary of concept location in three dimensional space by stating this location relative to other concepts. A D-matrix was produced for the hard-of-hearing subjects. This matrix consisted of thirty-six rows (corresponding to the number of concept pairs which equaled $\frac{n(n-1)}{2} = \frac{9(8)}{2} = 36$) and fifty-four columns (one column per subject). A similar matrix was produced for the matched normal hearing control subjects. The entry in each cell of these matrices was the D between the two concepts indicated by the choice of row for a given subject. The D was computed by taking the difference between





the median scores of the two concepts on each of the three factors, squaring the differences, summing the three squares, and taking the square root of the sum. The data in these matrices was evaluated statistically by comparing a given row (across all columns, i.e, subjects) of one matrix with the same row of the other matrix. These two rows of D's were subjected to the Wilcoxon Matched-Pairs Signed-Ranks test to determine whether the two distributions of D involved in each analysis were drawn from the same population. The thirtysix possible pairs of concept comparisons yielded thirty-six matrix rows, thus thirty-six Wilcoxon tests. The hypothesis under test was as follows:

- H_O: there is no difference between the hard-of-hearing group and the normal hearing group in the distance (D) between concepts, e.g., the distance between Concepts 1 and 2 is not significantly greater for one group of subjects or the other.
- H₁: the inter-concept distances (D) of the two groups of subjects differ significantly.

The data for a particular inter-concept analysis were arranged in two columns, each column having a N of fifty-four. The entry in one column was the D for the hard-of-hearing subject while the entry opposite in the second column was the appropriate D for the matched normal hearing subject. The test of the hypothesis was made at the .05 level. Since the direction of the difference was not predicted, the region of rejection was two-tailed. A difference score (d) was obtained for each pair of matched subjects. The d's were ranked and a positive or negative sign was affixed to each rank by the same procedure outlined on page 84. The smaller of the sums of the likesigned ranks (T) was obtained. A table of the normal distribution



was entered with the computed z value and the probability associated with the occurrence under the null hypothesis was determined. Table 20 presents the summary of these statistical tests.

The distance (D) from Concept 5 STRANGERS and Concept 8 PEOPLE OF AUTHORITY differs between the two groups of subjects. This means that the hard-of-hearing subjects placed Concepts 5 and 8 significantly closer together in three dimensional space than did the normal hearing group. The same occurrence can be noted for the distance between Concept 7 MYSELF IN THE FUTURE and Concept 9 MYSELF AND FAILURE with the hard-of-hearing subjects placing these concepts significantly closer together in space than did the normal hearing people. The distance of Concept 4 MYSELF WITH A HEARING LOSS from Concept 9 MYSELF AND FAILURE differs between groups at the .07 level which approaches significance. At that significance level it can be said that the hard-of-hearing subjects placed Concepts 4 and 9 closer together in space than did the normal hearing group. No other differences approached the level of significance chosen, indicating that the distances in space between concepts did not differ for the two groups except in three out of thirty-six instances.

It can be concluded that the hard-of-hearing significantly: (1) judge the future and failure as being closer together in meaning, i.e., more semantically similar, than do normal hearing people; (2) judge strangers and people of authority as being closer together in meaning, i.e., more semantically similar, than do normal hearing people; and (3) for practical purposes, judge hearing loss and failure as being closer together in meaning, i.e., more semantically similar, than do normal

					Con	cepts			
		2	3	4	5	6	7	8	9
1	N T z P	53 -672 39* .70	52 -598.5 82 .42	53 -678.5 33 .74	54 656.5 74 .46	54 -644.5 84 .40	54 -662 69 .50	54 -658.5 72 .48	53 -677 34 .74
2	N T* z P	r *	53 678 25 .80	53 672.5 38 .70	54 6.13.5 -1.11 .26	54 602.5 -1.21 .22	54 673 60 .54	54 657.5 73 .46	52 -662.5 24 .80
3	N T z P			53 698 15 .88	52 627.5 56 .58	52 -605 58 .56	52 -675.5 12 .90	51 5 -605 54 .58	51 -511 -1.42 .16
4	N T z P				53 -564 93 .36	51 559.5 97 .34	51 636 25 .80	54 -719.5 20 .84	51 -472 -1.79 .07
5	N T z P					52 -604 77 .44	54 688.5 46 .64	53 -466 -2.21 .03	53 -540.5 -1.55 .12
6	N T z P						51 597 66 .50	53 -648.5 59 .56	53 -613 91 .36
7	N T z P							49 -600.5 12 .90	51 -424 -2.24 .03
8	N T z P								52 -608 74 .46

SUMMARY OF THE WILCOXON TESTS PERFORMED ON DISTANCES (D) BETWEEN CONCEPTS FOR THE HARD-OF-HEARING GROUP AND THE NORMAL HEARING GROUP

*A z larger than 1.92 required for significance at the .05 level, two-tailed test.

**Wilcoxon T which serves as the test statistic. The + or - sign only indicate whether T is the sum of the positive or negative ranks.

TABLE 20



hearing people. The distance between Concepts 1 and 3 was not significantly different between the two groups, thus it cannot be said that hard-of-hearing adults differ in self-regard from normal hearing adults when the relationship between MYSELF and MY HAPPIEST SELF serves to define self-regard.

Effect of Age, Sex, and Amount of Hearing Loss on Self-Concept Judgments

The purpose of this evaluation was to determine the effect of age, sex, and amount of hearing loss on the self-concept of the hard-ofhearing subjects. Only the ratings on Concept 1 MYSELF were evaluated. The 105 hard-of-hearing subjects were divided into two groups on the basis of their sex--Group A_1 contained males and Group A_2 females. Each A group was divided into two hearing loss groups according to amount of loss (see page 77)--Group B_1 contained those having a high SAI and B_2 those having a low SAI. Each of the four B groups was divided into two groups on the basis of age (see page 77)--Group C_1 contained those people between 20-60 years of age and Group C_2 those people over 60 years of age. In order to equalize the effects of two of the variables while evaluating the third it was necessary to eliminate nine of the 105 subjects from the analysis, thus producing an N of the forty-eight in each A group, an N of sixty in group B_1 and thirty-six in group B_2 and an N of forty-eight in each C group.

The median score for a factor for each of the ninety-six subjects was utilized as the criterion value. Thus three three-dimensional tables were derived--one for each of the three factors. Within each factor an analysis was performed to determine whether the two A (sex)

groups were drawn from the same population, whether the two B (hearing loss) groups were drawn from the same population, and whether the two C (age) groups were drawn from the same population.

The following hypotheses were tested for each factor of Concept 1 MYSELF:

- H: there is no difference in the median ratings on the concept MYSELF between male and female hard-of-hearing subjects.
- H: there is no difference in the median ratings on the concept MYSELF between hard-of-hearing groups dichotomized on the basis of amount of hearing loss.
- H: there is no difference in the median ratings on the concept MYSELF between groups of hard-of-hearing groups dichotomized on the basis of age.

The alternate hypothesis in each case was that there was such a difference, thus producing a two-tailed test of the hypothesis since direction was not predicted.

The Mann-Whitney U test was utilized to test the above hypotheses. This test was utilized because it appears to be the most powerful alternative to the parametric t-test for large samples of subjects¹¹¹ and for the hypotheses tested.¹¹² The statistic U was computed by ranking the medians of the combined groups for the dichotomized variable under study and following the procedure outlined by Siegel.¹¹³ Thus, when variable A (sex) was evaluated, the ninety-six medians--forty-eight males and forty-eight females--were ranked by assigning the rank of 1 to the lowest score in the combined group, etc. A correction for ties was utilized as recommended when the normal curve approximation is employed with the large samples $(n_2>20)$.¹¹⁴ Table 21 presents a

 111
 112
 112

 Ibid., p. 136.
 112
 114-145.

 113
 Ibid., pp. 119-120.
 114

 Ibid., pp. 124.
 114

TABLE	21
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			Factors		
Varia	les	I (Capability)	II(Genuineness)	III(Toughness)	
Sex (A)	n,	48	48	48	
	n ₂	48	48	48	
	บ	1108.5	807	942	
	Т	690	4773	934	
	z	32	-2.63	-1.56	
	p*	.75	.01	.12	
Hearing	n,	60	60	60	
Loss	n ₂	36	36	36	
(B)	ບ້	914.5	1040	988	
	Т	690	4773	934	
	z	-1.22	31	696	
	P	.22	.76	. 48	
Age (C)	n,	48	48	48	
	n ₂	48	48	48	
	ບ້	1015	780	1076.5	
	Т	690	4773	934	
	z	-1.01	-2.83	56	
	p	.31	.005	.58	

• SUMMARY DATA FOR MANN-WHITNEY U TEST PERFORMED TO DETERMINE WHETHER SELF-CONCEPT DIFFERED AS A FUNCTION OF SEX, AMOUNT OF HEARING LOSS, AND AGE

*Two-tailed probability associated with the given z value.

summary of the analyses relative to the effect of the age, sex, and amount of hearing loss variables on self-concept. The results show that only on the <u>Genuineness</u> factor was a significant difference between groups found, and that the difference existed only with the sex and age variables (p = .01 and .005 respectively). Thus, the ratings of the hard-of-hearing subjects do not differ in terms of self-judged <u>Capability</u> or <u>Toughness</u> as a function of age, sex, or severity of hearing loss.

In Table 22 are arranged the measures of central tendency which serve as a summary of the distributions of the two independent samples involved in each Mann-Whitney U test summarized in Table 21. Inspection of the medians for the sex and age variables under Factor II

TABLE 22

Variables	Ca	I apability	Factors II Genuineness	III Toughness
A(Sex)	1) Male	2.46	1.58	3.10
	2) Female	2.70	1.03	3.00
B(Amount of	1) 51-75 SAI	2.44	1.06	3.43
Hearing Loss)	2) 0-50 SAI	3.25	1.83	3.25
C(Age)	1) 20-60 yrs	3.00	1.45	3.36
	2) 60 + yrs	2.43	1.04	3.25

MEDIAN RATINGS ON CONCEPT 1 MYSELF FOR EACH FACTOR AS A FUNCTION OF AGE, SEX, AND AMOUNT OF HEARING LOSS

(Genuineness) indicates that the males judged themselves as less genuine than did the females--the <u>Genuineness</u> factor consisted of the moral-immoral, true-false, and sincere-artificial scales--and the younger hard-of-hearing judged themselves less genuine than the older subjects. These differences were significant at or beyond the .01

level of confidence, as indicated in Table 21. While the hard-ofhearing differed from the normal hearing subjects primarily along the <u>Capability</u> factor, the hard-of-hearing differed among themselves on the basis of age and sex only along the <u>Genuineness</u> factor.

The observation that men and the young of both sexes judge themselves as less moral, true, and sincere than women and the older people of both sexes, respectively, would appear to be consistent with expectation. These results are interpreted as providing evidence of the "face" validity of the semantic differential approach to the measurement of the phenomenal self-concept.

Instrument Reliability

The test instrument was re-administered to thirty-two of the hard-of-hearing subjects three months following the initial administration to obtain information relative to the reliability of measurement. The self-judgments of these thirty-two subjects were evaluated with respect to reliability in three different ways. The methods and procedures involved in each of these evaluations will be discussed at this time.

Concept Stability

An estimate of concept reliability was obtained utilizing the Pearson Product-Moment coefficient of correlation to determine the relationship between the initial mean rating for a concept and the retest mean rating for the concept. The mean value per concept was obtained by determining the average rating over the nine scales representing the three universal factors. The obtained reliability

cC D(0 i V C coefficients are contained in Table 23 along with the appropriate means and standard deviations. These correlations range from 0.67 to 0.87 with the average correlation equaling 0.76. This particular instrument yields estimates of reliability consistent with those previously reported relative to the semantic differential. The obtained coefficients were actually higher than anticipated when considering the length of time intervening and that the subjects were making selfratings which might be anticipated to fluctuate from time to time. It would appear that the most stable judgments over time were those related to hearing loss (Concept 4), hearing aids (Concept 6), and friends (Concept 2).

TABLE 23

		Mean	Rating	Standard	Deviation	Correlation
	Concepts	Test	Retest	Test	Retest	Coefficient
1.	Myself	2.69	2.64	.74	1.07	.72
2.	FRIENDS	2.60	2.76	1.04	1.13	.80
3.	MY HAPPIEST SELF	2.35	2.59	.91	1.09	.77
4.	MYSELF WITH A					
	HEARING LOSS	3.12	3.15	1.26	1.25	.87
5.	STRANGERS	3.13	3.29	.97	1.02	.75
6.	MYSELF WITH A					
	HEARING AID	3.05	3.09	1.22	1.15	.81
7.	MYSELF IN THE FUTURE	2.85	3.03	1.16	1.25	.69
8.	PEOPLE OF AUTHORITY	3.22	3.12	.93	1.14	.67
9.	MYSELF AND FAILURE	3.27	3.25	1.18	1.14	.75

CONCEPT STABILITY OVER THREE MONTH TIME LAPSE FOR THIRTY-TWO HARD-OF-HEARING ADULTS

Factor Stability

An estimate of factor reliability was obtained utilizing the Pearson Product-Moment coefficient of correlation to determine the

relationship between the initial mean rating for a factor and the retest mean rating for the factor. The mean value per factor per subject per concept was obtained by averaging the ratings on the three scales of the factor. This resulted in twenty-seven correlations--one per factor (three) for each of the nine concepts. The results are contained in Table 24. Inspection of the coefficients by factor reveals that Factor I has the highest reliability across concepts, ranging from a low of 0.59 to 0.87 with a mean r = 0.73. Factor II showed the next highest reliability with the coefficients ranging from a low of 0.32 to 0.84 with a mean of 0.65. Factor III showed the least reliability, with the coefficients ranging from 0.43 to 0.73 with a mean of 0.58. These reliability coefficients, or at least the factor averages, appear consistent with the reliabilities quoted in the review of literature. None of the reliability coefficients reported in the literature were obtained on factor scores, therefore it was not possible to compare these factor scores with others. The decline in reliability, however, was consistent with expectation since the work of Osgood et al. with absolute deviations indicated increasing deviations from Factor I to Factor III.

Concept 7 MYSELF IN THE FUTURE and Concept 8 PEOPLE IN AUTHORITY appeared to be the least reliably measured concepts across all three factors. The particular reasons for this are not clear at this time and further study is warranted, although essentially this lack of higher reliability could mean concept instability or a change

¹¹⁵Osgood, Suci, and Tannenbaum, <u>op. cit</u>., pp. 129-132.



