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SCALES AND PROCEDURES FOR ASSESSING SOCIAL-PSYCHOLOGICAL CHARACTERISTICS OF VISUALLY IMPAIRED AND HEARING IMPAIRED STUDENTS.

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DESCRIPTORS- *EXCEPTIONAL CHILD RESEARCH, *VISUALLY HANDICAPPED, *AURALLY HANDICAPPED, *TESTS, ADOLESCENTS, BLIND, DEAF, GROUP TESTS, HARD OF HEARING, LEARNING THEORIES, PARTIALLY SIGHTED, PSYCHOLOGICAL CHARACTERISTICS, PSYCHOLOGICAL TESTS, QUESTIONNAIRES, SELF CONCEPT, SOCIAL CHARACTERISTICS, TEST CONSTRUCTION, TEST RELIABILITY, TEST VALIDITY, SELF CONCEPT AND ACADEMIC ABILITY SCALE,

THIS IS A METHODOLOGICAL STUDY TO DETERMINE IF RELIABLE AND VALIDLY COMPARABLE DATA CAN BE OBTAINED FROM SCALES DESIGNED FOR USE WITH HEARING IMPAIRED, VISUALLY IMPAIRED, AND NON-IMPAIRED HIGH SCHOOL STUDENTS. THE MAJOR INSTRUMENTS ASSESSED SELF CONCEPT OF ACADEMIC ABILITY. IT WAS CONCLUDED ON THE BASIS OF CROSS-VALIDATION AND OTHER ANALYTICAL PROCEDURES THAT RELIABLE AND VALIDLY COMPARABLE DATA CAN BE OBTAINED IN MASS TESTING WHEN CERTAIN METHODOLOGICAL PROCEDURES ARE FOLLOWED. A SUBPHASE OF THE STUDY INCLUDED A COMPARATIVE ANALYSIS OF IMPAIRED RESIDENTIAL AND NON-IMPAIRED PUBLIC HIGH SCHOOL STUDENTS. IT WAS CONCLUDED THAT (1) SELF CONCEPT OF ABILITY ACCOUNTS FOR MORE VARIATION IN GRADE POINT AVERAGE THAN IQ, (2) SELF CONCEPT IS AN INTERVENING VARIABLE BETWEEN ACHIEVEMENT AND PERCPETIONS OF OTHERS, (3) TEACHERS' EVALUATIONS HAVE A GREATER IMPACT ON SELF CONCEPT OF STUDENTS WHO ARE IMPAIRED AND IN RESIDENTIAL SCHOOLS THAN ON NON-IMPAIRED STUDENTS IN PUBLIC SCHOOLS, (4) PARENTS OF HEARING IMPAIRED RESIDENTIAL STUDENTS ARE PERCEIVED AS BEING LESS CONCERNED ABOUT HOW WELL THEY DO IN SCHOOL WHEN COMPARED TO PARENTS OF VISUALLY IMPAIRED AND NON-IMPAIRED STUDENTS, AND (5) THE HEARING IMPAIRED CAME FROM FAMILIES WITH LOWER SOCIOECONOMIC STATUS LEVELS. RECOMMENDATIONS ARE GIVEN FOR DEVELOPING SCALES AND ADMINISTRATIVE PROCEDURES FOR OBTAINING RELIABLE AND COMPARABLE SOCIAL-PSYCHOLOGICAL DATA THROUGH QUESTIONNAIRES AND FOR EXTENDING SOCIAL-PSYCHOLOGICAL RESEARCH INVOLVING HEARING IMPAIRED, VISUALLY IMPAIRED, AND NON-IMPAIRED POPULATIONS. APPENDIXES INCLUDE QUESTIONNAIRE SCHEDULES, SCHOOL RECORDS DATA, AND ADDITIONAL TABLES. FORTY REFERENCES ARE GIVEN. (AUTHOR)

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Scales and Procedures for Assessing Social-Psychological Characteristics of Visually Impaired and Hearing Impaired Students

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SCALES AND PROCEDURES FOR ASSESSING SOCIAL PSYCHOLOGICAL CHARACTERISTICS OF VISUALLY IMPAIRED AND HEARING IMPAIRED STUDENTS

Project No. 6-8720
Contract No. OEG 3-6-068720

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Scales and Procedures for Assessing Social-Psychological Characteristics of Visually Impaired and Hearing Impaired Students

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

Educators and social scientists have spent a considerable amount of time and energy comparing the characteristics of different student populations. And special educators have been particularly interested in comparing impaired and non-impaired students. Accompanying this interest in drawing comparisons there has developed an awareness that considerations for instrumentation are basic in the collection of data that is to be meaningfully compared, especially when that data is composed of student responses to verbal stimuli. In addition, differing theories and definitions often make difficult the meaningful comparison of the social characteristics or situations of the impaired and the non-impaired.

A recent national conference report, "Research Needs in the Vocational Rehabilitation of the Deaf," (29) recognized the shortcomings of on-going efforts by giving high priority to the development of instruments for measuring social psychological factors. It was agreed that instruments are needed to measure parental and student attitudes, cognitions about self, aspiration levels, vocational interest and plans, and the status of the family. Moreover, members of the conference stressed the need for instruments which would yield comparable data from both impaired and non-impaired populations.

A. PROBLEM

Can social-psychological data be obtained from acoustically impaired and visually impaired students which is comparable to data obtained from non-impaired students? This is the basic problem of this study. It is a problem which is based on the proposition that reliable and valid data from both impaired children and children not known to be impaired are essential for an adequate knowledge of the social-psychological context within which learning and development occurs.

A study of the reliability and validity of instruments designed to permit comparative statements is a prerequisite to a more definitive investigation. And before contrasting the social-psychological characteristics of impaired and non-impaired populations these critical problems must be dealt with.

For example, if we design an instrument to measure a social-psychological construct, the language or concepts included in the item may be incomprehensible to the exceptional child. Error variance may therefore be increased and our ability to reach valid conclusions needlessly hindered.

Conversely, if we redesign an instrument strictly in terms of the limitations of the exceptional child, i.e., tamper with the wording and presentation of items, we have no assurance that this instrument will yield comparable and valid data. Therefore, assessment of the reliability and validity of any instruments is the first stage in comparative research on exceptional children.

In attempting to meet the need for instruments which will yield comparable data for impaired and non-impaired populations, Joiner, Erickson, and Brookover have modified the Self-Concept of Academic Ability Scale (elaborated upon in the theory and methods sections) and other social-psychological instruments for use with hearing impaired and visually impaired high school students. These modified instruments should make it possible to provide a preliminary test of a social-psychological theory of learning with impaired populations and to make more meaningful comparisons between the impaired and the non-impaired.

1. Theoretical Problems*

Since the major variable of this study is "self-concept of academic ability," a few brief statements are in order about what we mean by the phrase, "self-concept of academic ability," hereafter referred to as "SCA."

First, the instrumentation phase of this research concerns only one of several important constructs within our theory. Because we are primarily studying self-concept of academic ability, it might be misunderstood that we think other self-conceptions or other variables are less important. In this research we are attempting to establish a more definitive understanding of that category of symbolic behaviors we define and observe as "...the evaluations one makes of oneself in respect to his ability to achieve in academic tasks as compared to others." (4) One of our basic assumptions is that the self conceptualizing behaviors of individuals about their ability to carry out academic requirements is a functionally limiting variable which operates within broader limits and influences the nature and extent of many students' school achievement.

Second, this should not be interpreted to mean that biological differences--for example, those resulting from neurological impairment or skills levels play no part in academic performance. Organic states, skills and affective conditions provide a framework for learning. Within this framework, learned cognitions of what is appropriate, desirable, and possible for the individual are postulated to influence learning outcomes. Some students, even educable mentally retarded children may so learn that they can't learn, that even the most sophisticated special education programs are unfortunately hindered. Other researchers utilizing the theory and instrumentation presented in this report have found in their research support for this view (36).

*This section is a summary of a more complete statement by the authors in Self-Concept of Academic Ability and School Achievement Volume III(4).

Third, it may be noted that our definition of self-concept of academic ability is a behavioral definition--that we have not stated, nor have we implied that we are measuring a psychological trait or some underlying phenomenological self. We are concerned with one class of self-defining behaviors concerning academic abilities. Furthermore, we are not describing some generalized or global self-concept. We are certain that it is possible for a student to think of himself as handsome, popular, well-liked, a good person and yet as rather ignorant in statistics. We suggest the obvious. If one wishes to account for a person's behavior as a statistics student, then the student's cognition about his ability in statistics is likely to be a more relevant variable than his cognitions about his dancing ability or how well others like him.

Fourth, often the term "self-concept" in the title of a scale or study is the only identifying feature which might lead one to think of the study as a self-concept study. In such cases, were the title absent, it would be reasonably argued that conformity, ambition, adjustment, physical ability, physical appearance, or social virtues were the subject of investigation. Given this, it is not surprising that somewhat more carefully defined and homogeneous variables (such as previous academic achievement, IQ, and SES) yield better research results.

Perhaps the best description of a large part of the self-concept literature we have reviewed is that it is verbally redundant or synonymous but non-replicative. Literally hundreds of studies have been done on self-concept and reported in the educational, sociological and psychological literature. Yet few of these studies can be replicated or compared because of either unclear conceptualization or instrumentation, or both. Confirmation or disconfirmation of others' findings is, therefore, impossible and so it is inaccurate to speak of conflicting results. For example, an examination of the research on whether there are sex differences on self-concept discloses what appear to be contradictory findings. However, a finding of no differences in another study is disconfirmed. Depending on the measure used, girls have been reported to have both higher and lower self-concepts than boys.

Fifth, there is the problem of which self-conceptions are relevant. The use of multifactor instruments which employ items assessing such different behaviors as self-concept of ability in reading and liking for oneself present difficulties. When the subjects' responses to these disparate factors are summed or averaged as an index of a general self-concept this is particularly true. Since most measures of self-concept are multifact, it appears to us that this may be one reason why some researchers have discarded self-concept as a relevant variable in understanding school behavior.

Related to this problem is the notion that a person may hold more than one self-concept of academic ability. In addition, these self-conceptions may vary depending upon to whom the subject is comparing himself at the time of assessment. For example, a blind child may hold

a high self-concept of academic ability when he refers himself to his blind classmates and a low self-concept of academic ability when he refers himself to sighted students. Conceivably, as a person moves from one social situation to another, the others to whom the individual is comparing himself may also change. If one assesses an educable mentally retarded child's self-concept before and after placement in a special education classroom and fails to determine with whom the child is comparing himself, when he responds to the measuring instruments, findings that the child scores higher on the post test may be erroneously concluded to mean that the child has improved in self-concept. It is possible that the child may have lowered in his self-concept of ability as compared to others outside of his special class. At the same time, however, he may have developed a relatively high self-concept of ability with reference to his new classmates.

The point is that the responses of subjects to questions asking them to evaluate themselves may lack comparability for any of these reasons. The comparability of data especially depends upon: (1) whether the items making up the measure of self-concept tap one or several factors; and (2) whether there is some means by which one can determine to whom the subjects are comparing themselves when they make their responses.

B. OBJECTIVES OF STUDY

1. General Objectives

(a) to determine whether reliable and valid self-concept of academic ability data can be obtained from impaired students

(b) to determine whether self-concept data obtained from impaired students permits meaningful comparison with self-concept data from non-impaired students.

(c) to provide a preliminary description of the social psychological situation of the impaired on selected variables.

(d) to examine the utility of a social-psychological theory of learning by testing derived hypotheses.

The implications of the attainment of these objectives are discussed in detail in the final chapter.

2. Methodological Objectives

The basic reliability, validity, and comparability questions asked about the instruments used in this study are:

a. To what extent do responses to the modified instruments correlate with responses to the original instruments when both are administered to the same non-impaired students? With this question we are concentrating on response variance which is believed attributable to variance in method of obtaining measures of the same construct (heteromethod). A second question asks to what extent do the items in each form of the instrument show parallel order in frequency of agreement?

b. How stable over time are the students' responses to the self-concept scale? In this question, we are concerned with whether the instruments are providing indices of information about social-psychological characteristics which are stable enough in students to warrant attention. While stability of responses is often used as a measure of reliability, variation in response may be due to both error in measurement and change in subject. In addition, error variance may also be stable due to response sets of subjects. Hence, stability data is not the appropriate measure of reliability or variance attributable to error in instrumentation.

c. Are the students' response patterns on the major instruments reproducible? This reliability question concerns the homogeneity of the items in the scale and asks whether item response patterns can be predicted from total scores. If they can, it is inferred that the items represent a homogeneous content universe and the scale is uni-dimensional.

d. Are the students' responses to the instruments useful for predicting behavioral criterions? As a validity question this can be broken down into three parts: (1) Do students' responses correlate with hypothesized dependent variables? and (2) If student responses predict criterion variables, how well do these responses predict as compared with other predictors, e.g., measured intelligence? In other words, do the SCA responses make an additional independent contribution to the prediction of the behavioral criterion? and (3) Are predictions for the impaired as accurate as those for the non-impaired? Rephrased, can we cross-validate predictions between impaired and non-impaired populations? This is perhaps the most powerful mode for the validation of an instrument because it nullifies the impact of ideosyncratic characteristics of a sample which might lead to spurious conclusions about the validity of a measure.

e. What other evidence is there for concluding that the instruments assess what they are purported to measure? This question concerns evidence that what has been conceptualized as the phenomena under investigation was assessed by the instruments. There are several facets to this general question: (1) Do the items have face validity in light of the theory they are designed to test? This is of limited utility for assessing validity; (2) Do the responses of impaired students to the modified instruments relate to other variables in the same way as do the responses of non-impaired students to the original instrument, and (3) Given what we know about the social situations of various impaired and non-impaired populations, can we predict the relative magnitudes of associations between relevant variables?

f. Perhaps a final elaboration of the problems of validity concerns the question: When we ask students to identify characteristics about themselves with reference to others, how do we know that the students are using the same criterion? Perhaps, for example, blind institutionalized students are using a different "ruler" to evaluate themselves than non-impaired students in the regular school. If so, this needs to be considered when making comparisons.

3. Population Study Objectives

As developed in the section on theory, several social-psychological variables are potentially relevant for understanding the behavior of students, both impaired and non-impaired. While the major emphasis of this study is on the development of comparable instruments for assessing self-concept of academic ability with impaired and non-impaired populations, the availability of subjects and prior data made it possible to tentatively describe students in institutions for the blind and deaf and non-impaired students in regular school programs. These students are compared with reference to the following questions:

a. General Significant Others (GSO)

A social-psychology is concerned with the influence that others have upon a person's ideas and actions. It is believed that one condition which is necessary for exerting influence is for the "other" to be important to the one who is being influenced.

(1) Who do the impaired students identify as being important in their lives?

(2) How does this compare with the "others" that are identified by public high school 10th, 11th, and 12th graders who are not impaired?

(3) We are particularly interested in the identification of institutional personnel as significant others. Also, how does absence from the family affect the identification of family members as significant others?

b. Academic Significant Others (ASO)

Another question of importance for developing a social-psychology of learning is "who does the impaired student perceive as caring about his school performance?" This is the converse

of the first question in that we originally asked who is important to the student and now we ask him to identify who he perceives as caring about his own performance in a specific set of activities.

(1) Who do they identify?
(2) How do these compare with non-impaired students?
(3) How do institutional personnel fare? Are a greater proportion of teachers viewed as caring? How about family members?

c. Surveillance

Another consideration in the study of social influences on a particular activity is to what extent is the student's behavior perceived to be held under surveillance by others. Does the impaired student in an institution perceive his parents as being aware of what he does in school?

(1) Does surveillance by parents differ for the deaf and the blind and do both of these impaired populations differ from nonimpaired students?
(2) Does surveillance by friends differ for the deaf and the blind and do both of these impaired populations differ from non-impaired students?

d. Perceived Evaluations of Academic Ability by Others

One of the frequently occurring symbolic behaviors among students is the evaluating of ability. Presumably, students derive their self-conceptions of academic ability from their perceptions of others' evaluation of their academic competence. How do impaired and non-impaired students' perceptions of others' evaluations of them compare?

e. Expectations and Plans for Educational and Occupational Attainment

These questions concern the student's perceptions of how far in school they plan on going and what levels of occupation they plan on entering. Of interest also are the educational levels that their parents, friends and teachers expect them to attain.

(1) Do students in institutions for the deaf and blind differ from one another and from non-impaired children in terms of occupational aspirations, occupational plans, educational aspirations and educational plans?
(2) Do students differ by type of impairment?

C. THEORETICAL AND METHODOLOGICAL BACKGROUND: A REVIEW OF LITERATURE

In Parts One and Two of this section the theoretical relevance of a social-psychological orientation for understanding exceptional children and the basic propositions for this study are discussed. The second part discusses the specific prior research by the authors which led to this study. The third and fourth parts, because this is primarily a methodological study, present a brief review of the literature relevant to reliability and validity.

1. Theoretical Background

Social-psychological perspectives on human behavior have received some exposition in the writings of scholars concerned with exceptional children and special education (9;10;11;13;24;37;38;30;40). Yet there is little evidence of either a significant trend toward social-psychological theory testing of an empirical nature or the development of research procedures and instruments based on any one of several competing social psychologies. Despite the scarcity of empirical studies, it is quite likely that social-psychological theories can be further tested with deviant populations and that the results of theory based research activity will lead to a better understanding of exceptional children (4).