TABLE 24

0		Fact	or I	Fact	tor II	Fact	tor III
Concepts		T*	RT**	T*	RT**	 	RT**
Concept 1 MYSELF	r Me a n S.D.	.8 3.08 1.20	37 2.91 1.37	1.64 0.67	32 1.81 1.10	.4 3.35 1.19	43 3.23 1.04
Concept 2 FRIENDS	4 Mean S.D.	.7 2.58 1.28	79 2.84 1.28	.6 2.05 0.88	51 2.38 1.16	2.84 0.97	71 3.08 1.23
Concept 3 MY HAPPIEST SELF	r Mean S.D.	.7 2.68 1.24	76 2.89 1.30	.: 1.89 0.87	74 2.09 1.19	.(2.49 1.07	53 2.80 1.22
Concept 4 MYSELF WITH A HEARING LOSS	4 Mean S.D.	.8 3.53 1.57	31 3.54 1.63	.7 2.39 1.35	73 2.56 1.37	.7 3.37 1.35	73 3.51 1.12
Concept 5 STRANGERS	r Mean S.D.	.7 3.25 1.19	0 3.49 1.16	.6 2.63 1.10	53 2.77 1.33	.5 3.54 1.18	3.59 1.00
Concept 6 MYSELF WITH A HEARING AID	r Mean S.D.	.6 3.15 1.54	9 3.19 1.38	.8 2.58 1.38	34 2.53 1.32	.5 3.46 1.21	9 3.56 1.36
Concept 7 MYSELF IN THE FUTURE	r Mean S.D.	.5 3.15 1.80	9 3.29 1.52	.6 2.06 1.28	5 2.30 1.17	.5 3.33 1.30	1 3.35 1.17
Concept 8 PEOPLE OF AUTHORITY	r Mean S.D.	.6 3.09 0.99	5 2.91 1.31	.6 2.83 1.15	8 2.91 1.31	.50 3.75 1.15	0 3.69 1.28
Concept 9 MYSELF AND FAILURE	r Mean S.D.	.7: 3.40 1.54	5 3.25 1.50	.60 2.63 1.26	6 2.57 1.17	.51 3.71 1.36	3.71 1.36

FACTOR STABILITY OVER THREE MONTH TIME LAPSE FOR THIRTY-TWO HARD-OF-HEARING ADULTS

*Initial test.

****** Retest in three months.

in attitude within the hard-of-hearing group with respect to these two concepts.

Absolute Deviation Probability Statements

The correlation coefficient summarizes a relationship or lack of relationship, but it does not provide information of immediate use when dealing with scores. To know that a test is reliable because a high coefficient is obtained informs one that subjects tend to rank themselves similarly from test to retest or on equivalent forms, but this information is not helpful when an investigator has a test score and a retest score for an individual and wishes to know whether there is a shift of meaning or whether the observed difference can be assumed to be measurement error.

Information of this nature which allows probability statements regarding various factor differences from test to retest was obtained from the test-retest data. The absolute deviation in scale units from test to retest was obtained for each factor of each concept for each subject. A separate summary table for the probability statements was made for each factor across all subjects of each concept and for each factor across all concepts and subjects. The data for the individual concepts are contained in Appendix D. The summary probability statements across all concepts and subjects are presented in Table 25.

A frequency distribution of the absolute deviations was made and the per cent of responses for each deviation computed. Thus, in Table 25 it can be seen that twenty-two per cent of the thirty-two subjects had an absolute deviation of zero scale units on Factor I, etc.

	F.	actor I		Factor II		Factor III
Absolute	Per Cent of	Probability of Equal or Greater	Per Cent of	Probability of Equal or Greater	Per Cent of	Probability of Equal or Greater
Deviation	Responses	Deviation	Responses	Deviation	Responses	Deviation
0.0	.223	1.000	.292	1.000	.159	1.000
0.3	.194	. 777	.148	.708	.180	.841
0.4	.042	.583	.054	.560	.106	.661
0.6	.032	.541	.019	.506	.053	.555
0.7	.184	.509	.144	.487	.155	.502
1.0	.134	.325	.141	.343	. 120	.347
1.3	.057	.191	.046	.020	.049	.227
1.4	.011	.134	.021	.156	.018	.178
1.6	.007	.123	.019	.135	.007	.160
1.7	.053	.116	.039	.116	.042	.153
2.0	.032	.063	.039	.077	.039	.111
2.3	.011	.031	.025	.038	.018	.072
2.4	.000	.202	.007	.013	.004	.054
2.6	.000	.020	.000	.006	.004	.050
2.7	.018	.020	.000	.006	.014	.046
3.0	.000	.002	.000	.006	.014	.032
3.3	*000.	.002	.003	.006	.004	.018
3.4		.000	.000	.006	.000	.018
3.6			.000	.006	.004	.014
3.7			.000	.006	.004	.010
4.0			.003	.003	.004	.006
4.4						.000

PROBABILITY OF OBTAINING GIVEN DEVIATIONS FROM TEST TO RETEST (Across all Concepts and Subjects)

TABLE 25

*The impreciseness noted is due to accumulated rounding error.



The probability was computed by determining "the proportion of time that a deviation equal to or greater than each size deviation can be expected."¹¹⁶ This was done by cumulatively subtracting the per cent of responses from 1.000. Osgood <u>et al</u>. state that the values found in the probability column "correspond to confidence levels; they are a gauge of the degree of confidence with which an investigator can conclude that a given change on an item is significant."¹¹⁷

Inspection of Table 25 reveals that a factor deviation of greater than two units on Factors I and II and 2.4 units on Factor III would be expected to occur less than five per cent of the time by chance. Osgood et al. found that factor score deviations greater than 1.00 on the evaluative factor, 1.50 on the potency factor, and 1.33 on the activity factor were significant at the .05 level. The difference between the results of Osgood and those quoted here average about one scale unit per factor. Their test-retest data, however, were accumulated within thirty minutes, while the test-retest interval employed in this study extended over a three month period. The increase in the size of the significant absolute deviation over time can be explained by either or both of the following: (1) the increased unreliability of the instrument over time; or (2) the dynamic nature of the self-concept in that it is continually under modification (which may result in reinforcement or change) by the experiences of the individual. The choice of the second alternative would be compatible with the position supported in the review of

116<u>Ibid., p. 132.</u> 117<u>Ibid., p. 132.</u> 118<u>Ibid., pp. 138-139.</u>

literature with regard to the development and maintenance of selfconcept. However, no evidence can be presented in favor of either of the alternatives at this time.

Equivalent Forms Reliability

A coefficient of equivalence was obtained for each factor of all concepts. This internal-consistency procedure was performed on the data derived from the total group of 105 hard-of-hearing subjects and separately on the data from the fifty-four normal hearing control subjects. Two scales per factor were chosen to be the variables correlated with the computed coefficient corrected appropriately for length. The two scales showing the most extreme loading on each factor in the universal factor analysis results were utilized.

This resulted in a total of fifty-four reliability coefficients. These coefficients are presented in Appendix E. They are summarized in Table 26 by presenting the average correlation per factor derived from the two groups of subjects. Each correlation represents the average across the nine concepts. The coefficients derived from the hard-of-hearing data ranged from 0.44 to 0.90, while those from the normal hearing data ranged from 0.49 to 0.88.

These ranges within which the coefficients fluctuate appear to reflect concept-scale interaction. The lower correlation obtained for a given factor on a certain concept may be explained by the change in meaning of the two scales involved in the correlation. The coefficients tabled in Appendix E, then, may be viewed partly as indices of concept-scale interaction as well as "error" variance derived from errors of measurement.

TABLE 26

		Factors	
	I	II	111
Hard-of-Hearing Group N = 105	0.79	0.70	0.69
Normal Hearing Group $N = 54$	0.72	0.65	0.78

SPLIT-HALF RELIABILITY COEFFICIENTS FOR THE THREE FACTORS ACROSS NINE CONCEPTS (Coefficients corrected for length)

Since the self-concept ratings of the normal hearing subjects have been compared to those of the hard-of-hearing subjects, it was felt important to determine whether the test was equally reliable with the two groups. The hypothesis of no difference between the two obtained average coefficients per factor, as listed in Table 26, was tested as outlined by Blalock.¹¹⁹ A two-tailed test of the hypothesis was utilized with the level of significance set at 0.05. The results, as presented in Table 27 reveal that there was no significant difference between the pairs of coefficients. This conclusions should not be presumed to be valid for specific concepts but only represents the situation across all concepts. But it would appear that the test instrument yielded equally reliable ratings from both groups of subjects. The average split-half coefficients are not as high as

¹¹⁹ H. M. Blalock, <u>Social Statistics</u> (New York: McGraw-Hill Book Co., Inc., 1960), pp. 309-311.

desirable, but it should be borne in mind that the obtained correlations are probably quite conservative estimates of reliability because of the scales chosen for use.

TABLE 27

SUMMARY TABLE FOR TESTING THE HYPOTHESIS OF NO DIFFERENCE BETWEEN CORRELATION COEFFICIENTS

Factors	r ₁	r ₂	z ₁	z ₂	s.d.	Z	Required Z for sig. at .05 level
` I	.79	.72	1.0714	0.9076	0.17	0.96	<u>+</u> 1.96
II	.70	.65	0.08673	0.7753	0.17	0.54	<u>+</u> 1.96
111	.69	.78	0.8480	1.0454	0.17	-1.16	<u>+</u> 1.96

Discussion

Several questions were posed at the outset of this research, and have been enumerated in detail in Chapter I. The purpose of this discussion is to evaluate the results of this investigation in light of these questions.

<u>Self-Concept of Hard-of-Hearing and</u> Normal Hearing Adults

One area of concern was whether hard-of-hearing adults differed in self-concept from normal hearing people, at least as defined by the semantic differential instrument. The result of comparisons of both populations for each concept indicates that generally the hardof-hearing do not differ from the normal hearing except along the <u>Capability dimension</u>. The groups differed on four concepts (MYSELF, MY HAPPIEST SELF, MYSELF IN THE FUTURE, and PEOPLE OF AUTHORITY) along this dimension. The hard-of-hearing, in particular, judged themselves to be significantly less capable at present. under the happiest conditions, and in the future than did the normal hearing adults. It cannot be said, however, that the hard-of-hearing adults tend to be more neurotic than the normal hearing adults on the basis of feeling significantly less capable. The frequently used definition of selfregard, i.e., the discrepancy between self and ideal-self feelings, indicated that the hard-of-hearing adults did not differ in selfregard from the normal hearing adults. This would appear to mean that although the hard-of-hearing feel significantly less capable than the normal adults, they have made concomitant changes in other self-related attitudes (in particular the ideal self-image) that allows them to maintain a level of self-regard similar to that of the normal hearing adult. This finding is compatible with those of Dembo et al. (see page 9) relative to the psychological consequences involved in the handicapped using the normal adult as a model. It would appear that the group data of the hard-of-hearing subjects participating in the study reflects the tendency to "accept their loss," thus enabling the group to face the disability without selfdevaluation. If this is true, the feeling of the hard-of-hearing of being less capable than the normal hearing adult indicates an adjustment to reality, and the concomitant realignment of the happiest-selfconcept allows them to maintain the emotional distance between these two concepts requisite to normal adjustment. Thus it would appear that the hard-of-hearing adult is able to maintain a well-adjusted, but altered relationship with the environment.

The thesis was advanced in Chapter II that the common objective paper and pencil tests of personality are not wholly relevant for administration to the handicapped. The interpretation of responses on these tests relative to normal responses placed the handicapped at a disadvantage and it may be inferred that their responses reflect neurotic personality organization, when in effect the response to certain items may reflect a sensible adjustment to reality. It is anticipated that if the observed differences between groups on the semantic differential test had occurred on one of the common measuring instruments designed to categorize people as "normal" or "abnormal," they would have been interpreted as indicating some deviation of the hardof-hearing group from normal.

In conclusion, it would appear that the hard-of-hearing adults differed to some extent in self-concept from the normal hearing adults. They primarily characterized themselves as being less capable than the normal hearing adults. It cannot be said, however, that the hard-ofhearing adults as a group differed from the normal hearing adults in terms of self-regard. Thus it can be inferred that both groups appeared to be "well adjusted."

The attitudes towards FRIENDS, MYSELF WITH A HEARING LOSS, STRANGERS, MYSELF WITH A HEARING AID, and MYSELF AND FAILURE tended to be similar for the two grups of adults on the <u>Capability</u> dimension. No differences in attitude even approaching significance were found between the two groups on the <u>Genuineness</u> dimension, and only the one difference noted above was evident on the <u>Toughness</u> dimension. It would appear that the first factor (<u>Capability</u>) proved to be the most
discriminating factor in finding the differences in attitude between hard-of-hearing and normal hearing subjects. This occurred apparently because of the nature of the factors involved. It is possible to be "true," "sincere," and "moral" (Genuineness factor) independent of the hearing loss variables. Thus it is anticipated that the most relevant dimension for discrimination between groups is the <u>Capability</u> dimension. Had this occurrence been anticipated another choice of factors might have provided more discriminative ability in the instrument. For example, the <u>Anxiety-Tension</u> factor might be an excellent factor to accompany the <u>Capability</u> factor. The original choice of factors to be employed was determined by factor structure, i.e., the three factors accounting for the largest amount of the variance were selected. The results of this study, however, indicate the feasibility of utilizing other factors that might discriminate better between groups and subjects.

Through use of the D statistic the location of each concept relative to the other concepts could be fixed in three-dimensional space. The three axes of this space are defined in terms of the dimensions sampled by the instrument. The distances between the concepts are compared to determine whether one of the groups of subjects tended to place certain concepts closer together in three-dimensional space than did the other group. The analysis revealed that the hardof-hearing adults judged the following pairs of concepts to be more semantically similar than did the normal hearing adults: (1) Concepts 5 and 8 (STRANGERS and PEOPLE OF AUTHORITY); (2) Concepts 4 and 9 (MY-SELF WITH A HEARING LOSS and MYSELF AND FAILURE); and (3) Concepts 7

and 9 (MYSELF IN THE FUTURE and MYSELF AND FAILURE). The fact that the hard-of-hearing judge authority figures and strangers as closer together in meaning than normal hearing people do is interesting and may reflect the effect of the social barriers erected by the hearing loss. Communication with unfamiliar people generally presents a more challenging communication situation for the hard-of-hearing person than does the same situation with friends or family. This effect is also apparent in the attitude of the hard-of-hearing adults as expressed by their feeling that strangers are significantly "tougher" than portrayed by the normal hearing adults. Thus, it is possible that the attitude about the communication situation has been generalized to the people involved. Therefore, different people producing a difficult social situation for the hard-of-hearing are judged as being more similar than the normal hearing people would report. The close relationship between hearing loss and failure and the future and failure in the hard-of-hearing group can be thought of as representing a more objective and realistic appraisal of the effect of their handicap than the normal hearing group who have never experienced hearing loss or the associated barriers to effective communication. It can also be interpreted to indicate poor adjustment to their handicap. The clinical significance of these relationships is not known, but the fact that the hard-of-hearing judge these concepts to be more closely located in three-dimensional space than do normal hearing people should not automatically infer abnormality.

Self-Concept of the Hard-of-Hearing

Another area of concern posed at the outset of this study was related to the effect of age, sex, and amount of hearing loss on selfconcept. One of the findings was that no difference in self-concept existed as a function of the amount of hearing loss. This finding is contradictory to the statements of Ramsdell (see page 110) and compatible with the comments of Meyerson. Ramsdell implied that increased depression and suspiciousness occurred with increases in the amount of hearing loss. This theory was not substantiated in this study, and the indication is that once an adult sustains enough hearing loss to interfere with communication, i.e., a Social Adequacy Index of less than seventy-five, no further deleterious psychological effect occurs with increasing amount of hearing loss.