Empirical studies of the social-psychological situation of the hearing impaired which stress self-definitions, perceptions of others, and role analysis are rarely encountered in the literature on hearing or visual impairment. The situation is unfortunate because a few social-psychological theories have been especially useful in suggesting ways for experimentally manipulating behavior. Recognition of the need for experimental research with impaired populations has been late in arriving but now appears in some writings in the field. Meyerson, for example, discusses the type of research which has been conducted in attempting to establish a "psychology of impaired hearing." (24). He argued that although "testing-correlating-comparing strategies" yielding descriptions are fundamental in scientific investigation, an additional question ought to be asked: "Does the study contribute to the specification of the manipulable, environmental conditions under which the behavior investigated occurs, varies in strength or fails to occur. . . A major limitation hindering the further development of empirical documentation for a psychology of impaired hearing is the continued utilization in research of nonmanipulable variables" (24).

It should be noted, in reference to Meyerson's comments, that in the relatively brief history of social-psychology, a rather formidable body of experimental research has accumulated. Most of these studies illustrate various experimental methods which have been devised to influence an individual's behavior (7). Generally the subject's behavior has been influenced or manipulated through the use of planned and controlled social interaction. One important part of Brookover's research, for example determined the effectiveness of three treatment

strategies directed toward "others" in the life of the student in bringing about self-conception and academic behavior changes on the part of students (5).

Another argument for the development of social-psychological studies of hearing and visually impaired populations is based on the fact that these populations are often identifiable by others; they can be readily singled-out. Meyerson has developed a basis for a psychology of physical disability in which "visibility" by others and the evaluations of others are assigned a central position. In partial summary of his somatopsychology he states:

> It is society, far more than condition of the body, which determines what a person will be permitted to do and how he will behave. All cultures place values upon certain aspects of physique, although different aspects of physique may be differentiated as important in different cultures, and different values may be assigned to the same variations. Nevertheless, certain generalizations may be made:
>
> 1. Physique is a social stimulus.
> 2. It arouses expectations for behavior.
> 3. It is one of the criteria for assigning a person to a social role.
> 4. It influences the person's perception of himself both directly through comparison with others and directly through other's expectations of him.
> 5. Comprehension of the kind, extent, and degree of socially imposed handicaps on persons with atypical physiques is basic to an understanding of the somatopsychology of physical disability (26).

On the basis of the above passage, it appears that studies of the person's perception of himself and the evaluations of his capacity and capabilities by others are relevant.

The contention that social-psychological studies should be carried out which deal with the self-other interactions of impaired populations is supported, again, by recent research findings. Evaluations and expectations which are communicated in interaction between the hearing impaired student and others attain special potency because the hearing impaired seem to rely heavily on others for evaluative judgments as well as behavioral decisions (1). A study of the vocational status and adjustment of deaf women concluded with the suggestion that the interaction between parents, child, and school personnel be explored in research (31) By starting at this point the field of "others" is narrowed from what might include all people in the general language community or participants in the common culture to those who repeatedly interact with the subject such as parents, friends, and teachers.

2. Theoretical Propositions*

The major theoretical propositions which have been investigated in the Brookover studies at Michigan State University (4;5;6) and upon which the present research is based are:

1. The self-concept of ability is a "functionally limiting" variable in school performance.

2. Students, including the hearing impaired, develop their self-concept of ability largely through their perceptions of how their "significant others" evaluate their ability.

3. The student must believe that engaging in a task is the appropriate thing to do.

4. Whether or not a given task is viewed as appropriate by the student is dependent upon his "self-identity" in relation to others.

Perceived evaluations of ability mentioned in proposition Number 2 are not considered "prescriptive" (20;23). That is to say if a student perceives that a significant other evaluates him as being capable of performing a task at some set level, it is not always true that this significant other will expect the student to engage in that activity. For instance, a parent might evaluate his child as being able to succeed in college on the basis of his knowledge of the child but might not expect him to attend college because of the financial situation of the family or conflicting interests shown by the child.

Symbolic interaction theory serves as a basis for derivation of the above sub-propositions and also states that a person acts toward himself and others as a consequence of his conceptions of the standpoints of others toward him (22). In order for a person to intentionally act to achieve in a given task he must see the task as appropriate, its appropriateness being determined by his self-identity in relation to others. His self-identity as well as the expectation that he engage in the activity are social emergents or concepts which are established through communicative interaction between the student and others. Yet it is possible that even when an activity is considered appropriate by the student and he is expected to engage in the activity by his parents, he may still not act to achieve. He may have learned that the activity, whether he does it or not, will have little effect upon the social relationships he presently values or aspires to attain. If this is so, the likelihood of his pursuing the activity may be substantially decreased.

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*Revisions of propositions earlier derived by Brookover (3) from the work of George Herbert Mead (22).

Three basic relationships have been explored in previous research with non-impaired children carried out by Brookover, et. al. (4;5;6) These are the relationships of student-peer (friend), student-parent, and student-teacher. The rationale for examining these relationships is drawn from the early work of Ralph Linton(20)and the recent work of Robert K. Merton on "Role Set" (23). Using the deaf as an illustration, the deaf child moves among relationships with his parents, teachers, and friends and in so doing may maintain a common set of role expectancies emerging from his being defined as "deaf." Although at any given moment the deaf student may be physically in proximity with any one of a number of others, he symbolically takes into account other relationships which he has experienced. In this fashion a self-identity as "deaf" or hearing impaired along with the previous evaluations and expectations relating to this condition are carried into new situations.

In examining the parent-student, friend-student , and teacher-student relationships a useful theoretical concept is that of reciprocal role relationships. A relationship is termed a reciprocal role relationship when it is based on a reciprocity of actions; when an individual "... enacts a social role which is defined with reference to another role, as in the relationship between patient and doctor..." (17) or between hearing impaired student and special class teacher. Kelman notes that "...if an individual finds a particular relationship satisfying, he will tend to behave in such a way as to meet the expectations of the other." He behaves in terms of his perception of the demands of that relationship. A hearing impaired student may learn that he is obliged to achieve at a high level in school if he is to maintain his present relationships with others or if he desires to establish a new relationship involving expectations for academic achievement.

In summary, the general social-psychology behind the present study is symbolic interactional. Symbolic interaction theory is concerned with the genesis of "self" and its place in organized human behavior. From this point of view self arises through the internalization of symbolic gestures and involves the individual's perception of the expectations which others hold for his behavior. In this study, self-concept of academic ability represents the individual's view of himself as a student. Reciprocal-role relationships, normative influences, and the idea that performance in a task is in part compliant behavior are all factors in the arisal of self-concepts.

3. Prior Research by Authors

This investigation began with instruments (see Appendix A) standardized with non-impaired students and supported under U.S. Office of Education, Cooperative Research Projects #845, #1636, and #2831.(4;5;6) (The Principal Investigators of this study were associate investigators on the later two projects.) A complete statement of reliability and validity findings associated with these instruments are provided in Final Reports of these projects. For the present study, these instruments were modified by the authors for use with impaired student populations who are: (1) partially-sighted and can read large type; (2) blind

and can read braille; (3) visually-impaired who are unable to read (structured interviews); and (4) hearing-impaired populations who read or understand sign language or finger spelling.

Some of the more important prior findings of Projects #845, #1636, and #2831 were: (1) the academic achievement level for low-achieving students tends to be impeded by low self-concepts of academic ability; (2) the self-concepts of ability of students are dependent upon their definitions of how others, primarily parents, evaluate them; (3) self-concepts of low-achieving students can be enhanced by working with parents with corresponding increases in achievement; (4) similarly, the development of educational and occupational aspirations and plans are dependent upon their definitions of how others, primarily parents, evaluate them; and (5) self-concept of ability and educational and occupational plans and aspirations appear to function independently of socio-economic status, measured intelligence, school climate, preference for achievement, memory of past performance, and past achievement.

The major limitation in each of these studies, however, is the fact that the hypotheses were tested with Caucasian students who were in a regular school program (i.e., not in special education, institutionalized, etc.)

4. Reliability

The question of reliability has traditionally involved determining the extent to which systematic and error variance enter into the scores, obtained upon administration of a measurement (18). The total variance of scores is easily estimated but may be due to several factors. Generally, however, these fall into two categories:

1) Where x_t = an obtained score, x_t may be thought of as a sum of (x), the true score under perfect conditions of measurement, and (x_e), an error component.

$$x_t = x + x_e$$

2) Reliability may also be thought of in variance terms where (v_t), the total variance of scores, equals (v), the sum of true variance and variance due to error of measurement.

$$v_t = v + v_e$$

Where no error of measurement exists, a condition rarely found,

$$v_t = v \text{ and } x_t = x.$$

There are three main types of reliability coefficients presented in Technical Recommendations for Psychological Tests and Diagnostic Technique (33).

In this study we deal with each recommendation, but we are primarily concerned with processes or behavioral events which may be identified as uni-dimensional, homogeneous, or functionally united. In the

observation of behavior, functionally united may mean either that events change concomitantly, that events are dynamically interdependent, or that one event changes dependently with the independent event.

(a) Analysis by Face Value

Note that the original self-concept of academic ability instrument was developed by interviewing students and identifying frequently expressed concerns relating to intellectual "ability" and capacity for schoolwork.

(b) Analysis of Internal Consistency:

One method of obtaining an estimate of internal consistency which has been used with the Perceived Evaluations of Academic Ability Scales is Hoyt's Analysis of Variance (14). The object of this test is to determine whether or not the ratio of error variance to individual variance is small. This method conforms to the definition of reliability given by Kerlinger (18).

(c) Analysis of Internal Consistency: Uni-Dimensionality

Loevinger (21) quotes Cureton as saying that "...The most important requirement for a test whose scores are to be interpreted as measurements would seem to be that its items all draw upon the same sets of abilities or traits." Tests which meet this requirement have been called: unified tests. Not only have different names for tests which meet this requirement been coined, but several analytic devices are also available to determine if they do in fact meet the requirement.

Scale analysis attempts to determine whether items in a scale draw upon the same set of abilities or traits. Several types are available to the researcher: Thurstone (35), Guttman in Stouffer (32), Loevinger (21), and Green in White and Saltz (39). For the purposes of this research, Thurstone's technique is inappropriate since it is used when initially constructing a scale, the selection of items and scaling proceeding simultaneously. Guttman's, Loevinger's and Green's techniques are each appropriate for assessing uni-dimensionality. The use of Green's methods, which are as powerful as Guttman's and Loevinger's may allow for the development of change analysis in later studies and calculation of the standard error of the coefficient (I). Hence, Green's method was used. A recent article by White and Saltz (39) and an earlier one by Loevinger (21) discuss scaling as a method for determining reliability and the relationship between scaling and factor analysis.

(d) Coefficient of Equivalence

The scales developed for use with visually-impaired and hearing-impaired students and scales for non-impaired students were simul-

taneously administered to regular grade students and the coefficient of equivalence calculated. This represents an estimate of the degree to which two attempts to score a person on a test result in a similar ordering of persons. A complete equivalence analysis involves comparison of means, standard deviation, and standard error of the means.

(e) Coefficient of Stability

According to Thorndike and Hagen "...if we have two forms of a test, we may give each pupil first one form and then the other. They may follow each other immediately if we are not interested in stability over time, or may be separated by an interval if we are. The correlation between the two forms will provide an appropriate reliability coefficient." This also applies to the assessment of test - retest "stability of measurement." Here, the correlation between scores from the first and second administration of the scales provides a stability coefficient. (34)

(f) Scale Length

One objective in constructing tests is to obtain the most information with the least questions. Particularly with deviant populations we must attempt to work according to this principle. Among different groups of exceptional children we find attention-span difficulties, distractibility, communication problems and, as with all children, a great potential for just plain boredom with the testing enterprise. With deaf students, the extensive presentation of the scale through signing the content, lip-reading, and directing attention to the written form of the questions serve to slow up the administration of the test. The same can be said of visually-impaired students. A somewhat delicate balance must be maintained between elaborating the content enough to insure understanding and progressing rapidly enough to hold the interest and attention of the students. Although lengthening the scale has been said to be one method of increasing its reliability, it is doubtful that doing so would be the best strategy to use in instrument development with exceptional children.

5. Validity

This study also presents several kinds of evidence on the validity of SCA.

(a) A typical indicant of the integrity of items is their face value. Reading the items leads us to believe that they all tap an underlying common process or behavioral event, e.g., arithmetic achievement, dogmatism, political liberalism, etc. Face value decisions as to the functional unity of items represent the lowest level of scale analysis and have been made in the construction of the scales.

(b) Predictive validity refers to the existence of an association between the hypothesized independent-dependent variables; i.e., how well scale predicts hypothesized independent behaviors such as achievement or occupational plans (8). Both parametric and nonparametric measures of association are appropriate. Cross-validation procedures for determining generalized validity of SCA are discussed in the Procedures Section. (16)

(c) Construct validity of theoretical validity, according to Kerlinger (64), occurs whenever hypothesized relationships logically deduced from a theory are empirically confirmed. And in the present study, hypothesized relationships between perceived expectations of others, educational occupational plans, aspirations, self-concept of ability, school performance are tested. Students who are not known to be impaired should exhibit a higher magnitude of association between perception of parents expectations and development of career and educational plans than institutionalized visually-impaired students. Similarly, visually-impaired students should be more influenced by their perceptions of parents than hearing-impaired students. In contrast, the hearing-impaired should be more influenced by perceptions of teachers' expectations and evaluations, the visually-impaired and, in turn, the non-impaired students. Obviously the validity, as employed here, develops the theoretical rationale for the constructs under investigation. As part of this analysis it is important to determine whether assumed factors are, in fact, separate factors; e.g., that perceived evaluations of others are not the same phenomenon as self-concept.

CHAPTER II

METHOD

A. POPULATIONS AND SAMPLES

Populations include: (1) Longitudinal and cross-sectional categories of non-handicapped public high school students who are living at home; (2) visually-impaired students who are in academic programs and living in state schools for the blind, and (3) hearing-impaired institutionalized students who are in academic programs and living in state schools for the deaf. Random samples of 40 were drawn from each of these populations for most analyses. In some cases total population statistics were used.

1. Public school non-handicapped, living at home (NI) - The longitudinal population includes an entire class of Caucasian students in an urban midwestern city. These students were studied longitudinally from the seventh (1961) through the twelfth grade (1966) and complete school data from the fourth grade on (reading scores, intelligence scores, etc.), and questionnaire data from the seventh grade was available. All students were regularly promoted, and were not part of a special education program or included in experiments designed to enhance self-concepts. (N=562). The cross-sectional population includes students in two midwestern cities, from 5 high schools who met the above criteria. A random sample of this group responded to both the regular instruments and the parallel instruments developed for use with hearing-impaired and visually-impaired populations. Total approximate N=2000.

2. Visually-impaired institutionalized students (VI) - All those who attended (1965-66) the Michigan School for the Blind (MSB) as residential students, were in the high school academic program, and were from 12 to 19 years of age. This population includes those who read braille or large type. Total N=65.

3. Hearing-impaired institutionalized students (HI) - All those who attended (1965-66) the Michigan School for the Deaf and the Indiana School for the Deaf (ISD) as residential students were in the regular academic high school program, grades 8 through 12, and were 12 to 19 years of age. Total N = 105 for MSD, 85 for ISD.

The HI, VI, and NI populations were equivalent on IQ and GPA as determined by analysis of variance (see table 24, chapter IV.) There were significant differences between populations on socio-economic status (SES). However, statistical control for SES in previously reported research by the authors showed that the impact of SES on the major variables under study is minimal and indirect (4).

B. DATA COLLECTION PROCEDURES

1. Phase One, Development of Questionnaires, and Pretesting

In October, 1965, mass testing was conducted with approximately 2,000 12th grade students in a midwestern, urban, public school system. At that time, a random sample of 100 students from 2,000 (50 male, 50 female) was selected to respond to a scale for visually-impaired and for hearing-impaired students as well as the parallel forms upon which they are based. A mass testing of 600 16-year olds was also conducted in another public high school system and again parallel forms for impaired students and non-impaired students was administered and a random sample of 100 was drawn.

In December, 1965, the academic high school students in the Indiana School for the Deaf were given the instruments en masse twice (N=84), one week apart, in order to achieve preliminary information on procedures and instruments. Procedural conclusions were that the instruments must include several sample items for "warm-up," proctors should limit their physical movement, reduce distractions, and testing should proceed from structured to open-ended with only one or two questions placed on a page. A former teacher of the deaf, and doctoral candidate in deaf education, used finger-spelling and signs to administer the questionnaire with teachers from the Indiana School for the Deaf serving as proctors. After each testing, other deaf educators and the investigators of this study who observed and took notes on difficulties encountered during testing compared notes and made recommendations for testing. On this basis and on the basis of analysis of pre-test data procedures were established for final data collection.

2. Phase Two, Data Collection

In September and October, 1966, students in the academic high school programs at the Michigan School for the Deaf and the Michigan School for the Blind were tested twice in large groups, tests separated by 7 days. The subjects were seated in groups of two and three at tables facing a forward podium where the main test administrator stood. Two proctors were provided who were positioned on each side of the room to help students follow directions and interpret or repeat statements and directions given by the main test administrator. The proctors were members of the staff in the schools where the testing was conducted. They were able to communicate with the students with signs and finger spelling in the case of the hearing-impaired, and read braille in the case of the visually-impaired.

Testing began with a brief explanation of what was to take place and who the strangers were. It was emphasized that there were no right or wrong answers to the items and that everyone might have different ideas as to the best answers. These were questions

about how the students saw themselves and others in their life and answers were expected to differ from person to person. Attention was directed to the appropriate page in the questionnaire by flicking the lights and then holding up the questionnaires for the hearing-impaired and by verbal communication with the visually impaired. Color coding of pages was also employed. In the school for the deaf the main test administrator employed simultaneous "saying" and "signing" with the students following the written text if they so desired while in the school for the blind the administrator read aloud each question, the students simultaneously reading their braille or large type questionnaires. It should be noted that these students were inexperienced in the taking of mass psychological tests. Complete testing took approximately one hour for each administration.

On the first testing session, treated as a practice session, the element of newness was present for the subjects. This first testing included only a few items which were prototypes of the questions administered in the following testing sessions.

C. INSTRUMENTATION

In 1965, the senior authors of this study and Wilbur B. Brookover developed with the assistance of Gerry Crittenden, Vivian Stevenson, Bert Rodee and Lulu Alanso, scales for the social-psychological study of the hearing impaired, the visually impaired, and the educable mentally retarded. These scales and questions were alternate forms of the Michigan General Self-Concept of Academic Ability Scale and the other items developed by Brookover and associates under U.S.O.E. Cooperative Research Projects #845, #1636, and #2831 for use with students in junior and senior high in schools who were not known to be accoustically, visually or mentally impaired. (4;5;6)

These original instruments were modified so that they could be given in a group setting using manual signs and printed instructions. Those modified instruments were also transcribed into braille and large type for the visually impaired.

Data was obtained from students on the following variables. See Appendix A for copies of student questionnaire scales and questions. For visually impaired students these questionnaires were transcribed into braille and large type.

1. Variables, Questionnaire Data*

Abbreviation		Variable
a.	SCA	Self-concept of academic ability, original scale used only with NI students.
b.	SCA-D	Self-concept of academic ability, revised edition of SCA for use with VI and HI populations

*Except for socio-economic status the instruments have been developed under U.S. Office of Education, Cooperative Research Projects #845, #1636, & #2831. (See Appendix A)

Abbreviation		Variable
c.	SCA-I	Self-Concept of academic ability asks students to compare self with similarly impaired students.
d.	SCA-NI	Self-concept of academic ability, asks students to compare self with non-impaired students.
e.	PPEv	Perceived Parents' Evaluations of students' academic ability
f.	PFEv	Perceived Friends' evaluations of students' academic ability
g.	PTEv	Perceived teachers' evaluations of students' academic ability
h.	PPAch Pref	Perceived Parents' academic achievement preferences
i.	PFAch Pref	Perceived Friends' academic achievement preferences
j.	PTAch Pref	Perceived teachers' academic achievement preferences
k.	PPEd Exp	Perceptions of how far in school parents expect students to go
l.	PFEd Exp	Perceptions of how far in school friends expect students to go
m.	PTEd Exp	Perceptions of how far in school teachers expect students to go
n.	PP Surv	Perceived Parental surveillance of academic performance
o.	PF Surv	Perceived friends' surveillance of academic performance
p.	PT Surv	Perceived teachers' surveillance of academic performance
q.	Ed Asp	Educational aspirations, level of desires
r.	Ed Plans	Educational plans, level of expectations
s.	Oc Asp	Occupational aspirations, level of desires
t.	Oc Plans	Occupational plans, level of expectations

Abbreviations		Variable
u.	ASO	Academic significant others, those who are concerned about how well student does in school
v.	GSO	General significant others, those who are generally important in the students' lives
w.	SES	Socio-economic status*

2. Variables, School Records

a. Ability - Scores as assessed by the following standard "Intelligence tests": (1) the WISC with hearing impaired (2) the CTMM with non-impaired students, and (3) the Hayes' Binet with visually impaired students.

b. Academic achievement - students' grades in academic subjects were averaged (GPA) These grades were earned subsequent to the collection of other data.

c. Degree of hearing loss or visual impairment**

d. Age of onset of impairment

e. Methods of communication used (e.g., reads braille or large type; uses sign language, etc.)**

f. Achievement level on standardized tests**

3. Major Variables

The major variables and instruments in the study are: (1) the self-concept of academic ability, instruments SCA-D and SCA-I; (2) students' perceptions of the evaluations held for their academic ability by parents, friends, and teachers, instruments PPEv, PFEv, and PTEv; and (3) academic achievement as measured by GPA.

It should be noted that the criterion of achievement is not achievement in academic subjects as measured by standardized achievement tests. Clearly, rules for assigning grades vary from one school to the next and are particularly subject to the standards applied by individual teachers in the social context of their own classrooms. A wide variety of behaviors may be taken into account other than raw academic performance.

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*Coded according to Duncan's Socio-Economic Status Index. See A. Reiss, Jr., et. al. Occupation and Social Status, (Glencoe, Ill.: The Free Press, 1961).

**See Appendix B for a more complete description of assignment of values

And despite our attempts to make grades universally "meaningful" numerous faculty meetings testify to the heterogeneity of grading systems. What is plain, however, is that the assignment of a grade is a social act by the teacher based upon her definition of the student as a student. In this sense grade-point averages serve as a meaningful criterion for a social psychological study of educational behavior. Grades have an added social significance because they form an important part of the student's "record" and are used for a variety of classification and descriptive purposes.

The reliability and validity of the instruments assessing self-concepts of academic ability and perceived evaluations of parents, friends and teachers are presented and discussed in the following chapters. Reliability and validity findings on pre-test data reported by Joiner (15) are also presented in these chapters.

D. ANALYSIS

In most research reports reliability and validity data is presented in this section. Since this is primarily a methodological study of the reliability and validity of social-psychological instruments, procedures for analyzing and the reporting of reliability and validity data along with references are presented and discussed at length in each of the other chapters. Only a few brief statements, outlining the procedures of analysis are necessary here. The following procedures are respectively treated in Chapter IV, Results.

1. The equivalence and stability of measures were assessed by product moment correlations between different forms of a test and between test-retest data. Equivalence on the item ordering of student responses by population category employed the L test. (27)

2. In order to determine comparability the distributions for use with selected parametric procedures, means, standard deviations, and kurtosis and skewness indices were computed. The distributions were thus compared for normalcy.

3. Reproducibility of responses to instruments were assessed by the computation of Green's Rep, Rep and (I). In addition Phi (ϕit) coefficients were calculated for the purpose of item evaluation. (39)

4. The reliabilities for the perceived evaluations of others instruments were determined using Hoyt's Analysis of Variance.(14)

5. The predictive validity of the self-concept of academic ability scales was assessed by correlating predicted and obtained GPA Z's using SCA scores as single predictions and in confirmation in the IQ. (16)

6. Validity generalization was assessed by cross-validating prediction formulas across and within disability categories.

7. Construct validity was assessed by testing hypotheses with impaired children which had previously been confirmed in studies of non-impaired children. Testing with 1st and zero order product moment correlation procedures, these hypotheses are: (a) SCA-D is associated with GPA; (b) perceived evaluations of others is associated with SCA-D; (c) the associations between SCA-D and GPA are greater than the associations between perceived evaluations and GPA; (d) the associations between perceived evaluations and SCA-D are greater than the associations between SCA-D and GPA; and (e) controlling for variations in SCA-D will result in a greater reduction of the associations between perceived evaluations and GPA than will controlling for variation in perceived evaluations in the association between SCA-D and GPA. The last three hypotheses are derived from the proposition that self-concept of ability is an interviewing variable between perceived evaluations of ability and academic performance.

8. Analysis to assess the relevance of determining who the student was comparing himself, his referent, when responding to the scales was made by having the impaired students respond to two modified versions of the SCA-D, the SCA-I and the SCA-NI. The hypothesis tested with both visually impaired and hearing impaired populations was: HR: SCA-I $\geq$ SCA-D $\geq$ SCA-NI. The L test, an analysis of variance test, was used to test the null hypothesis against the ordered hypotheses: $M, \geq M \geq \ldots M$ (27). In addition zero and first order correlation procedures were employed to test the hypotheses that: (a) controlling for variation in SCA-D, the associations between SCA-I and GPA are greater than the associations between SCA-D and GPA when controlling for SCA-I; (b) the associations between SCA-D and SCA-I are greater than the associations between SCA-D and SCA-NI. In addition the magnitudes of the zero and multiple correlations of SCA-D, SCA-I and SCA-NI with perceived evaluations of parents, friends, and teachers, IQ, and GPA are compared. Cross validation procedures were used to examine the validity generalization of SCA-I

9. In order to provide descriptive data about varying social psychological characteristics of the populations under investigation in addition to that obtained in the methodological study the following comparisons were made:

(a) The means, standard deviations, and variances of number of responses were calculated for each category of student population (VI, HI, and NI) for the opened questions asking students to indicate who is important in their lives and who is concerned about their performance in school. One way analysis of variance was used to determine if there were differences in numbers of responses, which if there were, might account for differences in patterns of responses. Each category

of student population was then compared on the proportions who indicated teachers and parents, as ASO or GSO.

(b) The means, standard deviations, and variances were also computed for random samples of each category of student on all of the major variables of this study (See section C 1 above). Parametric one way analysis of variance, Kruskal-Wallis one way analysis of variance, the t test, and the Mann-Whitney U test were used to test differences depending upon the measurement level of the data being compared (28).

It should be noted that the effects of variations in age of onset of impairment and degree of impairment could not be determined in this study. The impaired populations selected for this study showed high proportions of severe impairments. Until the development of instruments in a pilot study, such as this investigation, the greater expenditure of funds for a larger study including more heterogeneous subjects was not warranted.

While this study controlled by population section, for age of onset and degree of impairment it was impossible to study the effects of these variables. Also, since this was a methodological study to develop instruments and because so little variation on method of communication was shown by the HI, no analysis of the effect of this variable was conducted.

CHAPTER III

RESULTS

In order to simplify the description of results, abbreviations for variable names are used throughout this chapter. For definitions and abbreviations see Chapter II, Instrumentation.

A. EQUIVALENCE, STABILITY, AND RELIABILITY: SCA-D

1. If the original SCA and modified SCA-D scales are administered to the same subjects at the same time, how similar are the scores? In order to answer this question, product moment correlations were calculated between the scores (totals) on the two different scales. These subjects were high-school seniors selected at random from three schools in an urban community in Michigan.

TABLE 1

PRODUCT MOMENT CORRELATIONS BETWEEN RESPONSES
OF NON-IMPAIRED HIGH SCHOOL SENIORS TO SCA AND SCA-D SCALES
RANDOM SAMPLES FROM 3 HIGH SCHOOLS

	High School #1 N=22 random sample	High School #2 N=39 random sample	High School #3 N=36 random sample	Combined N=97
r	.51	.84	.81	.75
r^2	.26	.71	.65	.56

2. Does the SCA-D yield normally distributed scores when administered to the hearing-impaired? How does the distribution of scores obtained from the hearing-impaired compare with that obtained from the non-impaired?

TABLE 2

SELF-CONCEPT OF ACADEMIC ABILITY-FORM D
MEANS, STANDARD DEVIATIONS, SKEWNESS, AND KURTOSIS
NON-IMPAIRED AND HEARING-IMPAIRED SUBJECTS

	Non-Impaired N=97 Random Sample	Hearing-Impaired N=85 Total Population
Mean	18.99	18.34
SD	2.96	3.34
Skewness	.08	.08
Kurtosis	-.15	.17

Variances were not significantly different (.05 level) between groups.

For both groups scores are approximately normally distributed; mesokuric, and near zero skewness.

3. Is the ordering of item difficulties according to agreement-disagreement ratios alike for the non-impaired and the impaired?

TABLE 3

ITEM DIFFICULTIES FOR SCA-D
HEARING-IMPAIRED, VISUALLY-IMPAIRED, AND NON-IMPAIRED

Sample	Item Number							
	Hypothesized P/Q Order:Hardest to Easiest							
	7	3	2	1	4	8	6	5
PS	7	3	2	1	4	8	6	5
ISD	4	7	3	2	1	8	6	5
MSD	7	3	2	1	4	8	6	5
MSB	7	1	2	3	4	8	6	5

L Test showed overall agreement of item orderings,
$P < .01$ ISD, MSD, MSB cutting points based on PS data

4. Are the responses of impaired populations to the SCA-D scale stable overtime, and if so, how does the degree of stability shown over a short period (7 days) compare with the stability of responses shown by the NI over a one year period?

TABLE 4

TEST-RETEST CORRELATIONS FOR SCA AND SCA-D

Scales: Impaired and non-impaired

Scale	Group	N	Interval	r Males & Females
SCA-D	ISD	85	6 days	.84
	MSD	105	7 days	.54
	MSB	65	7 days	.88
SCA	PS	562	1 year	.65
	PS	562	1 year	.74
	PS	562	1 year	.72

5. Is the SCA-D a reproducible scale? How does the reproducibility index obtained from impaired student responses compare with the reproducibility index obtained from non-impaired responses?

TABLE 5

REPRODUCIBILITY COEFFICIENTS OF SCA-D
GREEN'S REPIND, REP, (I) FOR HEARING IMPAIRED,
VISUALLY IMPAIRED AND NON-IMPAIRED STUDENTS

Population or Sample	Repind	Rep	(I)*	N
PS Seniors	.879	.941	.512	97
ISD	.846	.915	.448	85
MSD	.745	.888	.560	103
MSB	.880	.942	.517	65

*$I = \frac{Rep = Repind}{1.00 - Repind}$ $I \geq .50$ = criterion for reproducibility

6. Are all individual items homogeneous with the total test?

TABLE 6

PHI (ϕIT) COEFFICIENTS FOR EACH ITEM IN SCA-D SCALE: HEARING IMPAIRED, VISUALLY IMPAIRED, AND NON-IMPAIRED STUDENTS

Population of Sample	1	2	3	4	5	6	7	8
PS	.60	.5,	.77	.76	.76	.62	.56	.70
ISD	.57	.64	.57	.56	.52	.77	.44	.40
MSD	.39	.35	.48	.72	.43	.53	.51	.45
MSB	.62	.74	.62	.74	.76	.63	.63	.56

All ϕit values yield Z deviates, $p < .01$.

7. Reproducibilities, item orders, and cutting points for the reference group self-concept scales SCA-I and SCA-NI

For data on the item orders, cutting points, and reproducibilities for the reference group self-concept scales see Appendix C. In summary, both the SCA-I and SCA-NI yielded (I) values greater than

.50; cutting points were established so as to maximize reproducibility; and item orders varied according to scale and group. (See Chapter IV - Section B)

8. What is the reliability of instruments designed to assess the perceived evaluations of students' academic ability held by parents, friends and teachers, (PPEv, PFEv, and PTEv.)?

TABLE 7

HOYT'S ANALYSIS OF VARIANCE RELIABILITIES FOR PPEV, PTEV, AND PFEV: NON-IMPAIRED AND HEARING-IMPAIRED SUBJECTS

	PPEV	PTEV	PFEV
NI	.79	.84	.81
HI	.68	.81	.78

Hoyt suggests .80 as acceptable level of reliability (14).

B. VALIDITY: SCA-D

In this section, data is presented which bears on the predictive and construct validity of instruments used to assess self-concept of academic ability and student perceptions of the evaluations of their academic ability held by parents, friends and teachers.

1. Predictive Validity: SCA-D

a. Concurrent Correlations: SCA-D

There are several questions concerning the magnitudes of association between SCA-D and GPA. It is especially important to examine the effects of SCA-D against the contribution of IQ.

(1) How do correlations between SCA-D and GPA compare with the correlations between IQ and GPA? (Table 8)

(2) How much variation is shared between SCA and IQ? Are they relatively independent? Are they essentially measures of the same phenomena? (Table 8)

TABLE 8

ZERO-ORDER CORRELATIONS BETWEEN SELF-CONCEPT OF ACADEMIC ABILITY, INTELLIGENCE, AND GRADE-POINT AVERAGE FOR THE INDIANA SCHOOL FOR THE DEAF, MICHIGAN SCHOOL FOR THE DEAF, MICHIGAN SCHOOL FOR THE BLIND, AND PUBLIC SCHOOL

School			I.Q.	GPA ‡
ISD	N=40	SCA-D	.41	.51
	Random Sample	IQ		.42
MSD	N=40	SCA-D	.40	.32
	Random Sample	IQ		.24 (ns)
MSB	N=40	SCA-D	.29 (ns)	.37
	Random Sample	IQ		.27 (ns)
PS	N=1800	SCA	.49	.53
	Total Population	IQ		.49

ns = not significant at the .05 level, 2-tailed test

‡ Grades earned subsequent to collection of SCA-D and IQ scores

(3) Does the addition of SCA-D to IQ increase it's predictive efficiency in accounting for GPA? which variable contributes the most? How do the beta weights for each variable compare? Are there differences by population?