Reliability and Validity

The third area of concern was related to the development of a semantic differential measuring instrument to be utilized to index self-concept, with particular reference to the reliability and validity of such measurement. The results of these studies along with the evidence reported in the review of literature have demonstrated the usefulness of the semantic differential as a method of scaling the connotative meaning of a variety of conceptual stimuli. Evidence of reliability of measurement has been demonstrated both for concepts oriented toward measurement of personality characteristics as well as for a variety of non-personality oriented concepts. The reliability of measurement demonstrated in this research with self-concept items

is comparable to the reported reliability with other classes of concepts, especially when the time interval between test and retest is considered. Certain concepts appeared more reliably measured then others. The two concepts demonstrating the highest concept stability over time with the hard-of-hearing were related to the hearing problem, i.e., hearing loss and hearing aid. This indicated that the hard-of-hearing adults tended to rank these two concepts with more similarity on repeated testing than other concepts. The possible reasons for the higher stability of meaning over time of these concepts is not known, but a reasonable hypothesis would be that the attitudes regarding hearing loss and hearing aids are less susceptible to change than other self-related attitudes.

The definition of validity varies depending upon the source quoted. Ebel¹²⁰ states that while there are conceptual similarities in definitions there are also important points of divergence. While the discussion of validity and the methods for determining it go on, there is a general acceptance of the definition that states that validity is a statement of the extent to which a test measures what it purports to measure. Lindquist states "The validity of a test may be defined as the accuracy with which it measures that which it is intended to measure, or as the degree to which it approaches infallibility in measuring what it purports to measure."¹²¹

120 R. L. Ebel, "Must All Tests be Valid?," <u>American Psychologist</u> (October, 1961), p. 640.

121 E. F. Lindquist, <u>A First Course in Statistics</u> (rev. ed.; Boston: Houghton Mifflin, 1942), p. 213.

The American Psychological Association¹²² and the American Educational Research Association¹²³ have recommended four types of validity: content, concurrent, predictive, and construct. Generally, of particular importance in test construction, is the demonstration of one or more of these types of validity. Content validity is demonstrated by examining the test itself and comparing its items to the content of the body of information to be tested. In the development of the semantic differential instrument for this research, practical use was made of this type of validity. The scales utilized with the concepts in the factor analytic study were chosen with an eye to their relevance to the concepts. Concurrent validity is obtained by statistically determining the relationship of the test in question with another test purporting to measure the same quality.

There is a need for evidence of this type to be collected, and in Chapter V relevant comments are made regarding a specific study. The term "face" validity has been utilized in this report. This term has been defined for present purposes as a type of non-statistical concurrent validity. "Face" validity means that the observed results look like they agree with expectation or with other results independently obtained. Some evidence of "face" validity has been observed as the data of the present study has been analyzed. For example, the hard-ofhearing adults do differ significantly in feelings of <u>Capability</u> from

¹²²American Psychological Association, <u>Technical Recommendations</u> for Psychological Tests and Diagnostic Techniques (Washington, D. C.: American Psychological Association, 1954).

 ¹²³ American Educational Research Association, Committee on Test
Standards, <u>Technical Recommendations for Achievement Tests</u> (Washington,
D. C.: American Educational Research Association, 1955).

normal hearing adults when judging certain concepts. This finding is in agreement with those of Welles; Pintner; Pintner, Fusfeld, and Brunschwig; and Myklebust; discussed in Chapter II indicating some differences between hard-of-hearing and normal hearing adults. The concluding statements of Pintner, Eisenson, and Stanton can also be interpreted as providing "face" validity for the semantic differential because of the finding that only five of twenty-seven differences between the hard-of-hearing and the normal hearing adults were significant. They concluded that the hard-of-hearing, as a group, are not very different from the normal hearing. The finding that females and older people tended to feel significantly more genuine than males or younger people is consistent with expectation and thus provides more evidence of "face" validity. When it is remembered that one of the scales employed to index Genuineness was the "moral-immoral" scale, the above finding is consistent with information presently available regarding adult behavior.

Predictive validity is generally obtained by determining the statistical relationship between some index and a criterion. Since one of the purposes of testing is prediction, it becomes important to determine the extent to which the criterion can be predicted from the test data. No evidence of this type has been collected to date regarding these semantic differential instruments.

Construct validity is defined by Cronbach¹²⁴ as the analysis of the meaning of test scores in terms of psychological concepts,

124 Cronbach, <u>op. cit</u>., p. 104.

which are referred to as constructs. As reported in Chapter II (page 11) factor analytic procedures are one of the four suitable techniques necessary for aiding in the establishment of construct validity. Factor analytic procedures have been utilized in this research and it therefore may be said that some evidence of construct validity has been demonstrated for the developed semantic differential instruments. The factor analyses served to evaluate the obtained phenomonological judgments resulting in the isolation of three or more independent dimensions reliably utilized to index feelings toward concepts. These dimensions were then labeled on the basis of the construct involved.

Further evidence regarding construct validity is necessary, because as Wylie says,

It is not sufficient to demonstrate that one's self-concept measures have "predictive" or "concurrent" validity in the sense that an MMPI scale, for example, may be shown to discriminate nosological categories without an explanation of why the association between MMPI scores and diagnostic labels is obtained.¹²⁵

The conclusion would appear warranted that the semantic differential approach can be utilized reliably and with some validity to index the phenomenal self-concept. The test is relatively easy to prepare, administer, and score. In addition, it allows multidimensional scaling. Further use of this instrument in the clinical setting appears indicated. It is probable that the number of concepts could be reduced eventually, but at present, the clinical significance of the nine concepts utilized is not known. The inter-concept relationships would be helpful in making decisions regarding the choice of concepts to be retained.

125 Wylie, <u>op. cit</u>., p. 23.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS FOR FURTHER RESEARCH

The purpose of this research was essentially two-fold. The first purpose was to investigate the practicality of utilizing the semantic differential approach in the development of an instrument for obtaining self-judgments and to determine the relevant dimensions along which self-judgments are characteristically made. The second purpose was to evaluate and compare the self-concept and other selfrelated attitudes of the hard-of-hearing adult with those of normal hearing adults.

Summary

Nine concepts were each evaluated on fifty bipolar adjectival scales by a group of fifty-five college students. The judgments were quantified and subjected to factor analysis. Each of the nine concepts was factor analyzed individually, but in addition, a factor analysis across all nine concepts was accomplished. The goals of the factor analytic studies were to determine the relevant orthogonal (independent) dimensions utilized by people to evaluate each concept and to determine the nature and extent of concept-scale interaction. The results of these studies indicated that any concept can be evaluated by means of a multi-factor structure consisting of at least three rather well defined independent dimensions. The Universal factor-scale structure was chosen

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to be utilized with each of the concepts in the subsequent study to determine whether the self-judgments of hard-of-hearing adults differed from those having normal hearing.

The nine semantic differentials were then administered to 105 volunteer hard-of-hearing adults and to a control group of fifty-four volunteer normal hearing adults matched to the experimental group in terms of age, sex, and amount of formal education. The self-judgments were quantified and evaluated to determine whether: (1) the two groups differed from each other with respect to the concepts utilized; (2) age, sex, and amount of hearing loss were significant variables affecting responses; and (3) the judgments were reliably obtained and represented valid indices of self-feeling.

The results of this study indicated that the <u>Capability</u> factor provided most of the statistically significant discriminations between the hard-of-hearing subjects and their normal hearing counterparts. The ratings obtained from the hard-of-hearing adults were significantly different from the normal group on the <u>Capability</u> factor for four of the nine concepts. The results also indicated the hard-of-hearing adults tended to place some pairs of concepts closer together in threedimensional space than did their normal hearing counterparts. The results relative to the effect of sex, age, and amount of hearing loss on judgments within the hard-of-hearing group revealed that few significant differences were noted between the dichotomized groups.

Several methods for evaluating reliability were utilized and reported. Estimates of stability and internal consistency were obtained

employing correlation procedures. In addition, data relative to absolute consistency were presented utilizing probability statements.

Conclusions

Within the limits imposed by the instrument utilized to evaluate self-concept and the sample of subjects who volunteered to participate in this evaluation, the following conclusions appear warranted:

1. That the development of a hearing loss severe enough to interfere with communication, tends to make the afflicted adult feel less capable than does a normal hearing person of the same age, sex, and level of education. He also feels less capable in the future and under the happiest conditions. These would appear to be adjustments to reality that reflect an altered relationship with the environment.

2. That hard-of-hearing adults do not differ in self-regard from normal hearing adults of the same age, sex, and level of education based on the self-happiest-self relationship.

3. That hard-of-hearing and normal hearing adults of the same age, sex, and level of education do not differ in attitude with respect to friends, hearing loss, strangers, hearing aids, and failure--thus reinforcing the overall similarity of the two groups with respect to adjustment.

4. That the effects of the barriers erected to effective communication by hearing loss are apparent in the attitudes of the hardof-hearing adults, as opposed to the attitudes expressed by normal hearing adults, relative to the increased "toughness" of strangers and the increased semantic similarity in three-dimensional space of "hearing



loss" and "failure," "the future" and "failure," and "authority figures" and "strangers."

5. That the amount of hearing loss, in excess of that associated with a Social Adequacy Index of seventy-five, does not appear to be an important variable determining self-concept along any of the dimensions measured, i.e., <u>Capability</u>, <u>Genuineness</u>, and <u>Toughness</u>.

6. That changes in self-concept occur as a function of age, with people above sixty years of age judging themselves as more "genuine" than do people younger than sixty years of age.

 That there is a difference between the sexes in self-concept with women judging themselves as more "genuine" than men judge themselves.

8. That the <u>Capability</u> factor derived from the Universal factor analysis proved to be the most sensitive factor for discriminating between the hard-of-hearing and the normal hearing adults. The <u>Genuine-</u> <u>ness</u> and <u>Toughness</u> factors are either not the most relevant factors for this discrimination purpose or the two groups of adults do not differ in any other respects beyond Capability.

9. That the estimates of reliability obtained by correlation techniques in these studies appear consistent with reliability reported from other sources utilizing the semantic differential approach.

10. That the semantic differential technique can be validly utilized to measure the phenomenal self with respondents who are willing to co-operate by reporting their "true" feelings. The validity of the method in the individual case will remain in question until a method is devised to determine whether the self-responses have been "faked."



11. That the concept-scale interaction remains a problem of concern when utilizing the semantic differential, especially when the choice of employing Universal factor-scales for all concepts, or specific factor-scales for each of the individual concepts is concerned, because of the loss of information involved with either choice. The decision has to be based on the evaluations that are deemed important.

Recommendations for Further Research

This research was planned and carried out as part of a longer range research program that might lead to the development of a standardized instrument for evaluating the self-concept of hard-of-hearing adults. The evidence collected relative to reliability, ease of administration, "face" validity, factor analytic validity, ease of scoring, etc., indicate the feasibility of continued effort toward the development of a standardized instrument. The research summarized here represented an exploratory phase of this project for the purposes outlined at the beginning of this chapter. The evaluation of the instrument developed in this research and utilized to study attitudes of the hardof hearing has pointed out areas requiring further exploration.

The utilization of specific factors and scales with each of the concepts utilized should be evaluated. These scales and factors can be obtained from the factor analysis completed for individual concepts. The ability of these specific factor structures to discriminate between hard-of-hearing and normal hearing adults can then be evaluated. This will allow utilization of the most sensitive concept-factor-scale combination to define the semantic space. Further consideration should be given to the concepts to be judged. Nine concepts have been utilized under the assumption that each of the concepts is measuring, to some extent, different attitudes. A correlation study should be conducted to determine whether, in fact, nine different concepts are being measured or whether certain concepts are being judged synonomously. It might be possible in this way to eliminate certain concepts as redundant.

Following the refinement of the test through the procedures just described, additional studies will be required before it can be employed routinely as a clinical tool. Normative data must be obtained to enable the audiologist or hearing therapist to make prognostic statements or judgments of deviancy. Cross-validation studies are required because the validity of a test must remain in question until the results of test administration to different groups of subjects reveals that initial findings were due to other than sampling procedures. Further evidence of validity are also required. The relationship between this instrument and other recognized methods for evaluating the phenomonological self should be determined. In particular the concurrent validity of the test should be determined utilizing the Minnesota Multiphasic Personality Inventory as the other external criterion of adjustment. Predictive validity should also be investigated by more direct means. Of particular importance here, would be a determination of the ability of the test to predict "adjustment" to a hearing aid or progress in an aural rehabilitation program.

The routine employment of this test in a clinical setting remains as a future possibility, following the completion of the above outlined

research. The evidence to date only indicates the feasibility of this type of approach as well as some knowledge of the involved parameters of the phenomonological self that people will report reliably.



BIBLIOGRA PHY





BOOKS

- Barker, R. G. (ed.). <u>Adjustment to Physical Handicap and Illness</u>: <u>A Survey of the Social Psychology of Physique and Disability</u>. New York: Social Science Research Council, 1953.
- Blalock, H. M. <u>Social Statistics</u>. New York: McGraw Hill Book Co., Inc., 1960.
- Brunschwig, L. <u>Study of Some Personality Aspects of Deaf Children</u>. New York: Columbia University, 1936.
- Cronbach, L.J. <u>Essentials of Psychological Testing</u>. New York: Harper and Bros., 1960.
- Dai, B. "Some Problems of Personality Development Among Negro Children." In C. Kluckhohn and H. Murray. <u>Personality in</u> <u>Nature, Society, and Culture</u>. New York: Knopf, 1959.
- Harman, H.H. <u>Modern Factor Analysis</u>. Chicago: University of Chicago Press, 1960.
- Lindquist, E. F. <u>A First Course in Statistics</u>. Boston: Houghton Mifflin Co., 1942.
- Mead, G. H. (C. W. Morris, ed.). <u>Mind, Self, and Society.</u> Chicago; University of Chicago Press.
- Meyerson, L. "Somatopsychological Significance of Impaired Hearing." In R. G. Barker, (ed.). <u>Adjustment of Physical Handicap and Illness: A Survey of the Social Psychology of Physique and Disability.</u> New York: Social Science Research Council, 1953.
- Newby, H. <u>Audiology: Principles and Practice</u>. New York: Appleton-Century-Crofts, Inc., 1958.
- Osgood, C. E., Suci, G. J., and Tannenbaum, P. H. <u>The Measurement of</u> <u>Meaning</u>. Urbana: University of Illinois Press, 1957.
- Pintner, R., Eisenson, J., and Stanton, M. <u>The Psychology of the</u> <u>Physically Handicapped</u>. New York: Crofts, 1941.
- Ramsdell, D. A. "The Psychology of the Hard of Hearing and the Desfened Adult." In H. Davis, (ed.). <u>Hearing and Desfness:</u> <u>A Guide for Laymen</u>. New York: Rinchart Books, Inc., 1953.
- Rogers, C. R. <u>Client-Centered Therapy</u>. Boston: Houghton Mifflin, 1951.

- Siegel, S. <u>Nonparametric Statistics for the Behavioral Sciences</u>. New York: McGraw Hill Book Co., Inc., 1956.
- Sherif, M., and Cantril, H. <u>The Psychology of Ego Involvements</u>. New York: Wiley and Sons, 1947.
- Thorndike, R. L. "Reliability." In E. F. Lindquist, (ed.). <u>Educational Measurements</u>. Washington: American Council on Education, 1951.
- Wylie, R. C. <u>The Self Concept</u>. Lincoln: University of Nebraska Press, 1961.

REPORTS

- American Educational Research Association, Committe on Test Standards. <u>Technical Recommendations for Achievement Tests</u>. Washington: AERA, 1955.
- American Psychological Association. <u>Technical Recommendations for</u> <u>Psychological Tests and Diagnostic Techniques</u>. Washington: APA, 1954.
- Carhart, R., (Chairman). "IX. Report of Subcommitte on Hearing Problems in Adults." Journal of Speech and Hearing Disorders, Monograph Supplement 5, September, 1959.
- Dembo, T., Ladieu, G., and Wright, B. <u>Adjustment to Misfortune: A</u> <u>Study in Social-Emotional Relationships Between Injured and</u> <u>Non-Injured People</u>. Final report to the Army Medical Research and Development Board, Office of the Surgeon General, War Department, April, 1948. Typescript.
- "Workshop on Identification of Researchable Vocational Rehabilitation Problems of the Deaf." American Annals of the Deaf, 105:4: 335-370.

PERIODICALS

- Cronbach, L. J. and Meehl, P. E. "Construct Validity in Psychological Tests," <u>Psychological Bulletin</u>, 52 (1955), pp. 281-302.
- Davis, H. "The Articulation Area and the Social Adequacy Index for Hearing," Laryngoscope, 58 (1948), pp. 761-778.
- Ebel, R. L "Must all Tests be Valid," American Psychologist, (October, 1961), pp. 640-647.

- Grigg, A. E. "Validity Study of the Semantic Differential Technique," Journal of Clinical Psychology, 15 (1959), pp. 179-181.
- Heider, F. and Heider, G. "Studies in the Psychology of the Deaf: No. 2," <u>Psychological Monographs</u>, 53 (5, 1941), pp. 1-158.
- Helper, M. M. "Parental Evaluation of Children and Children's Self-Evaluation," Journal of Abnormal and Social Psychology, 56 (1958), pp. 190-194.
- Hotelling, H. "Analysis of a Complex of Statistical Variables into Principal Components," Journal of Experimental Psychology, 24 (1933), pp. 417-441, 498-520.
- Ingalls, G. S "Some Psychiatric Observations on Patients with Hearing Defects," Occupational Therapy and Rehabilitation, 25 (1946), pp. 62-66.
- Jones, A. "Distribution of Traits in Current Q-Sort Methodology," Journal of Abnormal and Social Psychology, 53 (1956), pp. 90-95.
- Jourard, S. M. and Lasakow, P. "Some Factors in Self-Disclosure," Journal of Abnormal and Social Psychology, 56 (1958), pp. 91-98.
- Kamano, D. "Symbolic Significance of Rorschach Cards IV and VII," Journal of Clinical Psychology, 16 (1960), pp. 50-52.
- Korman, M. "Implicit Personality Theories of Clinicians as Defined by Semantic Structures," <u>Journal of Consulting Psychology</u>, 24 (1960), pp. 180-186.
- Kleinmuntz, B. "Two Types of Paranoid Schizophrenia," <u>Journal of</u> Clinical Psychology, 16 (1960), pp. 310-312.
- Knapp, P. H. "Emotional Aspects of Hearing Loss," <u>Psychosomatic</u> Medicine, 10 (1948), pp. 203-222.
- Lazowick, L. "On the Nature of Identification," Journal of Abnormal and Social Psychology, 51 (1955), pp. 175-183.
- Messick, S. J. "Metric Properties of the Semantic Differential," Educational and Psychological Measurement, 17 (1957), pp. 200-206.
- Myklebust, J. "The Psychological Effects of Deafness," <u>American</u> Annals of the Deaf, 105 (1960), pp. 372-385.
- Osgood, C. E. "The Nature and Measurement of Meaning," <u>Psychological</u> <u>Bulletin</u>, 49 (1952), pp. 197-237.
- Osgood, C. E. and Luria, Z. "A Blind Analysis of a Case of Multiple Personality Using the Semantic Differential," <u>Journal of</u> Abnormal and <u>Social Psychology</u>, 49 (1954), pp. 579-591.



- 126
- Osgood, C. E. and Suci, G. J. "Factor Analysis of Meaning," <u>Journal</u> of Experimental Psychology, 50 (1955), pp. 325-338.
- Pintner, R. "Emotional Stability of the Hard of Hearing," Journal of Genetic Psychology, 43 (1933), pp. 293-311.
- Pintner, R., Fusfeld, I. and Brunschwig, L. "Personality Tests of Deaf Adults," <u>Journal of Genetic Psychology</u>, 51 (1937), pp. 305-327.
- Rabin, A. I. "Contribution to Meaning of Rorschach's Inkblots via the Semantic Differential," <u>Journal of Consulting Psychology</u>, 23 (1959), pp. 368-372.
- Semans, C. B. "Use of the Semantic Differential with Lobotomized Psychotics," <u>Journal of Consulting Psychology</u>, 21 (1957), p. 264.
- Smith, P. A. "A Factor Analytic Study of the Self-Concept," <u>Journal</u> of Consulting Psychology, 24 (1960), p. 191.
- Smith, R. G. "A Semantic Differential for Speech Correction Concepts," Speech Monographs, 29 (1962), pp. 32-37.
- Smith, R. G. "Validation of a Semantic Differential," <u>Speech Monographs</u>, 30 (1963), pp. 50-55.
- Welles, H. H. "The Measurement of Certain Aspects of Personality Among Hard-of-Hearing Adults," <u>Teachers College Contributions</u> to Education, No. 545 (Columbia University, 1932).
- Zax, M. and Loiselle, R. H. "Stimulus Value of Rorschach Inkblots as Measured by the Semantic Differential," <u>Journal of Clinical</u> <u>Psychology</u>, 49 (1954), pp. 579-591.
- Zucker, L. "Rorschach Patterns of a Group of Hard-of-Hearing Patients," Journal of Projective Techniques, 11 (1947), pp. 68-73.

UNPUBLISHED MATERIAL

- Bopp, J. "A Quantitative Semantic Analysis of Word Association in Schizophrenia." Unpublished Doctor's dissertation, University of Illinois, 1954.
- Cliff, N. "The Relation of Adverb-Adjective Combinations to their Components." Unpublished Doctor's dissertation, Princeton University, 1956.
- Kerrick, J. "The Effects of Intelligence and Manifest Anxiety on Attitude Change Through Communications." Unpublished Doctor's dissertation, University of Illinois, 1954.



Kaiser, H. F "The Varimax Method of Factor Analysis." Unpublished Doctor's dissertation, University of California, 1956.

Reeves, M. P. "An Application of the Semantic Differential to Thematic Apperception Test Material." Unpublished Doctor's dissertation, University of Illinois, 1954. APPENDICES



APPENDIX A

FACTOR ANALYSIS RESULTS

		г	н	III	IV	v	IN	h ²
Γ.	natural-strange	42	43	11-	33	02	10	67
2.	moral-immoral	15	55	-29	15	60	-03	43
e.	lighthearted-depressed	60	21	-18	42	19	60	65
4	clever-stupid	68	37	00	02	-11	04	19
ŝ	large-small	36	-05	13	-04	-06	29	24
9	masculine-feminine	17	-06	27	08	08	48	39
-	leader-follower	11	13	05	07	-02	17	56
°.	near-far	33	32	-15	17	18	19	34
6	quick-slow	74	12	15	14	-08	90	61
10.	success-failure	79	12	-04	8	07	60	99
:	kind-cruel	07	52	-48	04	90	-01	99
12.	unafraid-afraid	58	15	02	30	16	-05	48
13.	mild-intense	-16	15	-23	17	44	13	34
14.	full-empty	70	17	-10	08	03	10	54
15.	secure-insecure	70	22	-06	27	26	04	68
16.	emotional-unemotional	03	08	-20	00	-56	02	36
17.	popular-unpopular	67	23	-17	29	-02	10	63
18.	lenient-severe	04	10	-64	05	10	05	43
19.	talkative-silent	52	-05	-21	22	-12	23	44
20.	clear-confused	72	23	-02	17	13	11	62
21.	sociable-unsociable	51	12	-26	25	90-	15	44
22.	relaxed-tense	46	19	-13	45	26	-03	53
23.	happy-sad	64	31	-19	36	14	10	70
24.	calm-excitable	13	14	02	-01	59	03	39
25.	fair-unfair	49	48	-27	-08	90	12	57
26.	interesting-boring	68	20	-14	12	04	03	55
27.	true-false	38	68	-01	03	08	00	99
28.	sincere-artificial	53	56	-20	8	03	-01	64
29.	strong-weak	64	32	14	11	-02	-05	54
30.	good-bad	50	65	-16	07	05	10	53

UNIVERSAL FACTOR STRUCTURE OBTAINED BY VARIMAX ROTATION Across all concepts and subjects

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		UNIVERSAI	L FACTOR STR	UCTURE (Con	itinued)				
		I	п	ш	IV	Λ	IV	h ²	
31.	active-passive	70	15	03	15	-04	60	55	
32.	refreshed-tired	59	19	00	31	18	03	52	
33.	easy-hard	-01	10	-63	21	-04	02	45	
34.	apparent-unapparent	20	28	-05	17	02	37	29	
35.	humorous-serious	17	-01	-17	41	00	-07	23	
36.	liked-disliked	67	24	-22	26	-02	05	62	
37.	complete-incomplete	65	21	60-	24	17	16	59	
38.	valuable-worthless	80	16	-14	-10	07	-01	70	
39.	warm-cold	45	35	-38	23	-04	26	59	
\$	healthy-sick	64	24	-07	26	03	-03	54	
41.	superior-inferior	74	13	03	-02	-01	15	59	
42.	useful-useless	80	22	-12	-12	01	04	72	
£3.	sharp-dull	76	20	-05	01	-13	11	65	
4.	confident-unsure	17	07	00	28	19	07	11	
45.	tender-tough	02	13	-67	00	-07	-26	54	
46.	optimistic-pessimistic	54	24	60-	34	05	14	48	
47.	predictable-unpredictable	11	35	60-	90	25	35	33	
48.	comfortable-uncomfortable	62	17	-13	37	16	20	64	
49.	positive-negative	99	27	-07	16	05	19	58	
50.	desirable-undesirable	75	21	-11	11	-03	60	64	
Per	cent of total variance	30.94	7.56	5.16	4.40	2.86	2.34	53.26	
Per	cent of common variance	58.09	14. 19	9.69	8.26	5.37	4.39	100.00	

Each number in the body of the table is a correlation coefficient, indicating the correlation of each scale to each factor. These coefficients should be preceded by a decimal point.



		I	, II	III	IV	v	ΝI	VII	VIII	XI	x	h ²
	natural-strange	-10	42	60	- 58	00	-04	-11	- 39	18	-07	75
2.	moral-immoral	-40	23	-12	-50	03	-25	11	15	02	10	58
ŗ.	lighthearted-depressed	-29	76	29	-13	07	-14	07	03	05	60	80
4.	clever-stupid	-35	21	38	60-	08	46	-32	-03	20	-19	72
ς.	large-small	-00	-11	01	-08	05	-01	01	90	-20	-78	68
6.	masculine-feminine	90	-14	31	33	-12	-16	50	-20	08	-41	73
7.	leader-follower	-14	29	11	-13	-12	90	-14	-12	60-	-03	78
∞	near-far	-44	- 05	-13	15	00	-13	34	8	-13	11	\$
9.	quick-slow	-41	-04	20	14	-19	31	-22	-19	20	15	51
10.	success-failure	-31	11	65	-02	25	-05	-08	-12	13	-16	99
11.	kind-cruel	-10	27	20	- 58	36	8	21	18	10	-21	72
12.	unafraid-afraid	-66	03	14	90	01	-16	-32	90	-04	08	59
13.	mild-intense	-12	53	-18	-16	13	-17	26	34	08	-01	59
14.	full-empty	-12	-12	63	14	25	21	60	-02	00	11	57
15.	secure-insecure	-64	34	21	-21	-02	-24	-08	07	08	21	73
16.	emotional-unemotional	- 38	- 19	08	-21	90	56	16	90	-21	-05	62
17.	popular-unpopular	-64	37	04	-02	05	6 4	01	-05	-09	-10	73
18.	lenient-severe	08	15	34	-34	22	03	01	33	-43	-03	60
19.	talkataive-silent	02	41	15	-08	05	13	60	-28	- 39	13	47
20.	clear-confused	-35	15	29	05	15	-06	12	-73	-01	07	81
21.	sociable-unsociable	-08	54	37	-26	90	36	-15	-18	-12	-04	71
22.	relaxed-tense	-08	77	-01	-07	30	-19	-05	-01	-07	-06	74
23.	happy-sad	-19	72	07	-08	15	20	10	-11	30	-03	75
24.	calm- excitable	- 19	07	-04	60-	10	-70	18	01	04	-07	60
25.	fair-unfair	-58	- 09	-15	-40	14	-08	27	03	21	-29	75
26.	interesting-boring	-73	19	08	8	22	15	13	-04	-24	- 00	74
27.	true-false	-69	21	-14	-41	17	-12	15	-21	07	-08	83
28.	sincere-artificial	-56	13	33	-45	11	-13	10	-06	90	-14	11
29.	strong-weak	-11	04	41	04	28	-17	- 58	6 0-	-07	-02	64
30.	good-bad	-01	20	07	-11	62	- 12	-03	-06	-02	13	71

		н	II	III	IV	۸	ΝI	IIV	VIII	ΙX	×	h4
31.	active=bassive	-69	-12	39	-24	03	- 10	-03	10	60	18	75
32.	refreshed-tired	-12	33	-15	i e	56	11	-27	-05	15	-18	69
33.	easy-hard	-07	08	-03	-73	-25	24	8	05	-27	-07	74
34.	apparent-unapparent	11	11	11	04	08	-09	11	05	11	19	61
35.	humorous-serious	-19	61	-14	-04	-18	-08	-17	01	-30	8	58
36.	liked-disliked	-75	37	-02	-03	05	17	-08	-15	-12	-12	79
37.	complete-incomplete	-64	22	30	-10	17	-03	12	-15	60	-04	63
38.	valuable-worthless	-38	- 12	34	-05	58	-03	8	-06	60-	-23	68
39.	warm-cold	-37	27	24	-11	-14	-13	10	8	-13	-19	47
<u></u>	healthy-sick	-48	24	-08	-12	-05	07	-41	-18	07	-44	71
41.	superior-inferior	-69	05	11	12	12	10	- 19	-10	10	-40	74
42.	useful-useless	-27	60	36	-13	64	12	-20	-12	12	-06	75
43.	sharp-dull	-68	12	29	20	14	18	8	-20	18	-03	74
44.	confident-unsure	-41	47	38	-03	15	-31	-22	-19	-31	18	77
45.	tender-tough	26	-09	01	-63	44	-05	-06	-03	-05	11	72
46.	optimistic-pessímistic	- 39	38	24	-27	-21	24	-10	51	24	10	84
47.	predictable-unpredictable	-24	11	-03	-19	-07	-22	68	-06	-22	02	63
48.	comfortable-uncomfortable	-11	61	47	10	-03	60	-04	-06	60	20	67
49.	positive-negative	-64	10	08	-01	-18	05	22	24	05	-06	59
50.	desirable-undesirable	- 06	16	46	-15	10	34	-14	- 55	34	-07	72
Der	cant of total variance	16.2		8 0.0	6 70	5 RK	4 84	67 4	91.4	3 76	3 68	68.02
Per	cent of common variance	23.82	14.85	11.79	9.85	8.62	7.16	6.94	6.12	5.50	5.41	100.00

Each number in the body of the table is a correlation coefficient, indicating the correlation of each scale to each factor. These coefficients should be preceded by a decimal point.