TABLE 9

MULTIPLE CORRELATIONS ($R_{0.12}$) and BETA WEIGHTS FOR SCA-D AND SCA FOR THE MSB, ISD, MSD, AND PS

School Random	N	Beta IQ	Beta SCA	Multiple Correlations $R_{0.12}$
40	ISD	.258	.406	.56
40	MSD	.133	.267	.34
40	MSB	.183	.320	.41
40	PS	.303	.381	.59

B. Validity Generalization: SCA-D

Validity generalization in this study involves the use of cross-validation procedures. The major question is: If we take the findings from one group, i.e. the beta weights for SCA-D and IQ, how efficiently will these beta weights predict GPA with a different group? This is perhaps the most stringent test of the validness of instrument for use with different populations. It is an especially stringent test when used with such diverse groups as residential hearing-impaired, residential visually impaired and non-impaired public school students. The results are presented in Table 10.

TABLE 10

ZERO-ORDER CORRELATIONS BETWEEN CRITERION GRADE POINT-AVERAGES (GPA_Z) AND THE WEIGHTED SUM OF THE PREDICTORS ($\beta IZ_z + \beta SCA_z = \hat{GPA}_z$).

Random N	Cross-Validating From:	Predicting To:	$r_{\hat{Z}Z}$	p of t (1-tailed)
40	ISD	MSD	.19	.20
40	ISD	MSB	.28	.05
40	MSD	ISD	.23	.20
40	MSB	ISD	.26	.05
40	PS	MSD	.20	.20
40	PS	ISD	.32	.01
40	PS	MSB	.22	.20

2. Construct Validity

Construct validation involved determining whether theoretically derived hypotheses, which were confirmed in prior research with non-impaired populations, are confirmable with impaired populations (see Chapter I and IV for a discussion of the theory and hypotheses).

a. Major Research Hypotheses

H_1 : SCA-D is associated with GPA (Refer back to Tables 8,9 and 10). Hypotheses Accepted

H_{2a}: PPEv is associated with GPA (Table 11). Hypotheses Rejected

H_{2b}: PFEv is associated with GPA (Table 11). Hypotheses Accepted

H_{2c}: PTEv is associated with GPA (Table 11). Hypotheses Accepted

H_{3a}: Correlations between perceived evaluations (PPEv, PFEv, and PTEv) and SCA-D are greater than the correlations between SCA-D and GPA (Table 11). Hypotheses Accepted

H_{3b}: Correlations between SCA and GPA are greater than the correlations between perceived evaluations (PPEv, PFEv, and PTEv) and GPA (Table 11). Hypothesis accepted 7 out of 9 cases.

Results for hypotheses two and three are presented in Table 11.

TABLE 11

CORRELATIONS BETWEEN SELF-CONCEPT OF ACADEMIC ABILITY (SCA-D), PERCEIVED EVALUATIONS, AND GPA: INDIANA SCHOOL FOR THE DEAF, MICHIGAN SCHOOL FOR THE DEAF, AND MICHIGAN SCHOOL FOR THE BLIND.

		SCA-D	PPEV	PTEV	PFEV
ISD	SCA-D	---	.50	.48	.53
Random N=40	GPA	.51	.25(ns)	.38	.36
MSD	SCA-D	---	.71	.69	.60
Random N=40	GPA	.32	.24(ns)	.40	.35
MSB	SCA-D	---	.69	.72	.77
Random N=40	GPA	.37	.27(ns)	.34	.32

ns = not significant at the .05 level 2-tailed test.

H_4: The correlation between perceived evaluations (PPEV, PTEV) and GPA will be lower, when SCA-D is controlled, than the correlation between SCA-D and GPA when perceived evaluations are controlled. (Tables 12-13). Hypothesis accepted 5 out of 6 cases.

TABLE 12

PARTIAL CORRELATIONS WITH GPA, CONTROLLING FOR PERCEIVED PARENTAL EVALUATIONS AND SELF-CONCEPT OF ACADEMIC ABILITY HEARING-IMPAIRED AND VISUALLY-IMPAIRED STUDENTS

1. GPA
2. PPEV
3. SCA-D

N=40 Random Sample

	Zero Order	First Order
ISD Random N=40	$r_{12} = .25$ $r_{13} = .51$ $r_{23} = .50$	$r_{12.3} = .00$ $r_{13.2} = .46$
MSD Random N=40	$r_{12} = .24$ $r_{13} = .32$ $r_{23} = .71$	$r_{12.3} = .03$ $r_{13.2} = .22$
MSB Random N=40	$r_{12} = .27$ $r_{13} = .37$ $r_{23} = .69$	$r_{12.3} = .00$ $r_{13.2} = .26$

TABLE 13

PARTIAL CORRELATIONS WITH GPA, CONTROLLING FOR PERCEIVED TEACHER EVALUATIONS AND SELF-CONCEPT OF ACADEMIC ABILITY FOR HEARING-IMPAIRED AND VISUALLY-IMPAIRED STUDENTS

1. GPA
2. PTEV
3. SCA-D

	Zero Order	First Order
ISD Random N=40	$r_{12} = .38$ $r_{13} = .51$ $r_{23} = .48$	$r_{12.3} = .24$ $r_{13.2} = .40$
MSD Random N=40	$r_{12} = .40$ $r_{13} = .32$ $r_{23} = .69$	$r_{12.3} = .26$ $r_{13.2} = .07$
MSB Random N=40	$r_{12} = .34$ $r_{13} = .37$ $r_{23} = .72$	$r_{12.3} = .12$ $r_{13.2} = .19$

C. REFERENCE GROUP SELF-CONCEPT SCALES COMPARED WITH SCA-D

As developed in Chapter I, a revision of SCA-D, where students are asked to indicate their academic ability with reference to similarly impaired students (SCA-I), and with reference to non-impaired students (SCA-NI), would result in the following hypothesized relationships:

H_5: $\bar{X}_{SCA-I} > \bar{X}_{SCA-D} > \bar{X}_{SCA-NI}$. Hypothesis Accepted

TABLE 14.

RANKING MATRIX OF MEANS FOR SCA-I, SCA-D AND SCA-NI ON GPA: HYPOTHESIZED RANKINGS BASED ON SCA-I > SCA-D > SCA-NI

	Residential Deaf						Residential Blind					
M Random Groups* Predicted rank N=5	SCA-I 1		SCA 2		SCA-NI 3		SCA-I 1		SCA 2		SCA-NI 3	
	ΣX	Rank	ΣX	Rank	ΣX	Rank	ΣX	Rank	ΣX	Rank	ΣX	Rank
I	93	1	90	2	84	3	97	1	91	2	86	3
II	81	1	76	2	74	3	85	1	83	2	79	3
III	88	2	93	1	75	3	84	1	74	2	70	3
IV	89	1	88	2	73	3	90	1	85	2	82	3
V	81	1	80	2	77	3	98	1	91	2	92	3
VI	80	2	85	1	72	3	97	1	94	2	88	3
VII	84	1	83	2	77	3	96	1	89	3	91	2
VIII	91	1	80	2	70	3	84	1	78	2	73	3
Total $\bar{X}$	17.43		16.86		15.05		18.48		17.40		16.42	

*Random groups of 5 subjects drawn from random samples of 40 subjects from the MSB and 40 subjects from the MSD.

L test. $p < .05$

Further hypotheses related to the relative associations of SCA-D, SCA-I, and SCA-NI with GPA are:

H_{6a}: Correlations between SCA-I and GPA are greater than correlations between SCA-D and GPA (Table 15). Hypothesis Accepted

H_{6b}: First order correlations between SCA-I and GPA, controlling for SCA-D, are greater than first order correlations between SCA-D and GPA, controlling for SCA-I (Table 15). Hypothesis Accepted

TABLE 15

ZERO AND FIRST-ORDER CORRELATIONS BETWEEN
(1) SCA-D, (2) SCA-I, and (3) GPA
HEARING-IMPAIRED STUDENTS AND VISUALLY-IMPAIRED STUDENTS

Variables 0. GPA
1. SCA-I
2. SCA-D

	Zero Order	First Order
MSD	$r_{01} = .46$	$r_{01.2} = .35$
N=40	$r_{02} = .32$	$r_{02.1} = -.05$
Random Sample	$r_{12} = .78$	
MSB	$r_{01} = .45$	$r_{01.2} = .26$
N=40	$r_{02} = .37$	$r_{02.1} = .00$
Random Sample	$r_{12} = .83$	

Other hypotheses concerning the reference perspective the student is adopting when responding to SCA items are (See Table 16):

H_{7a}: Correlations between SCA-D and SCA-I are greater than correlations between SCA-D and SCA-NI. Hypothesis Accepted

H_{7b}: First order correlations between SCA-D and SCA-I, controlling for SCA-NI, are greater than first order correlations between SCA-I and SCA-NI, controlling for SCA-I. Hypothesis Accepted

TABLE 16

ZERO AND FIRST-ORDER CORRELATIONS BETWEEN (1) SCA-D, (2) SCA-NI, (3) SCA-I

Variables 0. SCA-D
1. SCA-I
2. SCA-NI

	Zero Order	First Order
MSD	$r_{01} = .78$	$r_{01.2} = .74$
	$r_{02} = .45$	$r_{02.1} = .27$
N= random 40	$r_{12} = .37$	$r_{12.0} = .13$
MSB	$r_{01} = .83$	$r_{01.2} = .70$
	$r_{02} = .72$	$r_{02.1} = .44$
N= random 40	$r_{12} = .64$	$r_{12.0} = .09$

Which correlations are greater, perceived evaluations by SCA-D; perceived evaluations by SCA-I; or perceived evaluations by SCA-NI? (See Table 17). No consistent difference was found, although SCA-D seems to be most associated with perceived evaluations.

TABLE 17

PRODUCT MOMENT CORRELATIONS BETWEEN PERCEIVED EVALUATIONS OF PARENTS, FRIENDS, AND TEACHERS: AND THREE SELF-CONCEPT OF ACADEMIC ABILITY SCALES

	MSD N=40 Random Sample			MSB N=40 Random Sample		
	SCA-NI	SCA-I	SCA-D	SCA-NI	SCA-I	SCA-D
PPEV	.35	.60	71	.25(ns)	.67	69
PFEV	.24(ns)	.58	.77	.62	.71	.60
PTEV	.20(ns)	.63	69	.40	.77	72

D. VALIDITY: SCA-I and SCA-NI

1. Which self-concept measures are more associated with GPA and IQ? Are there differences by type of impaired population? (See Table 18). SCA-I was found to be most predictive of GPA, followed by SCA-D. SCA-NI was not significantly associated with GPA (.05 level).

TABLE 18

ZERO ORDER CORRELATIONS BETWEEN SCA-I, IQ, GPA,
AND TWO REFERENCE GROUP SELF-CONCEPT SCALES (SCA_I, SCA_{NI}):
MICHIGAN SCHOOL FOR THE BLIND AND MICHIGAN SCHOOL FOR THE DEAF

	SCA-D	SCA_I	SCA_{NI}	IQ	GPA
SCA-D	*	.78	.36	.40	.32
SCA_I	.83	*	.33	.34	.46
SCA_{NI}	.63	.71	*	.23(ns)	-.16(ns)
IQ	.29	.26(ns)	.07(ns)	*	.24(ns)
GPA	.37	.45	.26(ns)	.27	*

Correlations for Deaf are underlined
ns = P>.05 1-tailed

2. Are there differences in the multiple correlations: SCA-D, IQ - GPA and SCA-I, IQ - GPA?

TABLE 19

MULTIPLE CORRELATIONS ($R_{0.12}$) BETWEEN GPA, IQ AND SCA-D
CONTRASTED WITH $R_{0.12}$ BETWEEN GPA, IQ, AND SCA-I

School	Scale	$R_{0.12}$
MSD	SCA-D	.34
Random N=40	SCA_I	.54
MSB	SCA-D	.41
Random N=40	SCA_I	.47

SCA-I contributes more to IQ than does SCA-D when predicting GPA

3. Can we generalize the predictive validity of SCA-I across disability categories? That is, if we take the beta weights obtained for SCA-I and IQ predicting GPA with one impaired population and apply them in the other impaired population can we predict still achievement? As indicated previously, this is the most powerful test of validity of a scale for different populations. Findings are presented in Table 20.

TABLE 20

CORRELATIONS BETWEEN CRITERION (GPA_Z) AND THE WEIGHTED SUM OF THE PREDICTORS SCA_I AND IQ: GENERALIZING DOUBLY ACROSS DISABILITIES

Betas From	Predicting to	β IQ	β SCA_I	$r_{z\hat{z}}$
MSB	MSD	.100	.430	.32
MSD	MSB	.164	.408	.27

E. COMPARISON OF POPULATIONS ON OTHER VARIABLES

While this study is primarily a methodological investigation the availability of subjects made it possible to collect data allowing for some tentative comparisons of student populations. It is emphasized that these findings suffer from methodological limitations. Most of them are the result of single questions put to students; reliability estimates and validity assessment were not possible. Even so, these findings may suggest directions for further research in the social-psychology of exceptional children.

1. General (GSO) and Academic Significant Others

   a. Do the different impaired and non-impaired populations differ in the number of others they indicate as: (1) important in their lives (GSO), and (2) concerned with how well they do in school (ASO)? The answer to this question will determine if differences in who is named is merely a function of differences in number named.

      Tables 21 and 22 present summaries of one-way analysis of variance of the number of responses to the SO and ASO questions by the hearing-impaired, visually-impaired, and non-impaired. No statistically significant differences appeared. Therefore, differences in frequency of response within a category cannot be attributed to differences in overall frequency of response.

TABLE 21

ANALYSES OF VARIANCE OF F OF RESPONSES TO SIGNIFICANT OTHER ITEMS (EXCLUDING PARENTS): HEARING IMPAIRED, VISUALLY IMPAIRED, AND NON-IMPAIRED, RANDOM SAMPLES OF 40

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
HI, VI, NI	2	24.96	12.48	1.47 (ns)
Within	117	990.99	8.47	--
Total	119	1015.95		

TABLE 22

ANALYSES OF VARIANCE OF F OF RESPONSES TO ACADEMIC SIGNIFICANT OTHER ITEM (EXCLUDING PARENTS): HEARING IMPAIRED VISUALLY IMPAIRED, AND NON-IMPAIRED RANDOM SAMPLES OF 40

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
HI, VI, NI	2	9.10	4.55	.93(ns)
Within	117	570.90	4.88	---
Total	119	580.00		

H_o of no significant differences between the f of response to the academic significant other items is accepted.

b. With no significant differences in numbers of others indicated as GSO or ASO the following question was raised: Do the impaired and non-impaired populations differ in who, is indicated as GSO and ASO? See Table 23.

TABLE 23

TOTAL FREQUENCY (F) OF MENTION IN EACH CATEGORY OF GENERAL SIGNIFICANT OTHERS (GSO) AND ACADEMIC SIGNIFICANT OTHERS (ASO) AND PERCENTAGE (%) MENTIONING AT LEAST ONE IN EACH CATEGORY: HEARING IMPAIRED, VISUALLY IMPAIRED, AND NON-IMPAIRED SUBJECTS

	GSO						ASO					
	HI		VI		NI		HI		VI		NI	
	f	%	f	%	f	%	f	%	f	%	f	%
Peers Same Sex	21	28%	42	52%	28	38%	7	15%	13	20%	8	10%
Peers Opposite Sex	9	18	25	35	23	48	9	18	10	22	8	20
Parents	12	20	60	78	69	88	25	35	67	85	70	95
Teachers	16	18	37	50	29	22	27	45	28	42	20	28
Other Academic Personnel	5	10	10	15	2	5	15	20	13	18	12	28
Adult Relatives	40	42	32	28	26	32	9	15	14	20	23	30
Age Level Relatives	30	38	43	40	48	55	11	20	17	28	16	22
Local Adult	10	12	9	15	12	15	5	5	8	12	2	5
Non-Classifiable	5	8	4	10	8	20	3	8	7	10	14	35

Chi-square analysis of the parents and teachers as significant others and academic significant others data in Table 23 resulted in the following statistically significant associations (See Appendix C).

(1) While there were no differences between the NI and VI in mentioning parents as GSO, this was not so for the hearing-impaired. There was a tendency for not mentioning at least one parent as GSO to be associated with hearing-impairment $X^2 = 31.65 p < .001$

(2) Mentioning at least one parent as ASO also occurred more frequently than expected among the non-impaired and visually-impaired while less frequently among the hearing impaired $X^2 = 36.65$ $p < .001$

(3) Not mentioning teachers as GSO was associated with hearing-impairment, mentioning, with visual-impairment.

2. Comparisons of self-conceptions, perceived evaluations, perceived academic achievement preferences held by others, students' educational aspirations and plans, occupational aspirations and plans, socio-economic status, GPA and IQ. See Table 24.

a. Findings of difference between NI, VI and HI (Table 24)

1. The visually-impaired students expressed higher perceived parental evaluations of academic ability than the hearing-impaired.

2. Non-parametric analysis of variance revealed significant difference between the VI, HI, and NI on mean perceived parental educational expectation levels. The non-impaired were highest, the visually impaired next, and the hearing impaired lowest.

3. Similarly, perceived teacher educational expectations were significantly different among the VI, HI, and NI with again, the non-impaired scoring highest, the visually-impaired next, and the hearing impaired lowest.

4. Levels of perceived parental, friend, and teacher achievement preferences were higher for the visually-impaired than the hearing impaired.