	FACTOR	STRUCT	URE OF	CONCEPT	2FRI	ENDS, 0	BTAINED	BY VAF	IMAX RO	TATION		
		н	Ħ	III	NI	Δ	IV	IIV	IIIA	XI	×	h ²
	natural-strange	44	13	14	10	-29	-30	31	60	19	-18	59
3	moral immoral	20	8	29	04	-62	-43	13	-16	-12	01	75
ë.	lighthearted-depressed	45	26	21	-16	00-	-38	13	23	-01	-36	69
4	clever-stupid	-02	28	53	-10	-08	05	-08	46	80	-01	09
ŝ	large-small	20	19	04	-51	32	17	-13	16	-02	-15	53
.9	masculine-feminine	-07	-07	12	-10	41	35	65	20	13	-11	64
~	leader-follower	34	02	22	10	-33	-03	-06	26	36	-15	50
°.	near-far	11	03	-13	-40	-38	-23	-05	-04	-02	-58	73
6	quick-slow	58	10	-17	-16	-08	10	-32	26	-29	-10	73
•	success-failure	62	14	02	-11	-17	60	-07	32	00	-10	57
÷	kind-cruel	27	60	11	-48	-13	-36	10	15	42	90	68
2.	unafraid-afraid	21	18	25	-60	05	-33	20	32	14	15	80
ë.	mild-intense	07	-01	03	00-	01	-22	74	-13	-12	-04	63
+	full-empty	-02	41	60-	05	15	-14	-17	32	-10	-54	99
5.	secure-insecure	11	-05	90	-39	-01	-16	00-	60-	02	-11	11
	emotional-unemotional	-14	60	12	00-	-18	-14	-13	-17	-62	-05	55
1.	popular-unpopular	39	23	68	07	17	-01	05	-18	-10	-01	75
÷.	lenient-severe	-07	17	25	16	-23	07	08	-07	-07	-06	53
6	talkative-silent	75	16	11	03	04	-04	-17	17	-10	-28	75
	clear-confused	34	-20	10	-74	-14	-08	8-	14	9-	03	76
÷	sociable-unsociable	82	35	08	07	-06	-02	60	07	-02	12	84
5	relaxed-tense	22	-21	19	-01	-11	-16	8	15	-07	10	54
ë.	happy-sad	12	18	48	-47	90	-25	21	90-	17	-24	70
4	calm-excitable	05	-04	04	-10	-08	03	-05	-15	69	01	52
s.	fair-unfair	25	56	22	04	60-	-34	22	90-	22	-02	65
	interesting-boring	60	75	04	-12	-21	10	-17	08	-02	-13	69
2.	true-false	-11	50	10	08	-28	-03	30	-13	20	-31	60
œ.	sincere-artificial	43	24	60	-04	-64	60-	16	-10	23	90	17
6	strong-weak	68	10	20	-05	-17	07	-10	-31	07	60	67
.	good-bad	29	28	22	-12	-12	-39	25	-17	01	-14	50



Each number in the body of the table is a correlation coefficient, indicating the correlation of each scale to each factor. These coefficients should be preceded by a decimal point.

		н	Ħ	Ш	IV	Λ	ΝI	VII	IIIV	XI	h ²
-	natural-strange	26	21	26	-07	-15	16	-56	08	п	57
2	moral-immoral	21	46	37	10	-22	-10	-45	-12	10	67
e.	lighthearted-depressed	67	59	24	07	-04	04	-07	90	32	76
4.	clever-stupid	82	-04	60	26	-05	90	-11	60-	-13	29
s.	large-small	60	15	-15	-18	99	16	15	-28	03	65
.9	masculine-feminine	11	-14	-05	-06	81	-13	01	90	-13	73
1.	leader-follower	72	30	10	13	16	04	26	02	07	73
80	near-far	17	17	69	-10	-22	-21	07	13	60-	67
6	quick-slow	73	00-	13	33	16	10	90	10	-24	76
10.	success-failure	46	31	60	63	-10	-03	-06	-08	-17	76
н.	kind-curel	19	52	48	12	-27	04	-35	04	18	78
12.	unafraid-afraid	34	-03	07	-06	07	-05	-17	-75	-08	72
13.	mild-intense	-15	26	90	-13	90	-60	-25	32	80	65
14.	full-empty	11	36	14	00	01	-00	11	10	-25	82
15.	secure-insecure	62	19	-14	01	-04	-16	-22	-02	19	79
16.	emotional-unemotional	-01	15	-02	-09	-10	62	-06	90	21	72
17.	popular-unpopular	15	81	00-	12	-03	-06	15	90	-05	73
18.	lenient-severe	11	60	60	02	-33	19	-19	-07	-15	59
19.	talkative-silent	02	50	-10	-11	04	23	35	28	-01	53
20.	clear-confused	78	03	19	35	-04	90	02	90-	08	6/
21.	sociable-unsociable	48	74	11	-09	90	00-	00	13	17	85
22.	relaxed-tense	20	58	48	02	-11	-14	-05	-11	34	78
23.	happy-sad	25	59	21	22	-10	60	-05	-03	60	53
24.	calm-excitable	60	-15	90	8	-15	-17	13	-11	23	73
25.	fair-unfair	68	03	26	-08	02	60	-26	-04	17	65
26.	interesting-boring	82	60	05	-02	-03	-03	22	07	11	75
27.	true-false	11	60	69	29	60	-13	-00	-22	16	69
28.	sincere-artificial	19	23	45	14	-18	19	-20	-08	20	80
29.	strong-weak	58	16	25	18	19	02	-17	-03	32	62
30.	good-bad	47	19	25	17	-03	-07	-20	03	90	76

FACTOR STRUCTURE OF CONCEPT 3--MY HAPPIEST SELF, OBTAINED BY VARIMAX ROTATION

		I	II	III	Ν	Λ	ΝI	11V	VIII	XI	h ²
31.	active-passive	22	08	-09	63	-06	01	04	-07	16	49
32.	refreshed-tired	81	19	-03	14	04	60-	60-	-02	24	79
33.	easy-hard	-03	42	32	-16	-36	44	12	-06	60-	65
34.	apparent-unapparent	08	00-	68	60 -	-05	31	-18	28	01	69
35.	humorous-seríous	18	03	04	33	-31	21	28	29	16	47
36.	liked-disliked	18	81	-02	24	-03	90	-19	-02	-05	79
37.	<pre>complete-incomplete</pre>	50	31	08	02	23	-10	-05	15	-25	50
38.	valuable-worthless	36	21	22	56	-08	-16	02	-02	-08	58
39.	warm-cold	50	38	27	-30	-24	22	12	03	18	11
6 0.	healthy-sick	61	26	-05	48	02	-07	-03	-07	16	71
41.	superior-inferior	38	18	-02	25	40	13	-18	08	-27	52
42.	useful-useless	80	31	11	12	-06	-13	-15	-13	-11	83
43.	sharp-dull	80	19	16	08	08	60	8	-03	-01	72
44.	confident-unsure	78	16	-08	17	00-	-03	-15	-19	05	74
45.	tender-tough	05	37	07	01	-70	01	-10	11	-17	68
46.	optimistic-pessimistic	60	16	07	60	-02	32	-01	23	20	59
47.	<pre>predictable-unpredictable</pre>	22	07	21	-35	-13	-05	-25	68	07	77
48.	<pre>comfortable-uncomfortable</pre>	48	29	35	-01	-07	-07	39	00	-11	61
49.	positive-negative	35	46	30	37	38	07	-02	05	-07	11
50.	desirable-undesirable	40	61	06	32	14	18	-13	02	19	74
rer	cent of total variance	23.04	12.60	0./0	00.0	0.00	01.0	3.12	3.02	uu	02.20
Per	cent of common variance	33.22	18.17	9.66	8.07	8.04	7.35	5.36	5.22	4.90	99.99
Eac sca	h number in the body of the tab le to each factor. These coeff	ole is a ficients	correla should	tion co be prec	efficie eded by	nt, ind a deci	licating mal poi	the co nt.	orrelati	on of	each

				ONTWOTI	INIGO (ce	A IG UZN		NOTTO		
		г	Ħ	Ш	IV	Δ	IV	IIV	h ²	
-	. natural-strange	22	-48	-46	-19	38	00	-04	68	
2	. moral-immoral	15	-12	-53	-05	-33	-29	-23	57	
e.	. lighthearted-depressed	60	-56	-19	-07	11	-17	-12	11	
4	. clever-stupid	49	-16	-63	-31	22	90	-16	83	
s.	. large-small	30	-07	02	-07	04	16	62	52	
9	. masculine-feminine	-02	02	-05	10	19	-04	67	50	
-	. leader-follower	53	-41	-19	-10	21	02	14	56	
œ.	. near-far	34	-36	90-	10	48	-34	24	99	
6	. quick-slow	47	-18	-14	10	68	04	60	74	
10.	success-failure	36	-12	-01	-13	72	21	21	17	
Ξ.	. kind-cruel	28	-07	-52	-66	17	-20	00	85	
12.	. unafraid-afraid	74	-19	-18	14	60	-23	-08	20	
13.	. mild-intense	-01	-11	-08	-28	10	-72	-04	62	1
14.	. full-empty	49	-36	-23	14	45	-27	11	73	38
15.	secure-insecure	68	-31	60	-13	28	-23	11	73	
16.	emotional-unemotional	-16	-03	-10	-26	-01	75	15	68	
ч.	<pre>popular-unpopular</pre>	38	-49	-38	-39	35	-13	60-	83	
18.	. lenient-severe	00	-14	07	-83	14	17	-04	76	
19.	. talkative-silent	27	-61	11	-24	23	-15	18	62	
20.	clear-confused	11	-23	-18	90	18	-20	12	68	
21.	<pre>sociable-unsociable</pre>	32	-64	-19	-29	23	02	-12	70	
22.	. relaxed-tense	44	-32	-11	01	90	-54	-13	63	
23.	happy-sad	63	-46	-24	-16	22	-16	-03	17	
24.	. calm-excitable	03	8	-28	90	10	-46	24	35	
25.	. fair-unfair	21	03	-60	-53	20	-04	-06	73	
26.	interesting-boring	08	-16	03	-11	62	-16	05	20	
27.	true-false	11	03	-80	10	-05	00	60	68	
28.	<pre>sincere-artificial</pre>	36	-03	-51	-31	41	-05	-04	65	
29.	strong-weak	42	-29	-52	19	21	03	15	63	
30.	. good-bad	17	-03	-68	-33	25	-10	04	67	



		I	II	III	IJ	Λ	ΝΙ	IIV	h ²
31 0	atiwa-ngeejwa	, , ,	- 29	- 25	10	11	50	16	67
1 1 	ctive pagetyc	100	20			44			77
32. F	errea-Lieu	ט. יי	- 04 - 14	07-	01 - -	74	רע יי	17	04
3 3. e	asy-hard	17	-17	-16	-66	-10	-16	20	60
34. a	pparent-unapparent	60	- 58	-16	-08	-05	39	34	65
35. h	umorous-serious	38	-61	01	-09	07	-10	-36	66
36. 1	iked-disliked	27	-25	-45	-45	20	-05	01	79
37. c	omplete-incomplete	56	-64	-06	-18	22	-13	12	84
38. v	aluable-worthless	76	-04	- 10	-12	32	14	-07	73
39. w	arm-cold	40	-37	-11	-63	90	-09	24	78
40. h	ealthy-sick	73	-11	-27	-20	-03	05	01	99
41. s	uperior-inferior	70	-22	-27	-13	24	03	25	76
42. u	seful-useless	79	04	- 10	-37	30	05	90	87
43. s	harp-dull	31	-33	-45	-16	53	21	-06	76
44. c	onfident-unsure	68	-44	04	02	29	-19	05	78
45. t	ender-tough	-02	-09	-07	-86	08	14	-24	84
46. 0	ptimistic-pessimistic	66	-34	-23	-16	11	-19	02	68
47. p	redictable-unpredictable	13	-24	-52	-08	-09	-28	44	63
48. c	omfortable-uncomfortable	39	-56	-02	-16	27	-22	26	68
49. p	ositive-negative	70	-14	-32	-27	03	-26	23	80
50. d	esirable-undesirable	41	-18	- 30	-15	55	-16	03	65
Per c	ent of total variance	20.24	10.46	10.02	9.24	9.22	6.08	4.40	69.66
Per c	ent of common variance	29.06	15.02	14.38	13.26	13.24	8.73	6.32	100.00
ц со ц	numbar in the hodu of the ta	0 0 1 1 1 1 1		, tit	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4000

Each number in the body of the table is a correlation coefficient, indicating the correlation of each scale to each factor. These coefficients should be preceded by a decimal point.