5. One-way analysis of variance on socio-economic status disclosed significant differences between the VI, HI, and NI samples. The visually impaired were highest on mean SES (42.07); nest the non-impaired (39.38); and lowest were the hearing impaired (22.28)

TABLE 24

Analysis of Differences in Major Variables for Hearing Impaired, Visually Impaired, and Non-Impaired Students, Random Samples of 40.

	Visually Impaired RN=40			Hearing Impaired RN=40			Non-Impaired RN=40				
Variable	$\bar{X}$	Var	SD	$\bar{X}$	Var	SD	$\bar{X}$	Var	SD	Test**	p
SCA-D	17.40	12.35	3.51	16.86	7.05	2.65	*	*	*	t	ns
SCA-I	18.48	9.44	3.07	17.43	11.20	3.35	*	*	*	t	ns
SCA-NI	16.42	14.61	3.82	15.35	13.36	3.65	*	*	*	t	ns
PPEV	13.00	7.69	2.77	11.52	3.95	1.99	*	*	*	t	.01
PFEV	11.85	5.36	2.32	10.90	4.45	2.11	*	*	*	t	ns
PTEV	12.20	9.19	3.03	11.33	4.58	2.14	*	*	*	t	ns
PPSurv	3.75	1.15	1.07	3.95	.94	.97	3.45	.97	.98	KW	ns
PFSurv	3.48	1.79	1.34	3.87	.76	.87	3.43	1.48	1.22	KW	ns
PTSurv	2.70	1.06	1.03	4.13	.96	.98	*	*	*	KW	ns
PPED Ex	4.60	2.76	1.66	3.93	2.46	1.57	5.38	1.83	1.35	KW	.001
PFED Ex	4.40	2.25	1.50	3.80	2.02	1.42	5.05	2.15	1.47	KW	ns
PTED Ex	4.65	2.62	1.62	3.90	2.31	1.52	5.55	1.54	1.24	KW	.001
PP Ach Pref.	5.20	.50	.71	5.40	.74	.86	*	*	*	MWU	.001
PF Ach Pref.	3.55	3.65	1.91	4.95	2.25	1.50	*	*	*	MWU	.001
PT Ach Pref.	4.90	2.10	1.45	5.18	1.49	1.22	*	*	*	MWU	.001
Ed Asp	4.83	2.79	1.67	3.65	2.13	1.46	5.75	1.48	1.22	KW	.001
Ed Plans	4.53	2.43	1.56	3.68	2.43	1.56	5.18	2.20	1.48	KW	.001
Oc. Asp	44.25	704.90	26.55	35.68	448.59	21.18	*	*	*	t	ns
Oc. Plans	40.07	496.58	22.28	24.45	310.87	17.63	39.38	420.48	20.51	AV	.01
GPA	2.15	.53	.73	2.09	.47	.68	2.15	.61	.78	AV	ns
IA	106.73	234.15	15.30	100.18	212.05	14.56	*	*	*	t	ns

*Comparable data not available for these randomly drawn subjects.
Comparability with NI subjects treated in Validity Section, this chapter.

**t - t test; KW - Kruskal-Wallis one way analysis of variance; MWU - Mann-Whitney U Test;
AV - one way analysis of variance.

b. As indicated in Table 24 no significant differences (.05 level) were observed between:

1. VI and HI means on all of the self-concept of academic ability scales. (SCA-D, SCA-I, SCA-NI)

2. VI and HI means on perceived friends' and teachers evaluations of academic ability.

3. VI, HI, and NI means on perceived surveillance of parents and friends; and between the VI and HI on perceived teacher surveillance.

4. VI, HI, and NI means on perceived friends' educational expectations.

5. VI, and HI means on occupational aspirations and occupational plans of the VI and the HI.

6. VI, HI, and NI means on GPA.

7. VI, HI, and NI menas on IQ.

CHAPTER IV

DISCUSSION

A. EQUIVALENCE, STABILITY, AND RELIABILITY (SCA-D SCALES)

The combined group (N-97) correlation of .75 provides some basis for asserting equivalence. Note, however, that the percentage of shared variation (r^2) differed substantially in school #1. The relatively low correlation between SCA and SCA-D responses (.51) served to lower the overall correlation. In the other two schools high correlations (.84 and .81) were shown between the two forms. (See Table 1)

SCA-D responses for both the HI and NI were essentially alike in distribution, differences being well within the limits of chance fluctuation. In both cases scores were normally distributed; mesokurtic with near zero skewness. Variances were not significantly different. (See Table 2)

Since the SCA-D scale was designed for administration without modification (except braille or large type) to the visually-impaired, the question of equivalence was not raised. No deviations from normalcy of distribution of SCA-D scores were noted for the visually-impaired.

Another question relating to the equivalence of SCA and SCA-D asked whether the ordering of items according to difficulty is alike for the NI, VI, and HI. When ordered according to agreement-disagreement ratios, essentially the same ranking of items appeared for the HI, VI and NI (See Table 3). This highly consistent ordering of items, as shown by the "L" Test is surprising in light of the fact that item cutting points were cross-validated from the public school data to the impaired student data. Aside from being evidence of a common item-response configuration for the impaired and non-impaired, these results support the conclusion that data obtained using the SCA-D permit meaningful comparisons between the impaired and the non-impaired. Rephrased, the item responses suggest a common definition of the stimulus situation by the impaired and the non-impaired.

Test-retest correlations between scores on the SCA by NI students may be thought of as a "base-line" or minimal stability estimate since presumably some changes do occur in self-conceptions. But these changes should occur slowly. Therefore, tests separated by shorter periods of time ought to show higher correlations than tests separated by longer periods of time. Another interpretation of the test-retest correlations obtained for the impaired would be that ($1-r^2$) reflects the percentage of error variation, probably attributable to lack of understanding of the items or instructions, or simply random response. (See Table 4)

The responses of the ISD and MSB students to the SCA-D were more stable (r=.84 and .88) over one week than the PS responses to the SCA over one year (r=.65, .74, .72; See Table 4). While the stability of the females' responses were low (.74) at MSD, they still showed less fluctuation than PS responses over a one-year period. But the males at the MSD showed unstable responses to the scale (r=.45).

Determining the reproducibility of a scale is an alternative approach to the assessment of reliability when the items are presumed representative of a homogeneous universe of content (e.g. "fairmindedness", plane geometry, political liberalism, self-concept of academic ability). And the relationship between total scores and item scores on a "reproducible" test is such that knowledge of a person's total score allows us to predict, within certain limits of error, the subject's responses to each item. The Rep_{ind} values in Table 5 represent the reproducibility coefficients that would be found if the items in the scale retained their marginals (agreement-disagreement ratios) but were independent. As such, these coefficients can be viewed as minimal reproducibility coefficients which fluctuate in magnitude depending upon the response patterns of the subjects. The (I) values are of main interest since they are calculated using both the obtained reproducibility (rep) and the theoretical lower bound (Rep_{ind}).

An (I) value of .50 is generally considered adequate to support the conclusion of reproducibility and in three out of four trials this criteria was met. The (I) for ISD responses (.448) was slightly below the suggested level. Except for that group, results obtained with the impaired were as good or better than those obtained with the NI (See Table 5).

As far as item evaluation is concerned, one principle is that each item in a scale should be homogeneous with the total test. And a condition of item to test homogeneity exists when subjects who pass an item show higher total scores than those who fail it. To answer the question of whether individual items in the SCA-D were homogeneous with the total test Phi (ϕ_{it}) coefficients were calculated. These were transformed to Z values, the probability of which, in every test, was less than .01 (See Table 6).

B. REPRODUCIBILITIES, ITEM ORDERS, AND CUTTING POINTS FOR THE REFERENCE GROUP SELF-CONCEPT SCALES (SCA_I, SCA_{NI})

During the course of the present study two new scales were developed which explicitly state the reference group which the impaired student is to compare himself with when judging his academic capabilities. The first is SCA-NI and asks the student to compare his academic ability with students who are non-impaired. The second, SCA-I, asks the student to compare himself with other similarly impaired students.

Only reproducibilities, item orders, and cutting points were presented, the question of equivalence being peripheral because these items deal with perspectives toward impairment which only the impaired can take. And since these scales were only developed in time for one administration it was impossible to obtain stability estimates.

Un-cross-validated reproducibilities, item orders, and cutting points for these scales are located in Appendix C, Tables 25-28. In summary, (I) values for both scales (SCA-I, SCA-NI) were above the suggested value of .50 for the visually-impaired and the hearing-impaired. However, the

conclusion that these scales are reproducible (and reliable) would be premature despite this supporting evidence. The reason is that these reproducibilities were based upon item orders and cutting points which were chosen in such a way as to maximize the (I) value. These scales should be administered to new groups of students and these same item orders and cutting points used when calculating (I) before any final conclusions are arrived at.

C. RELIABILITIES OF THE PERCEIVED EVALUATIONS OF ACADEMIC ABILITY SCALES - (PPEV, PFEV, PTEV)

Since these scales are shorter (5 items), the use of scale analysis methods would be inappropriate. With so few items spuriously high estimates of reproducibility could result. Instead, Hoyt's analysis of variance, a conservative method for estimating the reliability of short scales, was used. This method is consistent with the definition that:

$$r_{tt} = \frac{\sigma^2 \text{ observed } \sigma^2 \text{ error}}{\sigma^2 \text{ observed}}$$

The results reported in Table 7 show that although generally lower, only in one case is there a marked difference in reliability obtained with the hearing-impaired (PPEV-.79 vs. .68). Still, these are high in comparison to reliabilities typically reported for attitudinal-type measures (12).

It was also found that these variables showed zero skewness and were mesokurtic for both groups of students.

D. PREDICTIVE VALIDITY OF THE SELF-CONCEPT OF ACADEMIC ABILITY SCALE-(SCA-D)

Whether or not knowledge of a subject's score on a variable (X) leads to prediction of behavior (Y) with a success rate better than guessing is one form of evidence to be considered in judging the validity of a measure. The authors wish to stress that predictive validation may result even when an understanding of the function of the predictor is absent, the function of the predictor being largely a matter of construct validation.

The data reported in Table 8 show that for each group the correlation between SCA-D and GPA was larger than the correlation between IQ and GPA. In fact, with the random samples of 40 from the MSD and MSB the IQ-GPA correlations were not statistically significant. The conclusion that IQ does not correlate with GPA would be incorrect, however, since repeated analyses in other situations have yielded statistically significant correlations (.25 to .50) with larger groups (4).

It is also concluded since SCA-D and IQ share less than 25% of their variation (r=.49) they are not measuring the same thing. Therefore, each can independently contribute to the prediction of a criterion.

In Table 9 the multiple correlations between IQ and SCA taken as predictor variables and the criterion GPA were reported. With respect to the necessity for cross-validation it should be noted that the multiple correlation is defined as "the correlation between one variable and the sum of two or more variables that are combined by weightings that will maximize the correlation" (28). In other words the data at hand is used to the maximal advantage of the investigator if he identifies his theory with a positive association.

One way of interpreting these multiple correlations is to compare the shift in predictive efficiency (E) when we add the second variable. To illustrate, the zero-order correlation between SCA and GPA for the Indiana group was .51 (See Table 8). This yields a predictive efficiency index of 13.5 representing an efficiency of 13.5% better than guessing (28). The multiple correlation obtained when IQ is added and optimally weighted is .56 for that group (See Table 9). The E is increased to 17.15%; not a dramatic shift. But when we look at the E for the zero order correlation between IQ and GPA for the same group, it is apparent that the addition of SCA resulted in a doubling of predictive efficiency (9.25% to 17.15%).

The predictive efficiency of the multiple R was largest in the public school (19.26), an improvement of about 4% from SCA alone. The general relationship holds true throughout, where the addition of IQ in a multiple correlation added little more in terms of predictive efficiency than SCA alone. Adding SCA substantially increased the predictive efficiency of IQ and thus appears a better predictor when GPA is used as the criterion.

It is important to note that the multiple correlations were low in the Michigan School For The Deaf and only moderate in the Indiana School For The Deaf and the public school. Apparently there are other relevant unidentified influences operating since for the most predictable (ISD) group 65% of the variation in GPA is unexplained by the multiple correlation.

The magnitude of the beta weights shown in Table 9 further suggests a greater relevance for SCA as opposed to IQ. In each of the three populations SCA received much more weight in the prediction formula than did IQ. It is also interesting to notice that self-concept of academic ability received more weight relative to IQ among the exceptional children than among the public school children.

If we were not skeptical we might be willing to stop at this point and say that a composite of IQ and SCA will yield a multiple R between .35 and .55 with a predictive efficiency of 6.33 to 16.48% better than guessing. But knowing that our methods make the data work for us, perhaps the results are more idiosyncratic than generalizable. Taking our findings from one group, how good will our results be when we apply the beta weights to a new group and attempt to predict their achievement?

The zero order correlations between the criterion and the weighted sum of the predictors weighted according to values determined on a different population were shown in Table 10. Using Katzell's (16) approach, congruent results from independent samples of equal size enable us to reject the null hypothesis at a level of confidence equal to the product of the independent probability values. For example, the p of $r_{z\hat{z}}$ being zero for the deaf given two independent correlations (.19 and .23) whose individual p's under the null hypothesis are .20 becomes .04. Although we can infer that the $r_{z\hat{z}}$ values are greater than zero, the predictive efficiency is not substantial. With a correlation of .19 the improvement over guessing is 1.8% and with a correlation of .32 the improvement is 5.25%.

E. CONSTRUCT VALIDITY

The following hypotheses were derived from the basic propositions of a social psychology of learning (See Chapter I). These hypotheses were confirmed.

Hypothesis 1. SCA-D is associated with academic achievement (GPA). Confirming this hypothesis were the correlations; .51 (ISD), .32 (MSD), .37 (MSB) between SCA-D and GPA. These were all statistically significant at the .05 level or better (See Table 8).

Hypothesis 2. Perceptions of the evaluations of academic ability by others (parents, friends, teachers) are associated with SCA-D. Hypothesis two was confirmed by the correlations reported in Table 11. Although perceived evaluations by self-concept correlations vary in magnitude from one institution to another (note that ISD is unusually low) all were significant at the .05 level or better.

On the assumption that self-concept of academic ability is an intervening variable between students, perceptions of the evaluations of their academic ability by others and their subsequent academic achievement, the following hypotheses were also tested. These, too, have been previously confirmed with non-impaired groups (4), and are confirmed in this study.

Hypothesis 3a: The associations between perceived evaluations of others and self-concept of academic ability are greater than the associations between self-concept and achievement.

Hypothesis 3b: The associations between self-concept and achievement are greater than the associations between perceived evaluations and achievement.

Confirming hypothesis three (a) were the consistent differences in correlations shown in Table 11 favoring the perceived evaluations by self-concept relationship over the self-concept by achievement relationship. In all nine comparisons the same direction in differences in magnitude of the r's prevailed.

Hypothesis three (b), that self-concept is more highly associated with achievement than are perceived evaluations, was not confirmed in every test. The data in Table 11 shows that perceived parental evaluations of academic ability were not significantly correlated with academic achievement among the institutionalized students. For the students at the Michigan School for the Deaf, however, the perceived evaluations of both teachers and friends showed slightly higher correlations with achievement than did self-concept of academic ability (r= .32 for SCA and GPA vs. .40 for PTEv by GPA and .35 for PFEv by GPA).

Table 12 showed the results of controlling for variation in SCA-D in the PPEv-GPA relationship ($r_{12.3}$) and controlling for variation in PPEv in the SCA-D-GPA relationship ($r_{13.2}$). The finding that control for SCA-D reduced the PPEv-GPA correlation to zero, while control for PPEv in the SCA-D-GPA correlation yielded only slight reductions from the zero order coefficients is consistent with the proposition that self-concept intervenes between perceived evaluations and achievement. The same phenomena has been repeatedly observed with data from non-impaired groups

But as shown by the data in Table 13 a surprising reversal occurred in the MSD and the MSB. In the MSB, control for either SCA-D or PTEv resulted in similar first order coefficients. ($r_{13.2}$ = .19 vs. $r_{12.3}$ = .12) In the MSD, variations in the perceived teacher evaluations account for the SCA-D-GPA correlation. Controlling for perceived teacher evaluations reduced the SCA-D-GPA correlation to near zero ($r_{13.2}$ = .07).

F. REFERENCE GROUP DIMENSIONS OF SELF-CONCEPT OF ACADEMIC ABILITY

An important question is whether self appraisals differ according to perspective. Is it possible for a student to conceive of himself as academically able with reference to one group but less able when asked for a comparison with another group? If systematic differences do exist, which referent framework is most useful when built into self-concept scales?

One would expect impaired children to "internalize" the inadequacy which a physical "defect" connotes in society. Based on this, we predicted the logical ranking of students evaluating themselves as follows: highest when asked to compare themselves with a similarly impaired referent group; second when no referent "other"was specified; and lowest when asked for a self-evaluation only in comparison to the non-impaired.

The data in Table 14 showed the results of ranking the $\Sigma\bar{X}$ over the three SCA scales for eight random sub-groups each for the MSD and the MSB. Conforming to the expected order were the means on the three scales. For the deaf SCA-I = 17.43, SCA = 16.86, and SCA-NI = 15.05; and for the blind SCA-I = 18.48, SCA = 17.40, SCA-Ni = 16.42. Application of the "L" test to the rankings of the $\Sigma\bar{X}$ for random groups confirmed this monotonic ordering.