		I	II	III	IV	Λ	١٨	VII	h ²
	natural-strange	-11	-87	03	15	00-	07	16	82
2.	moral-immoral	-15	-67	06	41	03	-01	90	65
т	lighthearted-depressed	-27	-41	55	-15	-37	-08	16	73
4.	clever-stupid	-68	-20	0 †	24	-12	12	01	75
ς.	large-small	-29	-20	-06	-52	-07	24	21	46
6.	masculine-feminine	-21	07	06	-28	-63	-12	03	54
7.	leader-follower	-44	-46	17	-14	-15	20	-55	82
∞ .	near-far	-16	-52	12	38	-39	12	-12	63
9.	quick-slow	-83	60-	15	-06	15	13	-02	77
10.	success*failure	- 58	07	4 6	07	-29	21	-04	68
11.	kind-cruel	-40	-25	23	61	-13	-07	25	74
12.	unafraid-afraid	-29	-36	03	-04	25	46	-10	50
13.	mild-intense	04	-01	14	05	-65	10	-15	48
14.	full-empty	-46	-49	07	17	-03	14	-16	54
15.	secure-insecure	-34	-46	45	13	-30	90	-16	67
16.	<pre>emotional-unemotional</pre>	-04	-40	29	04	31	35	-03	47
17.	popular-unpopular	-68	-45	21	-08	05	-05	90	72
18.	lenient-severe	01	-27	-01	63	-09	-12	-17	52
19.	talkative-silent	-08	-36	52	13	-06	30	60	53
20.	clear-confused	-46	-42	33	08	-32	17	- 28	11
21.	sociable-unsociable	-20	-44	58	18	- 19	35	15	78
22.	relaxed-tense	-22	-48	77	01	11	28	-05	57
23.	happy-sad	-60	-43	19	18	60-	11	03	63
24.	calm-excitable	- 06	04	01	42	-54	60-	08	49
25.	fair-unfair	-25	-16	50	48	-30	-07	-02	99
26.	interesting-boring	-36	-14	65	19	-13	04	04	62
27.	true-false	-42	-52	-13	48	-15	-27	-02	62
28.	sincere-artificial	- 55	-46	20	37	02	-17	-19	76
29.	strong-weak	-76	-07	16	12	-08	16	90	99
30.	good-bad	-45	-27	30	38	- 19	10	10	57
		I	II	III	IV	Λ	ΝΙ	VII	h ²
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31.	active-passive	-60	-08	53	20	-06	16	-01	71
32.	refreshed-tired	- 55	-18	31	-05	-08	62	47	99
33.	easy-hard	-11	-04	03	70	-18	27	05	60
34.	apparent-unapparent	-55	-19	08	-01	-30	-03	-11	45
35.	humorous-serious	-10	04	-05	-05	04	76	-02	59
36.	liked-disliked	-57	-41	10	-07	15	10	33	65
37.	complete-incomplete	-56	-28	18	41	-15	04	-22	99
38.	valuable-worthless	-27	00-	75	-04	10	-07	-14	68
39.	warm-cold	-23	-55	26	38	-36	36	04	83
.	healthy-sick	-31	-31	10	10	-16	42	52	69
41.	<pre>superior-inferior</pre>	-13	-02	54	16	-27	32	-52	78
42.	useful-useless	-36	-12	79	10	-07	-20	90	83
1 3.	sharp-dull	-78	60-	35	05	-05	10	07	11
4.	confident-unsure	-44	-25	40	-06	-14	47	-10	67
45.	tender-tough	01	-03	07	65	25	60	12	52
1 6.	optimistic-pessimistic	-29	-51	40	90	-29	18	14	64
47.	predictable-unpredictable	07	-30	60	28	-44	-11	22	44
18.	comfortable-uncomfortable	-28	-83	31	60	90	-06	-05	88
, 9.	positive-negative	-39	-31	13	37	03	39	12	57
50.	desirable-undesirable	-51	-12	38	-17	02	15	02	48
Per	cent of total variance	16.98	12.98	11.26	8.50	5.90	5.36	3.70	64.68
Per	cent of common variance	26.25	20.07	17.41	13.14	9.12	8.29	5.70	99.98
3acl	h number in the body of the ta	able is a c	orrelatio	n coeffic	ient. ind	icating t	the correl	lation of	each
			•	•		•			

scale to each factor. These coefficients should be preceded by a decimal point.



	I	II	ш	Ν	Δ	IV	IIV	h ²
-strange	32	-52	07	42	-24	-02	-07	62
moral	11	-21	64	64	-14	-33	-12	61
arted-depressed	12	-56	24	42	-34	00	-06	67
stupid	11	-21	20	10	-07	-17	30	11
nall	26	-07	-13	14	-07	-14	44	33
ne-feminine	60	22	16	60-	03	11	74	65
follower	55	-47	08	-15	-31	-08	13	68
	23	-11	-06	19	-04	-21	05	74
low	60	-27	-02	-02	-32	21	11	11
-failure	61	-31	-03	60	-47	04	07	11
uel	15	-07	53	04	-45	-47	-22	78
d-afraid	40	-47	17	36	-26	-02	08	61
tense	-54	-05	23	45	-11	-27	-02	63
pty	60	-17	-06	11	-43	-03	-15	42
Insecure	25	-54	44	37	-29	-03	11	62
al-unemotional	25	26	08	-54	-14	-30	-02	54
-unpopular	28	-40	23	07	-67	-15	90	17
-severe	00	05	08	90	-05	-86	60	17
ve-silent	57	-59	18	-14	11	-17	02	11
onfused	54	-25	26	43	-11	-01	-01	63
e-unsociable	37	-44	42	03	-32	-31	-04	70
-tense	04	-63	16	34	-12	14	-27	64
ad	07	-71	35	23	-29	-15	13	81
citable	-31	-05	36	46	-04	-18	19	51
fair	29	-16	54	24	20	-54	90	62
ting-boring	53	-39	02	01	-62	90	-01	82
lse	36	-22	75	19	-14	-03	11	80
-artificial	43	02	55	22	-23	-04	-29	68
weak	65	-35	42	-25	-21	60	18	69
4	19	-29	81	11	-02	-10	11	81

	H	11	111	N	D	Ν	VIT	h ²
31. active-passive	60	-67	04	04	05	-02	02	82
32. refreshed-tired	25	-59	21	37	-31	-01	02	69
33. easy-hard	15	-17	13	14	-19	-78	-12	75
34. apparent-unapparent	-03	-25	33	13	-28	60-	42	45
35. humorous-serious	-03	-66	-16	-06	-18	60-	10	52
36. liked-disliked	23	-28	21	05	-71	-17	-05	72
37. complete-incomplete	22	-55	11	60	-07	-04	-18	76
38. valuable-worthless	78	-12	20	12	-01	-24	02	73
39. warm-cold	38	-45	30	08	11	-52	-14	75
40. healthy-sick	20	-72	17	22	01	-03	-19	67
41. superior-inferior	72	60-	18	19	-17	-17	24	20
42. useful-useless	75	-01	37	-07	-21	-19	13	81
43. sharp-dull	84	-18	13	-06	-10	-05	-11	78
44. confident-unsure	49	-49	32	31	-25	17	07	78
45. tender-tough	-03	18	17	-17	-35	-36	-63	74
46. optimistic-pessimistic	29	-71	21	-12	-16	-21	27	78
47. predictable-unpredictable	-02	-01	37	68	-04	-16	18	65
48. comfortable-uncomfortable	22	-65	42	19	-23	08	08	75
49. positive-negative	55	-57	36	08	-05	-10	-02	78
50. desirable-undesirable	58	-49	14	16	-30	-18	17	78
Per cent of total variance	17.56	16.22	10.00	7194	7.26	6.68	4.38	70.04
Per cent of common variance	25.07	23.16	14.28	11.34	10.37	9.54	6.25	100.00

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		I	II	III	IV	v	IN	IIV	IIIN	XI	h^2
	natural-strange	-36	-04	48	-28	36	17	14	-05	01	62
2.	moral-immoral	-14	04	47	-42	31	03	18	-25	-21	99
ë.	lighthearted-depressed	-23	-05	60	-06	58	52	90	-16	03	11
4	clever-stupid	-49	53	16	10	27	10	-27	00	-03	72
5	large-small	-25	10	-04	48	24	17	-13	90	-42	59
.9	masculine-feminine	-20	24	-12	67	-01	-08	60	22	-31	73
7.	leader-follower	-28	52	04	12	-01	25	05	16	-50	72
œ.	near-far	-17	07	59	-27	-12	-40	-13	-17	90	68
6	quick-slow	-39	33	60	35	08	-05	-20	-54	-14	75
10.	success-failure	-68	50	16	05	-08	18	05	03	-06	61
Ξ.	kind-cruel	-29	26	37	-52	22	22	16	-14	-19	74
12.	unafraid-afraid	-23	22	21	10	-06	76	13	-19	60	80
ц.	mild-intense	02	-01	34	-01	13	05	42	14	56	65
14.	full-empty	-54	16	-02	-14	31	-18	-02	-24	-05	53
5.	secure-insecure	-26	99	00-	02	33	20	00-	-03	21	11
16.	emotional-unemotional	03	60	-04	-28	02	16	-82	-12	-08	82
1.	popular-unpopular	-75	10	18	-10	23	33	01	03	-05	78
8.	lenient-severe	-14	18	24	-48	42	08	03	11	21	58
1 61	talkative-silent	-49	-05	-01	-21	19	-16	-18	01	-07	38
ö.	clear-confused	-60	41	23	-02	27	-06	08	-18	-19	73
1.	social-unsociable	-05	8	10	-20	21	39	90	-17	-19	67
22.	relaxed-tense	- 39	34	46	-24	13	27	15	01	-16	67
23.	happy-sad	01	20	-06	04	02	14	87	-04	60	83
24.	calm-excitable	-23	37	16	-08	20	-03	-11	-12	03	75
25.	fair-unfair	-78	60	30	-15	18	19	12	-10	-03	82
26.	interesting-boring	-19	56	37	-14	-02	-11	19	-38	-18	72
27.	true-false	-42	16	53	-22	15	28	29	-00	-24	78
28.	sincere-artificial	-25	46	07	90	08	65	01	-22	-28	85
.67	strong-weak	-20	07	33	0-	44	17	07	-54	-15	70
30.	good-bad	-12	62	08	-02	0-	18	01	-46	-10	67

FACTOR STRUCTURE OF CONCEPT 7--MYSELF IN THE FUTURE, OBTAINED BY VARIMAX ROTATION



		I	11	III	IV	Λ	١٧	VII	VIII	XI	h^2
5		ĊĊ	26	5	č		r -	20	C r	.	Ċ
.10	acrive-passive	07-	70	N	-04	C7	11	5	71-	77	71
32.	refreshed-tired	-03	-08	-04	- 76	12	00-	-11	20	-08	67
33.	easy-hard	-07	32	76	60	04	08	-05	-01	17	72
34.	apparent-unapparent	- 10	01	90	-18	18	39	-33	16	37	51
35.	humorous-serious	- 80	04	22	08	60	17	90	-16	13	78
36.	liked-disliked	-64	35	27	-18	-05	60	90	-23	-11	11
37.	<pre>complete-incomplete</pre>	-56	45	-05	00	-07	36	05	-19	-03	20
38.	valuable-worthless	-31	-04	59	-33	45	11	-12	-08	-04	6/
39.	warm-cold	-34	20	21	02	99	07	60	-24	02	71
40.	healthy-sick	-42	35	-16	32	27	26	-18	-25	01	99
41.	<pre>superior-inferior</pre>	-27	81	04	8	16	60	08	-14	05	62
42.	useful-useless	-74	40	90	14	10	03	-15	-16	03	62
43.	sharp-dull	-60	45	18	02	05	28	14	-08	-09	72
44.	confident-unsure	-18	01	05	-82	03	-05	-14	00-	00	73
45.	tender-tough	08	37	15	-20	48	06	22	-07	-05	49
46.	optimistic-pessimistic	- 12	00-	81	60	22	23	02	90	13	80
47.	predictable-unpredictable	-20	30	39	-18	27	58	04	-07	03	73
48.	comfortable-uncomfortable	-17	83	15	16	14	03	01	-15	-00	82
49.	positive-negative	- 53	26	-12	05	15	21	60-	-57	-02	16
Per	cent total variance	14.58	11.40	8.44	8.42	6.86	6.64	5.52	5.36	3.26	70.48
Per	cent common variance	20.98	16.41	12.15	10.68	9.87	9.56	7.94	7.71	4.69	66. 66
Eac	h number in the body of the t	able is a	correl	ation	coeffic	:ient.	indicati	ng the	correla	tion of	each
	•)			

scale to each factor. These coefficients should be preceded by a decimal point.

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		н	н	III	IV	٨	IV	IIV	h ²
-	. natural-strange	38	-34	02	90	-18	60-	-56	62
2	moral-immoral	72	-26	-31	13	02	14	60	73
e.	11ghthearted-depressed	53	-16	-22	-06	-16	-60	17	67
4	clever-stupid	11	-05	35	-05	14	-10	03	75
s.	. large-small	31	-16	15	-01	20	-10	61	57
9	masculine-feminine	-13	60-	25	-06	-05	-18	35	25
1	. leader-follower	16	01	75	-36	-14	11	10	75
8	near-far	28	-31	-35	10	-01	-04	-02	34
6	. quick-slow	34	-40	47	-08	01	-22	-18	58
10.	success-failure	56	-33	45	15	-19	00	00-	68
Ξ	kind-cruel	64	-21	-42	-23	-25	01	-17	17
12.	. unafraid-afraid	32	-30	02	-04	05	-53	60	49
13.	. mild-intense	11	-29	-46	60-	-29	-25	-00	46
14.	. full-empty	74	-32	00-	-24	12	-02	04	72 5
15.	secure-insecure	54	-40	-05	-33	10	-34	00-	69
16.	. emotional-unemotional	-01	17	05	05	-72	07	-16	58
17.	<pre>popular-unpopular</pre>	34	-56	19	-20	-47	-05	90	73
18.	. lenient-severe	-03	04	-69	-19	08	00	-01	52
19.	. talkative-silent	10	-07	20	-34	-37	44	47	72
20.	. clear-confused	68	-50	03	-08	14	01	20	17
21.	sociable-unsociable	13	-26	10	-29	-62	-19	24	99
22.	, relaxed-tense	17	-69	-05	-10	-01	-11	60	54
23.	, happy-sad	58	-56	-15	17	-23	11	-05	76
24.	. calm-excitable	-00	-58	07	-05	20	-28	-50	72
25.	, fair-unfair	58	60-	-04	-52	15	-13	-16	68
26.	. interesting-boring	72	-02	01	-33	-23	-21	-04	72
27.	. true-false	85	-11	-02	90	11	-17	-12	62
28	 sincere-artificial 	74	-13	-15	-15	-22	-03	-31	76
29.	. strong-weak	80	07	16	-05	-02	-13	11	70
30	. good-bad	11	-37	03	01	-04	-07	14	75

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		I	п	III	IV	Λ	IV	IIV	h^2
31.	active-passive	-05	-25	51	-34	29	18	-13	58
32.	refreshed-tired	21	-54	17	90	-20	-49	05	65
33.	easy-hard	-18	07	-77	-14	90	30	-08	99
34.	apparent-unapparent	08	-18	-07	-52	-22	-37	26	57
35.	humorous-serious	11	-15	-14	-06	01	-52	-05	32
36.	liked-disliked	13	-70	60-	-02	-31	-32	-06	11
37.	complete-incomplete	41	-33	-14	-61	12	17	15	73
38.	valuable-worthless	11	90-	21	-29	-15	-21	-00	80
39.	warm-cold	15	-28	-39	-17	-48	-08	-18	55
40.	healthy-sick	58	-38	-03	17	01	-28	43	11
41.	superior-inferior	26	-20	59	-32	-16	29	19	20
42.	useful-useless	62	60-	22	-20	-23	-07	-08	78
43.	sharp-dul1	59	60-	19	-46	-15	-21	12	69
4.	confident-unsure	38	-33	30	-39	-17	11	16	56
45.	tender-tough	60	-11	-69	-13	-11	-08	-01	47
46.	optimistic-pessimistic	04	-67	12	02	01	-11	-01	47
47.	predictable-unpredictable	23	12	-16	-72	-16	-04	-07	64
48.	comfortable-uncomfortable	07	-78	-10	-29	12	01	20	11
49.	positive-negative	26	-64	45	-02	-02	-16	-25	26
50.	desirable-undesirable	80	05	10	-33	-19	-19	-03	83
Per	. cent of total verience	21 BK	11 98	7/ 0	6 66	96 2	5 14	1 50	65 16
	cour of court variance				00.0		1		+1.00
Fer	cent of common variance	33.50	L8.39	L4.95	10.22	8.0/	1.89	0.91	99.99

Each number in the body of the table is a correlation coefficient, indicating the correlation of each scale to each factor. These coefficients should be preceded by a decimal point.