Accepting the fact that responses differ systematically on SCA-D and SCA-I leads to the question of whether these yield different correlations with GPA. (See Table 15). The relationship between SCA-D, SCA-I and GPA was such that SCA-I accounted for more variation in GPA than did SCA-D. For both the deaf and the blind samples the self-concept of ability scale which asked for an impaired reference comparison was more highly correlated with GPA when variations in SCA-D were controlled ($r_{02.1}$) than when the technique was reversed ($r_{01.2}$).

In analyzing the magnitudes of association between the scale, correlations were computed between the three different referent perspectives for both the blind and deaf populations (See Table 16). The highest correlations were found between the instruments which did not ask for a specific referent and those which asked for comparisons between self and others of like impairment. Impaired residential students, when responding to the SCA-D seem to be adopting the perspective of the impaired-referent.

Are the evaluations that an impaired student perceives others as making of his academic ability more highly correlated with his self-concept in an impaired referent context, non-impaired referent context, or unspecified referent context? For both populations the magnitudes of association between perceived evaluations and SCA-I were greater than between perceived evaluation and SCA-NI (See Table 17). However, since subjects were drawn from residential schools this may be a function of the homogeneous social setting.

Among visually impaired residential students, perceived teacher evaluation accounted for more variation in SCA-I than did perceived parental evaluation while among hearing impaired residential students perceived teacher evaluation and perceived parental evaluation were similarly associated with SCA-I. These findings, however, differ from previous findings in studies on non-impaired children (4). Among both hearing and visually impaired the magnitude of association between perceived teacher evaluation and grade point average was greater than between perceived parental evaluation and grade point average. This finding also differs with those of Brookover, Erickson and Joiner in their studies of public school students where the association between perceived parental evaluation and grade point average was generally greater than the association between perceived teacher evaluation and grade point average (4).

G. VALIDITY GENERALIZATION OF REFERENCE GROUP SELF-CONCEPT SCALES ACROSS DISABILITY CATEGORIES

Previous analyses presented under the predictive validity of the SCA-D concerned the results of validity generalization between deaf populations and it was also noted that the reference group self-concept scales elicit responses which differ from those made to the SCA-D. Therefore, two further questions are raised:

1. To what extent, if at all, do the reference group scales improve prediction of GPA as reflected in the un-cross-validated multiple R's?

2. To what extent, if at all, can we generalize the predictive validity of these reference group scales <u>across</u> disability categories, i.e., from deaf to blind, blind to deaf, etc.?

For both the deaf and the blind, SCA-NI showed no significant correlation with IQ (See Table 18). A non-significant correlation was also observed for the blind on SCA-I by IQ. The SCA-I by IQ correlation for the deaf was low (.34) but statistically significant.

The intercorrelations between the three self-concept scales were alike in magnitude (.83, .71, .63) in the case of the blind, providing evidence of a greater consistency in self-concept despite the introduction of varying referents. On the other hand, the responses of the deaf to the unidentified reference group scale (SCA-D) correlated highly only with the impaired reference group scale responses.

How a deaf student defined his own academic ability with reference to the non-impaired was not significantly correlated with his GPA ($r = -.16$). Nor for the blind were self-definitions of ability with non-impaired referent significantly correlated with GPA ($r = .26$).

Because of the non-significant correlation of SCA-NI and GPA, the multiple correlation was not calculated (See Table 19). The non-impaired reference group scale has no validity as a predictor of grade point average in academic subjects. It is apparent, however, that the use of SCA-I in the multiple correlation resulted in an improvement over SCA-D (.54 vs. .34 and .47 vs. .41). These improved multiple R's are still not high.

Table 20 showed the results of generalizing predictive validity across disability categories (deaf to blind and blind to deaf). It can only be said that there was a positive correlation between predicted and obtained GPA ($r_{\hat{Z}Z}$ values obtained cross-validating within disability categories with the SCA-D). It is interesting to note that although institutional populations are so different as to yield a sizeable shrinkage from the multiple R's in cross-validating, the shrinkage when predicting the GPA's of the deaf using beta weights obtained from the blind resulted in nearly equivalent correlations. And although the cross-validated predictions are low, they were: (1) better than chance; and (2) as good across disability as within disabilities.

H. COMPARISON OF POPULATIONS ON OTHER VARIABLES

We wish to stress, again, that conclusions based upon certain comparisons which follow must be considered at best tentative. The reason for this is that the reliability and validity of some of these single item questions has not been determined. We do, however, believe that these comparisons should be made and can provide a basis for developing further research and hypotheses. Discussion ased on variables of unknown reliability and validity will be signaled by an asterisk.(*)

Since there were no significant differences between the HI and VI or IQ and no significant differences among the HI, VI, and NI on GPA in academic subjects, differences on other dimensions cannot be attributed to those variables. Although comparable IQ data was not available for the NI sample it is unlikely that they would be markedly higher. Group IQ test administered to the population from which these subjects were drawn yielded a mean of approximately 100 and a SD of 18 (Table 22-23).

Analysis of variance revealed marked differences between the groups on SES, but previous research by the present authors suggests that SES differences exert an impact only through some of the variables under study. That is,what appears often to be an association between, say, SES and GPA is reduced to zero or near zero when differences in SCA are controlled. The same is true for SES and Educational Plans and SES and Perceived Evaluations (4). Testing the hypothesis that SES bears only an indirect relationship to behaviors such as academic achievement, educational plans, and educational aspirations might well be a subject of replicative research with exceptional children.

No mean differences were observed between the HI and VI on any of the three self-concept of academic ability scales nor on perceived evaluations of academic ability by friends or teachers. Clearly, however, hearing-impaired students believed that their parents view them as being relatively incapable, academically. (Table 24). (*) Yet combined with this is the extremely atypical lack of mentioning of parents as being important in their lives or concerned about how well they do in school (See Table 23 and Appendix C, Tables 29-34).

Attributing this difference to being in a residential school with limited opportunities for interaction with parents seems difficult in view of the finding(*) of no difference between the NI, VI, and HI on perceived parental surveillance. These data suggest that while the HI students view their parents as knowing as much about what they are doing in school as other students, many HI do not believe that their parents care about how well they are doing. Also, they think that their parents believe they are less academically capable. And finally, parents are not viewed as important in their lives by a large proportion (80%) of the hearing-impaired students. All of this, however, needs further exploration.

(*) Another difference between the HI, VI, and NI also concerns parents, again, to the disadvantage of the HI. The average HI "academic" student perceives his parents as expecting him to go beyond high school to trade school, while the VI average response falls about half-way between going to trade school and going to college for a little while; the average NI student perceives his parents as expecting him to go to college for a while.

(8) On perceived parental, friend, and teacher achievement preferences a reversal occurred. When asked what marks he would have to get to make his parents, teachers, and friends happy, the HI students mention higher grades than the VI. (*) At the same time, the HI student plans for and aspires to

lower levels of education than the VI, who in turn plans and aspires toward less education than the non-impaired. (*) Notice, however, that the SES of the occupations planned and aspired toward were the same, on the average, for the VI and the HI. Recall that the HI and VI were different on SES of father's or other present "breadwinner's" occupation.

CHAPTER V

CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

A. SUMMARY OF CONCLUSIONS

1. The results obtained when using the modified Self-Concept of Academic Ability scale (SCA-D) with hearing-impaired and visually impaired students may be compared with results obtained from non-impaired subjects.

2. Although the distributions of scores, reliabilities, item orders, and stability over time are evidence of comparability, there is reason to believe that when the non-impaired responds to the SCA-D scale he is doing so with respect to a non-impaired referent. However, the responses of the impaired to the SCA-D scale suggest the utilization of impaired others as referent. Therefore, the most meaningful comparison is between SCA-D with the non-impaired and SCA-I with the impaired. This is particularly relevant to research in social settings which are homogenous, i.e., where there are only impaired students or only non-impaired students.

3. The data obtained with self-concept of academic ability instruments (SCA-D, SCA-I, SCA-NI) and perceived evaluation instruments (PPEV, PFEV, PTEV) is highly reliable for behavioral research. Very little difference is shown in the reliabilities calculated using impaired student responses and non-impaired student responses.

4. Scale analysis disclosed that all self-concept of academic ability scales are uni-dimensional, representative of a homogeneous universe of content.

5. It is possible to predict academic performance across disability areas, using formulas from the deaf to predict for the blind and vice versa, as efficiently as within disability areas, using formulas from one deaf group to predict academic behavior of another deaf group.

6. Self-concept scales which tap impaired referent comparisons when used with impaired populations in an educational setting for the impaired are better predictors of academic performance than are self-concept scales which do not ask the impaired student to compare himself with similarly non-impaired students.

7. Self-concept of academic ability makes a contribution to the prediction of academic achievement independent of IQ. The relative contribution of IQ and SCA in prediction equations favors SCA.

8. Self-concept of academic ability is highly associated with the perceptions students have of others' evaluations of their academic ability.

9. A large portion (between 75 to 90 per cent) of the variation in academic achievement as measured by GPA is not accounted for by variations in intelligence and self-concept of academic ability.

10. The association between perceived teacher evaluations of students' ability and students' self-concept of academic ability is higher among the residential impaired students than among non-impaired public school students.

11. Teachers are more likely to be seen as "concerned about how well the student does in school" among impaired residential students than among non-impaired public school students.

12. Parents are not likely to be identified as academic significant others or as general significant others by hearing-impaired students in institutions. Both public school non-impaired students and visually impaired institutionalized students frequently mention parents as ASO and SO.

13. Self-concept of academic ability is an intervening variable between the perceived evaluations of others and academic achievement.

14. Visually-impaired students perceive their parents as holding higher evaluations of their academic ability than do hearing-impaired students.

15. The educational expectation levels (how far in school student will go) of parents and teachers of the hearing impaired (as perceived by the student) are lower than those of the visually-impaired.

16. The hearing impaired, however, indicate that their parents, friends and teachers prefer that they achieve at higher levels in school than the visually-impaired.

17. The educational aspirations and plans of the visually impaired are higher than those of the hearing-impaired.

18. Socio-economic status of hearing-impaired residential students is significantly lower than the socio-economic status of the visually-impaired residential students or non-impaired public school students.

As indicated in the previous chapters, conclusions ten through eighteen above are very tentative. More sophisticated treatments of the reliability and validity of the instruments used to arrive at these conclusions were not possible. These last conclusions (10-18) should be interpreted more as hypotheses requiring further verification.

B. IMPLICATIONS AND RECOMMENDATIONS FOR MASS TESTING WITH HEARING-IMPAIRED AND VISUALLY-IMPAIRED STUDENTS

1. Filmed Presentations for the Hearing-Impaired.

This study should be replicated with large groups heterogeneous enough to permit multiple regression analysis. This would allow for an estimation of the effects of age of onset, method of communication, and degree of language facility. In order to test the large numbers required using standardized procedures a film could be developed to be used to administer questionnaires. An expert in manual and oral communication would be filmed administering the questionnaire. This film along with instructions for proctoring and so forth, would provide a standard format which could be administered by teachers or directors of deaf education. Comparable testing situations and data could be better insured and data blanks could be established at moderate cost. For the visually-impaired, more extensive investigation can proceed without special modifications other than braille and large type. Administration procedures are simple enough to permit local personnel to collect data.

2. Suggestions for researchers planning to administer scales to the hearing-impaired in mass testing situations

While the development of filmed presentations may be a parsimonious and sound methods for obtaining mass test information from the hearing-impaired, good data may also be obtained if attention is given to the following considerations in the traditional testing situation:

a. Warm-ups - If the group is inexperienced in the role of "respondent", the researcher, in administering attitudinal items, would be well advised to provide separate sessions for warm-up. These sessions might include item types which will be used in the main testing and could even include some sensitization to the kinds of materials and responses called for in the major testing. It is quite likely that the obtrusive nature of the tests may sensitize subjects to issues which are later discussed by the students in private. If this is so, opinions may emerge as a result of discussion or solitary reconsideration and show more stability in later tests.

b. Detailed Examination of Language - One of the first checks to be conducted on scales before administration is to determine reading vocabulary level and assess whether or not all terms can be translated into manual signs which will be understood by the students. For example, it was found that certain hypothetical transportations called for by the terms "pretend" and "make believe" were not readily understood when presented in manual signs.

c. Order of Item Types - It would be best to arrange the questionnaire in such a way that the more structured items precede less structured ones. For instance, items asking for a yes or no response should precede multiple choice type items, which should in turn precede open-ended items. This method simply enables the researcher to get the respondents off to a good start by insuring, as much as possible, their initial comfortability in the respondent role. Early ease in responding promotes both confidence and helps provide a relaxed, business-like atmosphere which tends to continue throughout.

d. Movement of Proctors - Enough proctors should be provided and they should be positioned in the room in such a way that problems in responding to questions can be observed without moving about the room. Pacing about the room by proctors is very distracting to the hearing-impaired.

e. Color Coding of Pages - To avoid the difficulty of having some students "get lost", pages in the questionnaire should be arranged in a color order.

3. Suggestions for researchers planning to administer scales to the visually-impaired in mass testing situations

The suggestion concerning the use of "warm-ups" is equally applicable to the testing of the visually-impaired. And the use of braille and large-type questionnaires is of course necessary. The only other modification of the testing situation concerns the method which the visually-impaired student uses in responding to the items. It was found that indicating responses on the brailled sheets with a short pencil, these being later coded by someone who reads braille, is better than attempting to have the students write out responses in braille.

C. IMPLICATIONS AND RECOMMENDATIONS FOR RESEARCH AND THEORY

1. Reliable tests or reliable subjects

One of the difficulties in behavioral measurement of an "obtrusive" variety is that the determination of the reliability of the instrument is dependent not upon examination of the instrument but upon examination of responses to the instrument. When an unsystematic pattern of responses is obtained with an instrument, when error variance is unusually large, is it because the measuring instrument is afoul or is it because the respondents are "unreliable" subjects? Of course this idea is behind the view that one can't trust the responses of impaired students such as the deaf or mentally retarded to instruments which involve the use of language.

Therefore, a particularly interesting course for future research is to identify those subjects whose responses contribute to error, those subjects whose responses are unsystematic and unpredictable,

and eliminate them or treat them separately. Can the identification of "unreliable" or "untestable" subjects and the elimination of these from prediction analysis result in better prediction? For the "untestables" alternate means of assessment, perhaps through interview, might be tried.

One way of going about determining who the "untestables" are is to examine the response matrix during the scaling procedure and note those subjects who are exceeding a fixed error rate. Aside, Green has suggested (39) that one can approach the homogeneity issue by not only asking how homogeneous are the items, but by turning the response matrix and recalculating the reproducibility of the subjects. Of course the inference of underlying population homogeneity on an attribute would be of interest to special educators because it asks, again, how systematic are the differences among people.

2. Increasing the Heterogeneity of Subjects

It is recommended that this research be replicated with groups of hearing and visually impaired students who are more heterogeneous in extent of family contact, degree of communication skill, and degree of impairment. In this respect, one of the limitations of the present study was the homogeneity of subjects on these dimensions. It was important in this pilot study to control these variables by selecting groups who were most severe in visual and hearing impairments and who were isolated from other public school children. While eliminating the need to control statistically for variations in these variables, which would require a much larger pool of subjects, an assessment of the effect of variation was precluded.

It is further recommended that replication include subjects representing a greater variety of rural-urban and regional settings. Socio-cultural differences may also have an impact which could be studied in future research.

3. Application of Multiple Regression Techniques

Bottenberg and Ward (2) have developed models which could be applied to social-psychological research with the impaired and which provide for the comparison of regression equations obtained from two populations. In order for this line of research to be carried out it would be necessary for the researchers to obtain data from large numbers (500 or more) of subjects so that subclassification on predictors would yield groups large enough to calculate a mean on.

The advantage of multiple regression analysis is that once a dependent criterion has been selected such as academic performance, all hypothesized independent variables can be introduced to determine what combination of these variables lead to optimal prediction. Rather than attempting to control for all sources of

variation except for the experimental treatment, as in the classic controlled experiment. A large number of measures are taken on as aspects of the situation thought to be related to the behavioral outcome.

In the present study an optimally weighted combination of IQ and self-concept scores was used as predictors of GPA in academic subjects. But the resulting prediction was minimal. Expanding this analysis through the multiple regression technique would permit us to determine whether perceived surveillance, by parents, friends, and teachers, student role preferences, models for self, educational aspirations, occupational plans, parental achievement preferences, teacher achievement preferences, age of onset, method of communication, etc. contribute to the prediction of school achievement. Further, by examining the combination and weighting of variables a comparison of the total social psychological situation of the impaired and non-impaired could be performed.

4. Developing Alternate Forms

Future efforts in development of scales for use with disabled students should take into consideration the limited communication skills often manifest by exceptional students. If comparability is to be obtained the scales used with exceptional children and typical students should be as nearly alike in format as possible. This means phrasing items in simple language, and since manual signs are more ideographic than written or spoken language, a simple test to determine linguistic complexity is to attempt to translate scales into manual signs. While simple, straight forward, presentations of verbal stimuli do not detract from the testing of the typical student, complex verbal forms and expression may make impossible the acquisition of equivalent data from disabled students.