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FACTOR STRUCTURE OF CONCEPT 9--MYSELF AND FAILURE, OBTAINED BY VARIMAX ROTATION

н	H	III	N	D	IV	h ²
11	-17	79	07	-10	-28	75
24	-25	03	-16	-14	-69	63
63	-35	34	- 09	-29	-14	74
55	-11	54	13	04	-25	68
08	-68	03	16	-16	02	52
-01	-44	-22	17	-29	60	36
54	-56	30	01	-02	-28	78
07	-28	71	-06	-32	60	70
51	- 46	42	07	-22	-26	76
62	-54	27	-13	-22	10	82
50	-31	20	-22	29	-45	72
69	-17	04	-13	-07	-28	60
13	40 4	17	- 44	-45	-02	60
34	-67	33	-13	-10	21	74
79	-21	27	-07	-22	-03	79
-18	10	-07	10	56	60	38
43	-57	37	-10	03	- 35	77
-11	02	- 10	- 70	-16	-01	53
24	-63	90	-24	03	08	52
64	-54	12	-08	-11	-15	76
37	-60	32	-17	05	-24	70
80	-01	10	-17	-23	02	73
61	-48	29	-19	-08	- 30	81
17	-12	21	-35	-51	10	48
33	-51	40	-07	17	07	57
46	-43	54	-10	90	07	11
30	-09	64	18	-11	-22	60
61	-37	44	12	05	-02	71
32	-09	. 73	25	03	00	71
26	-76	90	00	-06	-12	67

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	I	II	III	IV	Λ	IV	h ²
31. active-passive 32. refreshed-tired	32 57	-57 -36	41 49	10 -22	-05 -08	-07	61 77
33. easy-hard	15	-03	-23	-79	-12	-05	11
34. apparent-unapparent	02	-52	12	-01	-50	-29	62
35. humorous-serious	-01	04	34	-39	-11	60-	29
36. liked-disliked	47	-61	27	-17	16	-30	80
37. complete-incomplete	36	-28	65	-21	-08	24	74
38. valuable-worthless	71	-53	30	-07	-08	04	89
39. warm-cold	17	-69	22	-03	-10	-36	20
40. healthy-sick	58	-54	29	-02	12	-12	74
41. superior-inferior	80	-35	18	10	13	-03	83
42. useful-useless	42	- 70	18	25	03	-12	77
43. sharp-dull	52	-54	17	18	00	-19	66
44. confident-unsure	80	-28	16	-18	-09	-12	79
45. tender-tough	28	-10	-05	-67	39	-14	71
46. optimistic-pessimistic	74	- 39	22	60	00	-17	78
47. predictable-unpredictable	90	-11	05	03	-47	-04	60
48. comfortable-uncomfortable	43	-49	15	-36	-22	-28	70
49. positive-negative	32	-70	13	-08	-19	-16	67
50. desirable-undesirable	30	-69	28	-07	-06	-32	76
Per cent of total variance	21.48	19.86	11.54	5.94	4.66	4.52	68.00
Per cent of common variance	31.59	29.21	16.97	8.74	6.85	6.65	100.00
Each number in the hody of the t	able is a r	orrelatio	n cneffic	ient ind	li catino 1	the corre	lation of

each scale to each factor. These coefficients should be preceded by a decimal point.

APPENDIX B

TEST INSTRUMENT UTILIZED TO MEASURE SELF-CONCEPT

TEST INSTRUCTIONS (Please read carefully)

- 1. Remove the paper clip at the top of this page and separate this instruction sheet from the test booklet.
- 2. Notice that there is a sentence near the top of every page of the test booklet. For example, the sentence on the first page is: How do I feel about: MYSELF. There are nine pages in the test booklet, each with a slightly different sentence.
- 3. Notice that <u>below</u> the sentence on each page there are several scales (pairs of words that are opposites) with seven blank spaces between the two words at the ends of each scale.
- 4. You are to rate on every scale how you feel about the word or phrase in CAPITAL letters at the top of each page. In other words, you should rate how you feel about MYSELF on the first page, and how you feel about FRIENDS on the second page, and so on.
- 5. Here is how you are to use the rating scales:

EXAMPLE

Let us take for our example the first page of the test booklet. You are asked to rate how you feel about: MYSELF. If on the first scale you feel <u>extremely</u> superior or <u>extremely</u> inferior you should place your check-mark as follows:

superior X : ____: ___: ___: ___inferior
superior ___: ___: ___: ___: X_inferior

If you feel <u>quite</u> superior or <u>quite</u> inferior you place your checkmark as follows:

superior : X : : : : : : : inferior
or
superior : : : : : : : X : inferior

If you feel <u>slightly</u> superior or <u>slightly</u> inferior, place your checkmark as follows:

superior___:__:X:__:__:__:__inferior
superior__:__:_:X:__:__inferior

If you feel yourself to be <u>neutral</u> on the scale, that is, neither superior nor inferior but right in the middle, then place your check-mark as follows:

superior___:__:X:___:__inferior

In this way you decide in which blank space on the first scale you should put your check-mark. Then move down to the second scale and place a check-mark in one of the blanks by deciding whether you feel you are <u>extremely</u> interesting or <u>extremely</u> boring, or <u>quite</u> interesting or <u>quite</u> boring, etc. Then complete the rest of the scales on the first page in this manner.

- 6. After completing the first page turn to the second page and rate--How do I feel about: FRIENDS--in the same way, be deciding in which blank space your check-mark should go for each of the scales.
- 7. Complete the remaining pages of the test booklet by following the same procedure.
- IMPORTANT: (1) Remember. You are rating how you feel about the word or phrase that appears in CAPITAL letters at the top of the page.
 - (2) Be sure you check every scale for every page-- do not omit any. If you do not have a hearing aid, rate how you would feel on the sixth page.
 - (3) Place your check-mark in the middle of spaces, not on the boundaries.
 - (4) Never put more than one check-mark on a single scale.
 - (5) Do not worry or puzzle over individual items. It is your first impressions, or "feelings", that we want.



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How do I feel about: MYSELF

superior : : : : : : : inferior interesting__:__:__:__:___:___boring disliked :__:__:__:__:__liked severe__:__:__:__:__lenient false__:__:__:__:__true useless__:__:__:__:__useful immoral__:__:__:__:__:__moral artificial :__:__:__:__:__sincere easy__:__:__:__:__hard worthless__:__:__:__:__valuable tough__:__:__:__:__:__tender success :__:__:__:__failure tense__:__:__:__:__relaxed cruel__:__:__:__:__i__kind lighthearted : : : : : : : depressed happy__:__:__:__:__sad





How do I feel about: FRIENDS hard :__:_ :__:__:__easy interesting_:_:_:_:_:_boring weak__:__:__:__:__strong useful__:__:__:__:__useless clear :__:__:__:__:__confused lenient__:__:__:__:__severe afraid__:__:__:__:__unafraid unsociable : : : : : : : sociable true__:__:__:__:__:__false immoral__:__:__:__:__;__moral undesirable__:__:__:__:__desirable unsure : : : : : : confident failure : : : : : : success valuable : : : : : : : : worthless tender__:__:__:__:__:__tough sincere : : : : : : artificial cruel__:__:__:__:__:__kind



easy___:__:__:__:__hard moral__:__:__:__:__immoral tender : : : : : : : : tough lenient__:__:__:__:__severe unpopular___:__:__:__:__popular mild__:__:__:__:__intense liked__:__:__:__:___:___disliked sociable :__:_:_:__:__unsociable boring___:__:__:__:__interesting emotional :__:_:_:__:__unemotional clever__:__:__:__:__:__stupid useless___:__:__:__:__useful calm__:__:__:__:__excitable true__:__:__:__:__false worthless :__:__:__:__valuable success_:_:_:_:__:__failure sincere : __: __: __: ___: ___artificial

How do I feel about: MY HAPPIEST SELF

How do (or would) I feel about:

MYSELF WITH A HEARING LOSS







How do I feel about: STRANGERS valuable__:__:__:__:__worthless tough__:__:__:__:__:__tender success :__:__:__:__:__failure lenient_:_:_:_:_:_severe slow__:__:__:__:__:___;__quick true__:__:__:__:__:__false moral__:__:__:__:__immoral useful__:__:__:__:__useless strange__:__:__:__:__natural dull__:__:__:__:__sharp interesting_:_:_:_:_:_boring easy__:__:__:__:__hard sincere : : : : : : artificial uncomfortable__:__:__:__:__comfortable weak_:_:_:_:_:_strong





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How do (or would) I feel about:

MYSELF WITH A HEARING AID

sick_:_:_:_:_:_:_:_severe
sharp_:_:_:_:_:_:_:_dull
inferior_:_:_:_:_:_:_:_superior
artificial_:_:_::_:_:_:_sincere
tough_:_:_:_:_:_:_:_tender
relaxed_:_:_:_:_:_:_:_tense
unfair_:_:_:_:_:_:_tense
unfair_:_:_:_:_:_:_:_fair
success_:_::_:_:_:_:_tense
useless_:_::_:_:_:_:_true
useless_:_::_:_:_:_:_:_useful
moral_:_:_:_:_:_:_:_immoral
easy_:_:_:_:_:_:_:_hard
worthless_:_::_:_:_:_:_:__valuable
uncomfortable_:_:_:_:_:_:_:_:_:_comfortable

moral	i	_:_	_:_	_:_	_:_	immoral	
severe_	:	:	_:_	:	:	_:lenient	
uncomfortable	;	_:	_:_		_:	_:comfortable	
failure_	;	_:	;	_;_	_:_	:success	
sincere_	:_	_:	_:_	_:_	_:_	_:artificial	
worthless_	:_	_:	_:_	_:_	_:	_:valuable	
useful_	:_	:	_;_	_:_	_:_	_:useless	
unfair_	_:_	_:	_:_	_:_	_:_	_:fair	
humorous_	:	_:	_:_	_:	_:_	_:serious	
good_	:_	:	_:_	_:_	_:	_:bad	
pessimistic_	;	_:_	_:_	_:_	_:_	_:optimistic	
easy_	:	:	_:_	_:_	_:_	_:hard	
tender_	_:_	_:_	_:_	_:_	_:_	_:tough	
true_	_:_	_:_	_:	_:	_:_	_:false	
superior_	_:_	_:_	:	:	_:_	_:inferior	

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How do I feel about: MYSELF IN THE FUTURE





How do I feel about: PEOPLE OF AUTHORITY
failure_:_:_:_:_:_:_success
relaxed_:_:_:_:_:_:_:_tense
hard_:_:_:_:_:_:_:_sincere
tender_:_:_:_:_:_:_:_sincere
tender_::_:_:_:_:_:_tough
disliked_:_:_:_:_:_:_:_tough
disliked_:_:_:_:_:_:_:_.tough
useless:_:_:_:_:_:_:_:_useful
lenient_:_:_:_:_:_:_:_useful
lenient_:_:_:_:_:_:_:_severe
true_:_:_:_:_:_:_:_talse
valuable_:_:_:_:_:_:_:_.worthless
undesirable_:_:_:_:_:_:_:_.worthless

How do I feel about: MYSELF AND FAILURE

smal1_		_:_	_:_	_:_	_:_		_large
useless_	_:	_:_	:	_:_	;	_:_	useful
hard_		-:-	:_	_:_	;	_:_	easy
sincere_		_:_	_:_	:	:	_:_	_artificial
valuable_		_:_	:	_;_	_:_	_:_	worthless
success_	;	_:_	:_	_:_	:	_:_	failure
positive_		_:_	!	_:_	_:_	_:_	negative
immoral_	_:	_:_	_:	_:_	_:_	_:_	_moral
tender_	_:	_:_	-:-	:	_:	_:_	_tough
unsure_	_:_	_:_	_:	_:_	_:_	_:	_confident
insecure_		_:_	_:_	_;_		_;_	_secure
severe_		_;_	:	_:	_:	_:_	_lenient
good_	_:_	_:_	_:	_:_	_:	_:_	_bad
false_	:	_:_	:	_:_	_:_	_;_	_true
tense_	:	_:_	:	_:_	_:_	_:_	_relaxed





APPENDIX C

COVER LETTERS UTILIZED TO ACQUAINT

SUBJECTS WITH THE PURPOSE OF

THE STUDY



MICHIGAN STATE UNIVERSITY EAST LANSING

Cover Letter #1

COLLEGE OF COMMUNICATION ARTS . DEPARTMENT OF SPEECH

The Speech and Hearing Clinic of this University, the Hearing and Speech Center of the Rehabilitation Medical Center at Sparrow Hospital, as you may know, provide hearing tests, hearing evaluations, lipreading, and counselling services to hard-of-hearing persons. But in addition to these services, the staff of these clnics is constantly engaged in research to increase our knowledge of the nature, causes, treatment, and possible effects of hearing loss.

At present, we are interested in studying the effects, if any, of hearing loss on adults such as yourself. We are particularly interested in how some of your attitudes change as a result of experiencing difficulty in hearing and understanding what people say to you. We are well aware of some of the problems you face. For example: conversation is more difficult; you sometimes misunderstand what others say to you; sometimes you would rather stay away from group situations because you find that listening is more difficult, and so on. We are interested in finding out what effect the hearing loss and the problems mentioned above have on the way we think about ourselves, our friends, the future, etc. We feel that this information will enable us to gain a better understanding of hearing loss and will allow us to improve our services considerably.

In order to do this we have prepared the attitude scale enclosed with this letter. We hope you will find our purpose worthy enough to take part by sharing your feelings with us so that your contribution can benefit other hard-of-hearing people.

We assure you that our interest in this matter is wholly scientific. We do no represent any commercial concern and the purpose of this study is in no way related to advertising or sale of hearing aids, and there are no fees involved.

After reading these statements about our intentions we hope you will take the few minutes required to complete the test. You will note that there are nine pages in the test plus one page of instructions. When you feel you understand what you are to do then proceed with the test itself. Upon completing the test (complete every page even if you do not wear a hearing aid) place it in the envelope and seal it. Do not put your name on the test.

In addition, would you please complete the information sheet clipped to the test and return it with the test. This information will make the results more meaningful.

If you have any questions about the test or the purpose of the study, please feel free to contact us. Thank you for your cooperation.

Sincerely,

Edward J. Hardick Research Fellow



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MICHIGAN STATE UNIVERSITY EAST LANSING

Cover Letter #2

COLLEGE OF COMMUNICATION ARTS . DEPARTMENT OF SPEECH

The Speech and Hearing Clinic of this University and the Hearing and Speech Center of the Rehabilitation Medical Center at Sparrow Hospital, as you may know, provide hearing tests, hearing aid evaluations, lipreading, and counselling services to hard-of-hearing persons. But in addition to these services, the staff of these clinics is constantly engaged in research to increase our knowledge of the nature, causes, treatment, and possible effects of hearing loss.

At present, we are interested in studying the effects, if any, of hearing loss on adults. We are particularly interested in how some attitudes change as a result of experiencing difficulty in hearing and understanding what people say. We are interested in finding out what effect hearing loss has on the way the hard-of-hearing think about themselves, their friends, the future, etc. We have obtained much information from hardof-hearing adults through their completion of the enclosed booklet, and are now in the process of collecting the same kind of information from normal hearing adults like yourself. By having both normal hearing adults and hearing handicapped adults complete the enclosed booklet we will be able to compare the two groups in certain respects. It is anticipated that this comparison will add much to our understanding of the effects of hearing loss and aid in building programs and services of great benefit to the hard-of-hearing in our community.