Some work needs to be done on the development of alternate forms of social-psychological instruments. While the development of achievement tests has proceeded with this idea in mind, one less frequently finds alternate forms of social-psychological scales. The necessity for alternate forms becomes especially paramount when attempting to assess change, that is, it becomes impossible in repeated testing with the same instrument to determine just how much instrument decay or learning from testing is affecting responses.

Also, since test-retest estimates of reliability are popular it should be stressed that the most legimitate approach is to correlate form 1 responses at time 1 with form 2 responses at time 2. The correlation of scores obtained from a single instrument (1 form) at two separate times may result in either spuriously high or spuriously low estimates of reliability since systematic errors such as response set may be viewed as reliable variance.

Another advantage to be obtained from the creation of alternate forms of the same instruments is that multitrait-multimethod matrices may be developed enabling researchers to assess:

(1) Relationships between the same variable measured in the same way over time.

(2) Relationships between the same variable measured in different ways over time.

(3) Relationships between different variables arising from the use of the same method of measurement.

(4) Relationships between different variables measured in different ways.

In essence, this method permits determination of how much of the observed relationships between variables can be attributed to similar methods of measurement without respect to their actual sharing of variation in nature.

5. Other Facets of Self-Concept of Ability.

From the theory which provided for the hypotheses of this study we may also derive hypotheses about dimensions of self-concept of academic ability. These dimensions, theoretically, can affect the magnitudes of association between self-concept of academic ability and school performance. These dimensions are: (1) students' self-conception of ability in varying social situations; (2) students' anticipation of future ability in interaction with conceptions of current ability; (3) students' conceptions of the type of relationship they have to others as indicated by the labels they attach to self, e.g., "I'm a fool." and (4) students' assessments of what they think they ought to do in their roles as students. All of these dimensions further define for the student his role in school.

Questions concerning self evaluation might ask the disabled person to describe "how well" he is able to perform certain activities that are important in our society. For instance, how well is he able to read, dance, operate machines, etc.? As mentioned earlier these evaluations are presumably made from the standpoint of some "other" and the evaluation can therefore not be considered a trait independent of social context. As was the case in this study, a productive line of questioning seems to ask for an evaluation of one's own ability in comparison to non-disabled persons and other disabled persons.

Contrary to the long tradition of interest in "desires, wishes, aspirations, and other measures of preferred states it is further suggested that the individuals' actual prediction of a future state of affairs, of what "is going to be," should yield valuable comparisons

between the disabled and the non-disabled. The importance of getting at a student's self-predictions stems from the fact that he is able to take into consideration large amounts of information known only to him. An individuals' predictions of his future, it is theorized, limits the range of behaviors attempted.

The third demension, the applying of labels to self, has received some attention in research with exceptional children. The labels which an individual attaches to himself connotes to self, and when made public to others, what the individual is supposed to be like. "Retard," "nut," "crazy," and "bad boy," are labels connoting probable actions on the part of the person labelled and the person doing the labelling. Therefore, the labels persons use to describe themselves should provide us with hypotheses as to the kinds of action he will take in varying social situations.

Normative judgements about self, that is, prescribing what is appropriate or right for self should also make it possible to more efficiently account for behavior. Many self-concept devices attempt to get at this kind of behavior by asking the subject what he would like to be like. But this is not necessarily what one thinks he ought to do, it may be merely his preference. Questions should be developed which ask the student how academically able he ought to be and ought to become.

6. Summary

In summary, this study has demonstrated appropriate and feasible ways for obtaining empirically reliable, valid and comparable social-psychological data from hearing impaired, visually impaired and non-impaired students. There appears to be no major reason why special educators and other researchers trained in measurement skills cannot proceed to use hearing or visually impaired students as subjects to further our social-psychological knowledge as well as to increase our understanding of exceptional children. The use of communication impaired subjects, along with non-impaired subjects, it is suggested, offers the behavioral scientist of whatever theoretical orientation a chance to contribute to behavioral principals while at the same time providing insights for alleviating serious educational problems.

CHAPTER VI

SUMMARY

This was a preliminary study of the reliability and validity of scales designed for assessing social-psychological characteristics of hearing-impaired and visually-impaired adolescents. The scales used in the study were modifications of scales used with non-impaired students in longitudinal research. Modifications included simplification of vocabulary, reduction of number of response alternatives and for the visually-impaired, presentation in large type and braille formats. Testing of the hearing-impaired was conducted en masse using manual sign translations along with the written items.

SUMMARY OF RESEARCH OBJECTIVES

The general objectives of the study were: (1) to determine whether reliable and valid self-concept of academic ability data can be obtained from impaired students; (2) to determine whether self-concept of academic ability date obtained from impaired students permits meaningful comparison with data from non-impaired students; (3) to provide a preliminary comparative analysis of the social psychological situation of the hearing-impaired and visually-impaired on dimension, such as perceived evaluations of academic ability by others, self-concepts of academic ability, perceived surveillance of academic activities, general and academic significant others, educational and occupational plans and aspirations, and perceived norms regarding academic performance; and (4) to examine the utility of a social-psychological theory of learning by testing derived hypotheses.

SUMMARY OF METHODOLOGY

The subjects of the study were: (1) a random sample of 12-19 year old public school, school students living at home (N-40); (2) a random sample of 12th grade public school students living at home (N-97); (3) visually-impaired students who attended the Michigan School for the Blind as residential students and who were in academic programs age 12-19, (N-65); (4) hearing-impaired institutionalized students attending the Michigan School for the Deaf (N-105) and the Indiana School for the Deaf (N-85) who were 12-19 years of age and in academic programs. Statistical analysis was generally conducted on random samples of 40 each from the impaired populations.

Analyses included determining: (1) the equivalence of original and modified instruments; (2) the stability of measure; (3) the homogenity, reliability, cutting point, and item indices for the self-concept scales; (4) characteristics of distribution; (5) the generalizability of the predictive validity of the self-concept of ability scales,

optimally weighted in combination with IQ, within and across disabilities; (6) the construct validity of self-concept of academic ability; (7) the reliability and validity of reference group self-concept scales; and (8) the relative status of the impaired and non-impaired populations on other social-psychological variables.

The data were collected through the administration of the scales, en masse, and from the students' school records. Analysis procedures involved the use of Z Scores, t tests, F test, skewness measures, kurtsis measures, Pearson Product Moment Correlation, Phi (ϕ1t) Coefficients, Chi-Squares, Green's (I), Rep., Repind, Mann-Whitney U tests, one-way analysis of variance (parametric), one-way analysis of variance (Kruskal-Wallis), multiple correlation, partial correlation beta weights, and $\hat{r}zz$. For predictions subsequent grade point average in academic subjects was used as the criterion variable.

SUMMARY OF FINDINGS

Only a brief summary of the highlights of th study are provided here. For technical details, data analysis, and qualification, the reader should consult the Results and Discussion Chapters.

The Michigan State University Self-Concept and Academic Ability Scale provides an example of a social-psychological scale designed for research with non-impaired students. And the results of this study show that reasonably comparable and reliable data was obtained when the scale was modified in terms of the limitation of manual sign and finger spelling. It seems likely that comparable forms of other verbal scales can be developed for use with impaired populations, permitting comparisons to be made, if a simple, direct language is used. Meeting the criteria of "signability" is likely to be one method of insuring that items are straight-forward enough to permit comparisons of various impaired and non-impaired groups.

For future research on self-concept of academic ability or other self-concepts, the results of this study clearly show the necessity for determining the focal self-other comparison which is being called forth when responding to self-concept items. Whether the student is responding with reference to non-impaired, or impaired students has a systematic and predictable influence upon the results obtained. Response to a self-concept instrument where reference group is not identified yields reliable and valid data, although with less predictive validity than impaired referent self-concept items. Lack of attention to the reference group dimension, however, makes interpretation of results, particularly comparisons between the impaired and non-impaired difficult.

When intelligence, as measured by individual tests, is used as a predictor of GPA in academic subjects in its best weighted combination with self-concept of academic ability, the latter shows better predictive power. But groups of hearing-impaired students are so different as to result in a large decrease of the multiple correlation when cross-validation techniques were applied. Interestingly, however, the shrinkage of the multiple R in cross validation between the visually-impaired and the hearing-impaired, was no greater than the shrinkage resulting when cross-validating across the disability category. Apparently, however, other important variables affecting achievement in academic subjects are not being tapped by either self-concept or intelligence measures since the improvement of prediction over chance when cross-validating is at best about 5 to 6 per cent.

The validity of self-concept of academic ability as a construct was shown by testing hypotheses derived from a symbolic interactional theory. The evidence was generally in accord with the proposition that self-conception intervenes between perceptions of others and academic performance. In one of the schools for the deaf, however, an unusual reversal occurred in the relationship between perceived teacher evaluations, self-concept, and academic achievement. Whether this reversal is best described as Type II error or as a deficient functioning of the variables is indeterminate at present.

Preliminary comparisons of visually impaired, and hearing impaired students living in residential schools and students in public school were also made. The following findings, however, must be considered tentative due to the lack of established reliability and validity data on the instruments used. In summary these comparisons indicate that:

1. There is a greater relationship between teachers and evaluations of students and students' evaluations of self among impaired residential students than among non-impaired public school students.

2. The education expectation levels of parents and teachers is greater among visually-impaired students than among hearing-impaired students.

3. The educational aspirations and plans are greater among visually-impaired students than among hearing-impaired students.

4. Teachers are more likely to be viewed as concerned about how well the students do in school by impaired students than by non-impaired students.

5. Parents are frequently indicated by both the non-impaired and the visually impaired as concerned about how well the student does in school. Parents of the hearing-impaired are not as frequently indicated as concerned about how well the student does in school as are the parents of the visually-impaired and non-impaired.

6. The socio-economic status of hearing impaired students is lower than the socio-economic status of visually impaired and non-impaired students. This may explain some of the differences in family expectations.

SUMMARY OF RECOMMENDATIONS

It is recommended that this research be replicated with groups of hearing and visually impaired students who are more heterogeneous in extent of family contact, degree of communication skill, and degree of impairment. In this respect, one of the limitations of the present study was the homogeneity of subjects on these dimensions. It was important in this pilot study to control for these variables by selecting groups who were most severe in visual and hearing impairments and who were isolated from other public school children. While eliminating the need to control statistically for variations in these variables, which would require a much larger pool of subjects, an assessment of the effect of variation was precluded.

It is further recommended that replication inclued subjects representing a greater variety of rural-urban and regional settings. Sociocultural differences may also have an impact which could be studied in future research.

A larger pool of subjects would also make possible the use of multiple regression analysis so as to determine what combination of variables are most predictive of behavior.

It is also recommeded that reliability, validity, and comparability studies be extended to instruments designed to assess with impaired populations such social psychological variables as educational and occupational aspirations and plans, student role preferences perceived surveillance by parents, teachers and friends, achievement preferences of parents, friends, and teachers. In addition alternate forms should be developed for each construct to be assessed.

Instruments should also be developed to assess other facets of self-conception of ability as well as other self-conceptions. This study has focused on only one facet of the self-concept structure.

This study has demonstrated that measurement techniques can be applied to develop reliable instruments which will yield validly comparable social-psychological data on impaired and non-impaired students. There is no methodological reason why social scientists should tend to ignore impaired populations for their research, and there is considerable theoretical and practical justification for conducting research with the communication impaired as well as the non-impaired. We hope this study contributes to the comparative study of students under varying conditions of disability and social context.

REFERENCES

1) Blanton, Richard L., and Nunally, Jim C., "Educational Language Processes in the Deaf", Psychological Reports. XV, 1964. p. 891-894.

2) Bottenberg, Robert A., and Ward, Joe H. Jr., Applied Multiple Linear Regression. Technical Documentary Report PRL-TDR-63-6 Air Force Systems Command, U.S. Air Force. 1963. p. 137.

3) Brookover, Wilbur B., "A Social Psychological Conception of Classroom Learning", School and Society. LXXVII, 1959, 1967. p. 84-87.

4) _____, Erickson, Edsel L., and Joiner, Lee M., Self-Concept of Ability and School Achievement. U.S. Office of Education Cooperative Research Project No. 2831. East Lansing: Human Learning Research Institute, Michigan State University. February, 1967. 365p.

5) _____, LePere, Jean M., Hamacheck, Don, Thomas, Shailer, and Erickson, Edsel L., Self-Concept of Ability and School Achievement, II. U.S. Office of Education Cooperative Research Project No. 1636. East Lansing: Bureau of Educational Research Services, Michigan State University. November 1965. 330p.

6) _____, Paterson, Ann, and Thomas, Self-Concept of Ability and School Achievement, I. U.S. Office of Education, Cooperative Research Project No. 845. East Lansing: Office of Research and Publications, Michigan State University, 1962.

7) Brown, Roger, Social Psychology. New York: The Free Press. 1965.

8) Cronbach L., and Meehl, P.L., "Construct Validity of Psychological Test", Psychological Bulletin LII, 1955, p. 281-302.

9) Cutler, Albert, "Place on Self-Concept in the Education of The Physically Different Child", Exception Children XXVIII, 1962. p. 343-349.

10) Dexter, L.A., "A Social Theory of Mental Deficiency", American Journal of Mental Deficiency. LXII, 1958. p. 920-928.

11) Frankell, Edward, "Effects of a Program of Advanced Summer Study on the Self Perception of Academically Talented High School Students", Exceptional Children. XXX, 1964. p. 245-249.

12) Helmstadter, G.C., Principles of Psychological Measurement. New York: Appleton-Century-Crofts, 1964. p. 101-103.

13) Hollingshead, Merrill T., "The Social Psychology of Exceptional Children: Part I In Terms of the Characteristics of Exceptional Children", Exceptional Children. XXVI, 1959. p. 137-140.

14) Hoyt, C., "Test Reliability Obtained by Analysis of Variance", Psychometrika, VI, 1941. p. 153-160.

15) Joiner, Lee M., The Reliability and Construct Validity of the Self-Concept of Ability Scale-Form D for Hearing-Impaired Students. Unpublished Ph.D. Dissertation, Michigan State University, 1966.

16) Katzell, Raymond, "Cross Validation and Item Analysis", Educational and Psychological Measurement, XI, 1951, p. 16-22.

17) Kelman, Herbert C., "Processes of Opinion Change", Public Opinion Quarterly. XXV, Spring, 1961. p. 64.

18) Kerlinger, Fred N., Foundations of Behavioral Research. New York: Holt, Rinehart, and Winston, Inc. 1964. p. 429-451.

19) Kuder, G.F., and Richardson, M.W., "The Theory of Estimation of Test Reliability", Psychometrika, II, 1937. p. 151-160.

20) Linton, Ralph, The Study of Man. New York: Appleton-Century-Crofts, Inc. 1936. p. 113-114. op cit.

21) Loevinger, J., "The Technique of Homogeneous Test Compared with Some Aspects of 'Scale Analysis' and Factor Analysis", Psychological Bulletin, 1948, 45. p. 507-529.

22) Mead, George Herbert, Mind, Self and Society. Chicago: University of Chicago Press. 1934.

23) Merton, Robert K., Social Theory and Social Structure. Glencoe, Illinois: The Free Press. 1957.

24) Meyerson, Lee , "Physical Disability as a Social Psychological Problem", Journal of Social Issues. IV, 1948. p. 1-10.

25) _____, "Psychology of Impaired Hearing", Psychology of Exceptional Children and Youth. ed. William Cruickshank. New York: Prentice-Hall. 1963. p. 118-191.

26) _____, "Somatopsychology of Physical Disability", Psychology of Exceptional Children and Youth. ed. William Cruickshank. New York: Prentice-Hall. 1963. p. 15-16.

27) Page, Ellis B., "Ordered Hypotheses for Multiple Treatments: A Significance Test for Linear Ranks", Journal of the American Statistical Association, LVIII, March, 1963. p. 216-230.

28) Peatman, John G., Introduction to Applied Statistics. New York: Harper and Row, Publishers. 1963.

29) "Research Needs In The Vocational Rehabilitation of the Deaf", (Merrill Rogers and Stephen Quigley, eds.) American Annals of the Deaf, September 1960, 105 no. 4. p. 335-370.

30) Reynolds, Maynard C., "The Social Psychology of Exceptional Children: Part III In Terms of The Interaction of Exceptional Children with Other Persons", Exceptional Children, XXVI, 1959. p. 243-247.

31) Rosenstein, Joseph, and Lerman, Alan, Vocational Status and Adjustment of Deaf Women. New York: Lexington School for the Deaf. 1963.

32) Stouffer, S., et al., Measurement and Prediction. Princeton: Princeton University Press, 1950. (Includes Guttman, Lazarsfeld, etc.).

33) Technical Recommendations for Psychological Test and Diagnostic Techniques, Psychological Bulletin, LI, 1954. Supplement, p. 201-238.

34) Thorndike, Robert L., and Hagen, Elizabeth, Measurement and Evaluation in Psychology and Education. John Wiley and Sons, Inc., New York, 1961.

35) Thurstone, L.L., "Theory of Attitude Measurement", Psychological Bulletin. 1929. 36. p. 222-241.

36) Towne, Richard C., and Joiner, Lee M., The Effects of Special Class Placement on the Self-Concept of Ability of the Educable Mentally Retarded. U.S. Office of Education, Cooperative Research Project No. 71-2073. East Lansing: College of Education, Michigan State University. September, 1966. 220p.

37) Trippe, Matthew J., "The Social Psychology of Exceptional Children: Part II In Terms of Factors in Society", Exceptional Children. XXVI, 1959. p. 171-175.

38) Washburn, William C., "Patterns of Self Concepts Related to Problems of Neurosis and Delinquency in Adolescents", Exceptional Children. XIX, 1963. p. 341-347.

39) White, Benjamin, and Saltz, Eli, "Measurement of Reproductibility", Psychological Bulletin. Volume 54 (March, 1957), p. 81-99.

40) Wright, Beatrice A., Physical Disability--A Psychological Approach. New York: Harper and Row. 1960.

APPENDIX A

QUESTIONNAIRE SCHEDULES

A. Self Concept of Ability - Form A*.

1. How do you rate yourself in school ability compared with your close friends?

   a. I am the best
   b. I am above average
   c. I am average
   d. I am below average
   e. I am the poorest

2. How do you rate yourself in school ability compared with those in your class at school?

   a. I am among the best
   b. I am above average
   c. I am average
   d. I am below average
   e. I am among the poorest

3. Where do you think you would rank in your class in high school?

   a. among the best
   b. above average
   c. average
   d. below average
   e. among the poorest

4. Do you think you have the ability to complete college?

   a. yes, definitely
   b. yes, probably
   c. not sure either way
   d. probably not
   e. no

5. Where do you thing you would rank in your class in college?

   a. among the best
   b. above average
   c. average
   d. below average
   e. among the poorest

6. In order to become a doctor, lawyer, or university professor, work beyond four years of college is necessary. How likely do you think it is that you could complete such advanced work?

   a. very likely
   b. somewhat likely
   c. not sure either way
   d. unlikely
   e. most unlikely

7. Forget for a moment how others grade your work. In your own opinion how good do you think your work is?

   a. my work is excellent
   b. my work is good
   c. my work is average
   d. my work is below average
   e. my work is much below average

8. What kind of grades do you think you are capable of getting?

   a. mostly A's
   b. mostly B's
   c. mostly C's
   d. mostly D's
   e. mostly E's

B. Self-Concept of ability - Form D*:

1. Think of your friends. Do you think you can do school work better, the same, or poorer than your friends?

   a. better
   b. the same
   c. poorer

2. Think of the students in your class. Do you think you can do school work better, the same, or poorer than the students in your class?

   a. better
   b. the same
   c. poorer

*This scale is a modification of SCA (Form A) for use with hearing impaired students. Items may be administered by oral and manual signs. This scale was also transcribed onto braille and large type for visually impaired students.

3. When you graduate from high school, do you think you will be with the best students, average students, or below average students?

   a. the best
   b. average
   c. below average

4. Do you think you could graduate from college?

   a. yes
   b. maybe
   c. no

5. If you went to college, do you think you would be one of the best, average, or poorest students?

   a. the best
   b. average
   c. poorest

6. If you want to be a doctor or a teacher, you need more than 4 years of college. Do you think you could do that?

   a. yes
   b. maybe
   c. no

7. Forget how your teachers mark your work. How good do you think your own work is?

   a. excellent
   b. average
   c. below average

8. What marks do you think you really can get if you try?

   a. A's and B's
   b. B's and C's
   c. D's and E's

C. Self-Concept of Ability - Impaired:*

1. Think of your deaf or hard of hearing friends. Do you think you can do school work better, the same, or poorer than they can?

   a. better
   b. the same
   c. poorer

2. Think of the deaf boys and girls in your class. Do you think you can do school work better, the same, or poorer than these students?

   a. better
   b. the same
   c. poorer

3. If you graduate from a high school for the deaf, do you think you will be with the best students, average students, or below average students?

   a. the best
   b. average
   c. below average

4. If there were a college just for deaf students, do you think you could graduate?

   a. yes
   b. maybe
   c. no

5. If you went to a college just for deaf students, do you think you would be of the best, average, or poorest students?

   a. the best
   b. average
   c. below average

6. If you want to be a doctor or a teacher, you need more than 4 years of college. Do you think you would be as able to do this as well as other deaf students?

   a. yes
   b. maybe
   c. no

*This scale is a modification of SCA (Form A) for use with hearing impaired students. Items may be administered by oral and manual signs. This scale was also transcribed on to braile and large type for visually impaired students.

7. Forget how your teachers grade your work. How do you think your schoolwork compares with work of other deaf students?

   a. excellent
   b. average
   c. below average

8. In a class for deaf students, what marks do you think you could get if you really tried?

   a. A's and B's
   b. B's and C's
   c. D's and E's

D. Self-Concept of Ability - Non-Impaired:*

1. Think of your hearing friends. Do you think you can do school work better, the same, or poorer than they can?

   a. better
   b. the same
   c. poorer

2. Think of your hearing boys and girls in your grade in another school. Do you think you can do school work better, the same, or poorer than public school students.

   a. better
   b. the same
   c. poorer

3. If you did graduate from another high school, do you think you would be with the best students, average students, or below average students?

   a. the best
   b. average
   c. below average

*This scale is a modification of SCA (Form A) for use with hearing impaired students. Items may be administered by oral and manual signs. This scale was also transcribed on to braille and large type for visually impaired students.

4. Do you think you could graduate from a college for hearing students?

   a. yes
   b. maybe
   c. no

5. If you went to a college for hearing students, do you think you would be one of the best, average, or poorest students?

   a. the best
   b. average
   c. poorest

6. If you want to be a doctor or a teacher, you need more than 4 years of college. Do you think you would be as able to do this as hearing students?

   a. yes
   b. maybe
   c. no

7. Forget how your teachers mark your work. How do you think your schoolwork compares with work of hearing public school students?

   a. excellent
   b. average
   c. below average

8. If you were in a class for hearing students, what marks do you think you could get if you really tried?

   a. A's and B's
   b. B's and C's
   c. D's and E's

E. Perceived Parental Achievement Preferences:

1. Which marks would you have to get to make your mother and father happy?

   a. A's
   b. B's
   c. C's
   d. D's
   e. E's
   f. my mother and father don't care what marks I get in school

F. Perceived Friends Achievement Preferences:

1. Which marks would you have to get to make your best friend happy?

   a. A's
   b. B's
   c. C's
   d. D's
   e. E's
   f. My best friend doesn't care what marks I get in school

G. Perceived Teachers Achievement Preferences:

1. Which marks would you have to get to make your favorite teacher happy?

   a. A's
   b. B's
   c. C's
   d. D's
   e. E's
   f. My favorite teacher doesn't care what marks I get in school

H. Perceived Parental Surveillance:

1. Do your parents know how you are doing in school? Pick one.

   a. They know everything I do in school.
   b. They know almost everything about my school work
   c. They know some things about my school work.
   d. They only know a little bit about my school work.
   e. They know nothing about my school work.

I. Perceived Friends Surveillance:

1. Does your best friend know how you are doing in school? Pick one.

   a. He knows everything I do in school.
   b. He knows almost everything about my school work.
   c. He knows some things about my school work.
   d. He only knows a little bit about my school work.
   e. He knows nothing about my school work.

J. Perceived Teachers Surveillance:

1. Does your favorite teacher know how you are doing in school?

a. She knows everything I do in school.
b. She knows almost everything about my school work.
c. She knows some things about my school work.
d. She only knows a little about my school work.
e. She knows nothing about my school work.

K. Perceived Parental Educational Attainment Expectations:

1. How far in school do your mother and father think you will go?

a. quit now
b. go to high school for awhile
c. graduate from high school
d. go to school to be a secretary or learn a trade
e. go to college for a little while
f. graduate from college
g. more than 4 years of college

L. Perceived Friends Educational Attainment Expectations:

1. How far in school does your best friend think you will go?

a. quit now
b. go to high school for a while
c. graduate from high school
d. go to school to be a secretary or learn a trade
e. go to college for a little while
f. graduate from college
g. more than 4 years of college

M. Perceived Teachers Educational Attainment Expectations:

a. quit now
b. go to high school for a while
c. graduate from high school
d. go to a school to be a secretary or learn a trade
e. go to college for a little while
f. graduate from college
g. more than 4 years of college

N. Educational Aspirations:

1. How far would you like to go in school?

   a. quit now
   b. go to high school for a while
   c. graduate from high school
   d. go to a school to be a secretary or learn a trade
   e. go to college for a little while
   f. graduate from college
   g. more than 4 years of college

O. Educational Plans

1. Sometimes what you expect to do isn't the same as what you'd like to do. How far in school will you really go?

   a. quit now
   b. go to high school for a while
   c. graduate from high school
   d. go to a school to be a secretary or learn a trade
   e. go to college for a little while
   f. graduate from college
   c. more than 4 years of college

P. Occupational Aspirations:

1. If you could have any job, which one would you like to have after you finish school?

Q. Occupational Plan:

1. Sometimes the job you get is not the job you wish for. What kind of job do you think you <u>will</u> get after you finish school?

R. General Significant Others Question (GSO)

GENERAL SIGNIFICANT OTHERS QUESTION

There are many people who are important in our lives. In the space below, list the Names of the people who you feel are important in YOUR life. Please indicate who each person is.

NAMES	WHO IS THIS PERSON

S. Academic Significant Others (ASO)

ACADEMIC SIGNIFICANT OTHERS QUESTION

There are many people who are concerned about how well young people do in school. In the space below, list the NAMES of the people you feel are concerned about how well you do in school. Please indicate who each person is.

NAMES	WHO IS THIS PERSON?

T. Perceived Parental Evaluations - Form D

Pretend you are your mother or father. Answer like they would. Pick one. Circle their answer.

1. Think of your mother and father. Do your mother and father say you can do school work better, the same, or poorer than your friends?

   a. better
   b. the same
   c. poorer

2. Would your mother and father say you would be with the best, average, or below average students when you graduate from high school?

   a. the best
   b. average
   c. below average

3. Do they think you could graduate from college?

   a. yes
   b. maybe
   c. no

4. Remember, you need more than four years of college to be a teacher or doctor. Do your mother and father think you could do that?

   a. yes
   b. maybe
   c. no

5. What grades do your mother and father think you <u>can</u> get?

   a. A's and B's
   b. B's and C's
   c. D's and E's

U. Perceived Friends' Evaluations - Form D

Pretend you are your best friend. Answer like he or she would. Pick one. Circle their answer.

1. Think of your best friend. Would your best friend say you can do school work better, the same, or poorer than other people your age?

   a. better
   b. the same
   c. poorer

2. Would your best friend say you would be with the best, average, or below average students when you graduate from high school?

   a. the best
   b. average
   c. below average

3. Does your best friend think you could graduate from college?

   a. yes
   b. maybe
   c. no

4. Remember you need more than four years of college to be a teacher or doctor. Does your best friend think you could do that?

   a. yes
   b. maybe
   c. no

5. What grades does your best friend think you can get?

   a. A's and B's
   b. B's and C's
   c. D's and E's

V. Perceived Teachers Evaluations - Form D

Pretend you are your teacher, the one you like the best. Answer like he or she would. Pick one. Circle their answer.

1. Think of your teacher. Would your teacher say you can do school work better, the same, or poorer than other people your age?

   a. better
   b. the same
   c. poorer

2. Would your teacher say you would be with the best, average, or below average students when you graduate from high school?

   a. the best
   b. average
   c. below average

3. Does your teacher think you could graduate from college?

   a. yes
   b. maybe
   c. no

4. Remember you need more than four years of college to be a teacher or doctor. Does your teacher think you could do that?

   a. yes
   b. maybe
   c. no

5. What grades does your teacher think you can get?

   a. A's and B's
   b. B's and C's
   c. D's and E's

APPENDIX B

SCHOOL RECORDS DATA

1. I.D. # _____

2. Achievement Level

   Reading _____ _____
   test name

   Math _____ _____
   test name

   Other _____ _____

   Other _____ _____

3. I.Q. _____ _____
   latest test

4. Academic Grades January, 1967

   English A = 4 _____

   Mathematics B = 3 _____

   Social Studies C = 2 _____

   Science D = 1 _____

   Comments _____

5. Method of Written Communication _____

Braille only = 1	Oral = 4
Large Type = 2	Sign = 5
Both = 3	Both = 6

6. If both above, which method is primarily used by the student _____

7. Age (year) at onset of visual impairment _____

8. Degree of Impairment

   OU (oclus uterque) _____
   OS (oclus sinister) _____
   OD (oclus dixter) _____

   Best eye with correction _____

   Severe (20/200 to LP) = 1
   Moderate = 2
   Mild ("20/70: sight saving") = 3

SCHOOL RECORDS (Cont.)

Best ear with correction _____

Profound = 9
Severe = 8
Moderate Severe = 7

Comments _____

APPENDIX C

ADDED TABLES

TABLE 25

SCA-I Visually Impaired
Scale Characteristics, Reproducibility, I

ITEM ORDER (Hardest to Easiest)	CUTTING POINT
7	3,2-1
2	3-2,1
1	3-2,1
5	3,2-1
3	3,2-1
6	3,2-1
8	3,2-1
4	3,2-1

$Rep = .96$

$Rep_{ind} = .88$

$$I = \frac{.96 - .88}{I - .88} = .67$$

TABLE 26

SCA-I Hearing Impaired
Scale Characteristics,
Reproducibility, I

ITEM ORDER (Hardest to Easiest)	CUTTING POINT
4	3-2,1
7	3-2,1
1	3-2,1
3	3-2,1
8	3-2,1
6	3,2-1
5	3,2-1
2	3,2-1

$Rep = .93$

$Rep_{ind} = .86$

$$I = \frac{Rep - Rep_{ind}}{1.00 - REP_{ind}} = .50$$

TABLE 27

SCA-NI Hearing Impaired
Scale Characteristics,
Reproducibility, I

ITEM ORDER (Hardest to Easiest)	CUTTING POINT
7	3-2,1
3	3-2,1
2	3-2,1
1	3-2,1
4	3,2-1
6	3,2-1
5	3,2-1
8	3,2-1

$$Rep = .92$$
$$Rep_{ind} = .70$$
$$I = \frac{.92 - .70}{1 - .70} = .73$$

TABLE 28

SCA-NI Visually Impaired
Scale Characteristics,
Reproducibility, I

ITEM ORDER (Hardest to Easiest)	CUTTING POINT
5	3-2,1
2	3-2,1
1	3-2,1
4	3-2,1
6	3,2-1
3	3,2-1
7	3,2-1
8	3,2-1

$Rep = .96$

$Rep_{ind} = .91$

$$I = \frac{.96 - .91}{1 - .91} = .56$$

TABLE 29

Parents As Significant Others: Visually-Impaired vs. Non-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
VI	31	9	40
NI	35	5	40
TOTAL	66	14	80

$x^2 = 1.38$

$.20 < p < .30$

TABLE 30

Parents As Academic Significant Others: Visually-Impaired vs. Non-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
VI	34	6	40
NI	38	2	40
TOTAL	72	8	80

Chi-Square Inappropriate

TABLE 31

Parents As Significant Others: Hearing-Impaired vs. Non-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
HI	8	32	40
NI	35	5	40
TOTAL	43	37	80

$x^2 = 36.66$

$p < .001$

TABLE 32

Parents As Academic Significant Others: Hearing-Impaired vs. Non-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
HI	14	26	40
NI	38	2	40
TOTAL	52	28	80

$x^2 = 31.65$

$p < .001$

TABLE 33

Parents As Significant Others: Hearing-Impaired vs. Visually-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
HI	8	32	40
VI	31	9	40
TOTAL	39	41	80

$x^2 = 26.47$

$p < .001$

TABLE 34

Parents As Academic Significant Others: Hearing-Impaired vs. Visually-Impaired

	Mentioned at Least One Parent		
	YES	NO	TOTAL
HI	14	26	40
VI	34	6	40
TOTAL	48	32	80

$x^2 = 20.83$

$p < .001$

TABLE 35

Teachers As Significant Others: Visually-Impaired vs. Non-Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
VI	20	20	40
NI	9	31	40
TOTAL	29	51	80

$x^2 = 6.54$

$.01 < p < .02$

TABLE 36

Teachers As Academic Significant Others: Visually-Impaired vs. Non-Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
VI	17	23	40
NI	11	29	40
TOTAL	28	52	80

$\chi^2 = 1.98$

$.10 < p < .20$

TABLE 37

Teachers As Significant Others: Hearing-Impaired vs. Non-Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
HI	7	33	40
NI	9	31	40
TOTAL	16	64	80

$x^2 = .312$

$.50 < p < .70$

TABLE 38

Teachers As Academic Significant Others: Hearing-Impaired vs. Non-Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
HI	18	22	40
NI	11	29	40
TOTAL	29	51	80

$x^2 = 2.65$

$.10 < p < .20$

TABLE 39

Teachers As Significant Others: Hearing-Impaired vs. Visually-Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
HI	7	33	40
VI	20	20	40
TOTAL	27	53	80

$x^2 = 9.45$

$.001 < p < .01$

TABLE 40

Teachers As Academic Significant Others: Hearing-Impaired vs. Visually Impaired

	Mentioned at Least One Teacher		
	YES	NO	TOTAL
HI	18	22	40
VI	17	23	40
TOTAL	35	45	80

$x^2 = .0506$

$.80 < p < .90$