You and many other normal hearing people are being asked to help us in this matter. We hope you will find our purpose worthy enough to take part by sharing your feelings with us so that your contribution can benefit hard-of-hearing people.

We assure you that our interest in this matter is wholly scientific. We do not represent any commercial concern and the purpose of this study is in no way related to advertising or sale of hearing aids, and there are no fees involved.

After reading these statements about our intentions we hope you will take the few minutes required to complete the test. You will note that there are nine pages in the test plus one page of instructions. When you feel you understand what you are to do then proceed with the test itself. Upon completing the test (complete every page) place it in the envelope and seal it. Do not put your name on the test.

If you have any questions about the test or the purpose of the study, please feel free to contact us. Thank you for your cooperation.

Sincerely,

Edward J. Hardick Research Fellow

MICHIGAN STATE UNIVERSITY EAST LANSING

Cover Letter #3

COLLEGE OF COMMUNICATION ARTS . DEPARTMENT OF SPEECH

There are two reasons for sending this letter to you. The first is to thank you for cooperating with us in this research that we trust will add to our knowledge of the many problems the hard of hearing face. It may seem impossible to you that much useful information could be obtained from the test you took. Yet a surprising amount of information was contained in your responses.

This brings us to the second reason for this letter. It is necessary for us, in constructing a test, to find out whether the information we obtained is reliable information. In other words, we have to know to what extent we may rely on the answers as being your "true" feelings. In order to do this it is necessary to take the test twice so that comparisons can be made.

The thought may occur to you that we do not seem to trust the answers you gave the first time. I assure you that we are certain that you have attempted to give your "true" feelings. However, it would be difficult for you to respond to the test in <u>exactly</u> the same way the second time you take it as the first time. In other words, some of your X's will be in different spaces the second time compared with the first. This is bound to happen, but we must know <u>exactly</u> to what extent this occurs. This information then determines how reliable the responses are.

Therefore we are asking for your cooperation for the last time. We would like you to take the test again following the same procedure as the first time you responded, and return the test to us. Do not try to remember how you marked the scales before----just put your X's where you think they belong, as though you were doing it for the first time.

If you have any questions or comments do not hesitate to include them in the return envelope.

Sincerely,

Edward J. Hardick Research Fellow

APPENDIX D

PROBABILITY OF OBTAINING GIVEN DEVIATIONS FROM TEST TO RETEST

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	Fac	tor I	Facto	r II	Factor	ш
bsolute eviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation
0.0	.313	1.000	.344	1.000	.125	1.000
0.3	.281	.687	.219	.656	.063	.875
0.4	.031	.406	.063	.437	.188	.812
0.6	.031	.375	000.	.374	.094	.624
0.7	.156	.344	.094	.374	.156	.530
1.0	.094	.188	. 125	.280	.125	.374
1.3	000.	.094	000.	. 155	.031	.249
1.4	000.	.094	000.	.155	000.	.218
1.6	000.	* 00.	000.	.155	.031	.218
1.7	.094	.094	.063	.155	.063	.187
2.0	000.	.094	.031	.092	.063	.124
2.3			000.	190.	000.	.061
2.7			000.	.061	.031	.061
3.3			.031	.061	000.	.030
4.0			.031	.030*	000.	.030
4.4			000.	000.	.031	.030*
					000.	000.

	Έ 4	actor I	Factor	II	Facto	r III
Absolute Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation
0.0	.188	1.000	.250	1.000	.250	1.000
0.3	.188	.812	.094	.750	.188	.750
0.4	.063	.624	.125	.656	.188	.562
0.6	.000	.561	.031	.531	.063	.374
0.7	.250	.561	.094	.500	.125	.311
1.0	.156	.311	.188	.406	.031	.186
1.3	.031	.155	.063	.218	000.	.155
1.4	000.	.124	.063	. 155	000.	.155
1.6	.031	.124	.000	.092	.031	.155
1.7	.063	.093	.031	.092	000.	.124
2.0	.031	.030	.063	.061*	.094	.124
2.3	000.		000.	000.	000.	.030
2.4					.031	.030*

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III	Probability of Equal or Greater Deviation	1.000	.906	.687	.593	.530	.280	.092	.061	.061	.061	.061	.030	.030	.030
Factor	Per Cent of Responses	.094.	.219	.094	.063	.250	.188	.031	000.	.000	000.	.031	000.	000.	.031*
or II	Probability of Equal or Greater Deviation	1.000	.594	.375	.312	.312	.281	.156	.093	.093	.093	.062	.031	000.	000.
Fact	Per Cent of Responses	.406	.219	.063	.000	.031	.125	.063	.000	.000	.031	.031	.031	.000	.000
ctor I	Probability of Equal or Greater Deviation	1.000	.719	.594	.531	.500	.281	.125	.094	.094	.094	.063	.032	.032	.000
E E	Per Cent of Responses	.281	.125	.063	.031	.219	.156	.031	.000	.000	.031	.031	.000	.031*	000.
	Absolute Deviation	0.0	0.3	0.4	0.6	0.7	1.0	1.3	1.4	1.6	1.7	2.0	2.3	2.7	4.0

CONCEPT 3--MY HAPPIEST SELF

*The impreciseness noted is due to accumulated rounding error.



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CONCEPT 4-

	F	actor I	Facto	r II	Factor	III
Absolute Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per_Cent of Responses	Probability of Equal or Greater Deviation
0.0	.125	1.000	.281	1.000	. 125	1.000
0.3	.188	.875	.094	.719	.281	.875
0.4	.063	.687	.094	.625	.031	.594
0.6	.063	.624	.031	.531	000.	.563
0.7	.188	.561	. 188	.500	.094	.563
1.0	.250	.373	.063	.312	.219	. 469
1.3	.031	.123	.031	.249	.094	.250
1.4	.000	.092	.031	.218	.031	.156
1.6	.000	.092	.031	. 187	.031	. 125
1.7	.063	.092	.063	. 156	.063	.094
2.0	.000	.029	.063	.093	.031	.031
2.3	.031*	.029	.031*	.030	000.	.000
	.000	.000	.000	.000		

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	Facto	r I	Facto	r II	Facto	r III
solute	Fer Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation
0.0	.313	1.000	.313	1.000	.094	1.000
0.3	.188	.687	.094	.687	.219	.906
0.4	.063	. 499	000.	.593	.188	.687
0.6	.000	.436	.000	.593	.063	. 499
0.7	.094	.436	.156	. 593	.125	.436
1.0	.094	. 342	.125	.437	.125	.311
1.3	. 125	.248	.125	.312	.031	.186
1.4	.000	.123	.031	.187	000.	. 155
1.6	.031	.123	.000	.156	000.	.155
1.7	000.	.092	.063	. 156	.094	.155
2.0	.063	.092	.031	.093	.031	.061
2.3	000.	.029	*063*	.062	000.	.030
2.7	.031*	.029	000.	000.	000.	.030
3.0	000.	.000	000.		.031*	.030
					000	000

CONCEPT 5--STRANGERS



	Fact	tor I	Facto	or II	Factor	r III
Absolute Jeviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation
0.0	.323	1.000	.290	1.000	.161	1.000
0.3	.161	.677	260.	.710	.161	.837
0.4	.032	.516	.065	.613	.032	.678
0.6	000.	.484	.000	.548	.065	.646
0.7	.129	.484	.258	.548	.226	.581
1.0	.032	.355	.161	.290	.129	.355
1.3	.065	.323	.032	.129	.065	.226
1.4	.065	.258	.032	760.	000.	.161
1.6	.000	. 193	.032	.065	.032	.161
1.7	.065	. 193	.032	.033*	000.	.129
2.0	.065	. 128	000.	000.	000.	.129
2.3	.032	.063			.065	. 129
2.6	000.	.031			.032	.064
3.0	000.	.031			.032	.032
3.3	.032	.031*			000.	000.
	.000	000.				





	Facto	r I	Facto	r II	Fact	or III
olute Lation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation	Per Cent of Responses	Probability of Equal or Greater Deviation
0.0	.167	1.000	. 333	1.000	. 133	1.000
0.3	.300	. 833	.033	.667	.200	.867
0.4	.033	.533	.033	459.	.100	.667
0.6	.000	.500	.033	.601	000.	.567
0.7	.267	.500	.167	.568	.100	.567
1.0	.033	.233	.200	.401	.100	.467
1.3	.033	.200	.000	.201	.067	.367
1.4	.000	、167	.000	.201	000.	.300
1.6	.033	.167	.000	.201	.067	.300
1.7	.067	.134	.100	.201	.133	.233
2.0	.033	.067	.033	.101	000.	.100
2.3	.033	.034	.033	.068	.033	.100
2.4	000.	000.	.033	.035*	000.	.067
2.7				.000	.067	.067
					000.	.000

CONCEPT 7--MYSELF IN THE FUTURE

*The impreciseness noted is due to accumulated rounding error.





CONCEPT 8--PEOPLE OF AUTHORITY

III	Probability of Equal or Greater Deviation	1,000 .687 .687 .687 .687 .687 .439 .436 .124 .124 .124 .033 .033 .033 .033 .033
Factor	Per Cent of Responses	.313 .125 .063 .063 .031 .031 .031 .031 .031 .031 .031 .03
п	Probability of Equal or Greater Deviation	1.000 .812 .562 .531 .531 .531 .531 .531 .437 .437 .437 .437 .437 .437 .437 .030 .032
Factor	Per Cent of Responses	. 188 . 250 . 250 . 004 . 005 . 031 . 031 . 031 . 031 . 031 . 031 . 031
I	Probability of Equal or Greater Deviation	1.000 .875 .875 .562 .562 .562 .406 .124 .124 .124 .124 .033 .033
Factor	Per Cent of Responses	.125 .250 .063 .063 .063 .063 .000 .000 .001 .001 .001
	lbsolute Seviation	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 00 0

*The impreciseness noted is due to accumulated rounding error.

Factor I Factor II Factor III	ProbabilityProbabilityProbabilityintof Equal orPer Centof Equal orGreaterofGreaterofGreaterisesDeviationResponsesDeviation	1.000 .200 1.000 .135 1.000 .833 .200 .800 .167 .867 .766 .033 .567 .067 .700 .766 .033 .567 .033 .606 .766 .033 .567 .033 .603 .766 .033 .567 .033 .603 .756 .033 .567 .033 .603 .756 .033 .567 .033 .603 .433 .167 .367 .133 .600 .233 .033 .200 .033 .267 .133 .000 .167 .033 .267 .133 .000 .167 .033 .267 .100 .033 .167 .000 .234 .067 .003 .033 .234 .067 .067 .000 .067 .013 .234 .067 .000 .000 .067 .013 .067 .000 .000 .067 .067
Factor I	Probability Per Cent of Equal or of Greater Responses Deviation	.167 1.000 .067 .833 .000 .766 .100 .766 .233 .666 .233 .666 .233 .133 .033 .133 .033 .133 .033 .067 .000 .067 .067 .000 .067 .067 .000 .067
	Absolute Deviation	0.0 0.4 0.7 0.7 1.1 1.0 0.6 0.7 0.6 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7

CONCEPT 9--MYSELF AND FAILURE



APPENDIX E

EQUIVALENT FORMS RELIABILITY

		Factor I			Factor II			Factor III		
Concept	Forms*	Mean	SD**	r	Mean	SD**	r	Mean	SD**	r
1	ж У	2.53 3.31	1.59 1.48	.76	1.85 1.57	1.10 1.03	.50	2.67 3.37	1.38 1.53	. 44
2	x y	2.38 2.55	1.37 1.30	.77	2.10 1.93	1.26 1.14	.58	2.55 3.06	1.35 1.42	.70
3	х У	2.38 2.71	1.37 1.28	.76	1.91 1.69	1.17 0.97	.57	2.06 2.39	1.25 1.40	.70
4	x y	3.37 3.41	1.73 1.61	.86	2.17 2.17	1.28 1.33	.79	3.14 3.22	1.60 1.63	.79
5	x y	3.15 3.49	1.53 1.37	. 82	2.86 2.51	1.32 1.35	.79	3.59 3.60	1.50 1.41	.69
6	x y	2.72 3.18	1.44 1.35	.90	2.46 2.16	1.51 1.41	. 82	3.00 3.27	1.49 1.55	.78
7	x y	2.71 3.19	1.45 1.44	.84	2.11 1.93	1.28 1.20	. 82	2.92 3.28	1.48 1.53	.75
8	x y	2.65 3.15	1.24 1.28	.58	2.64 2.35	1.38 1.24	.78	3.47 3.60	1.35 1.48	.57
9	x y	3.52 3.54	1.76 1.62	.87	2.82 2.23	1.68 1.30	.67	3.51 3.91	1.66 1.57	.84

(Coefficients Corrected for Length)

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*See Table 17, Chapter III.

****SD means standard deviation.**

SPLIT-HALF (EQUIVALENT FORMS) RELIABILITY COEFFICIENTS FOR EACH FACTOR OF EACH CONCEPT DERIVED FROM THE RATINGS OF THE HARD-OF-HEARING SUBJECTS



SPLIT-HALF (EQUIVALENT FORMS) RELIABILITY COEFFICIENTS FOR EACH FACTOR OF EACH CONCEPT DERIVED FROM THE RATINGS OF THE NORMAL HEARING CONTROL SUBJECTS

		Fac	tor I	F	actor II	Fa	Factor III		
Concept	Forms*	Mean	SD** r	Mean	SD** r	Mean	SD** r		
1	ж У	2.11 2.69	1.21 1.37 .79	2.02 1.59	1.05 0.81 .49	3.13 3.61	1.60 1.85 .76		
2	x y	2.43 2.54	1.35 1.08 .57	2.11 1.78	1.27 .57 0.79 .57	2.67	1.27 .81 1.46		
3	x y	2.06 2.19	1.09 .50 1.07	1.83 1.47	1.01 .81 0.69 .81	2.28	1.32 1.33 .74		
4	x y	2.91 3.17	1.59 .80 1.29	2.13 1.74	1.12 1.10 .70	3.04 3.20	1.64 .84 1.51 .84		
5	x y	2.94 3.18	1.23 1.01 .70	2.91 2.35	1.14 .73 1.17 .73	3.33 3.20	1.13 1.36 .63		
6	x y	2.65 3.17	1.26 1.21 .88	2.41 1.76	1.37 1.02	3.20 2.98	1.31 1.39 .79		
7	х У	2.04 2.48	0.95 1.02 .72	1.93 1.56	0.87 .63 0.82	2.52	1.30 1.29 .80		
8	ж У	2.04	0.89 1.14 .70	2.35	1.14 .79 0.96	3.54 3.67	1.53 .81 1.70		
9	х У	3.39 3.65	1.59 1.52 .84	3.07 1.80	1.56 .52 1.08	3.54 3.67	1.69 .84 1.78 .84		

(Coefficients Corrected for Length)

*See Table 17, Chapter III.

****SD means standard deviation.**





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