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A SUMMARY REPORT ON THE REVISION AND RESTANDARDIZATION OF THE HISKEY-NEBRASKA TEST OF LEARNING APTITUDE.

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THE REVISION OF THE HISKEY-NEBRASKA TEST OF LEARNING APTITUDE (H-NTLA) WAS UNDERTAKEN TO MODERNIZE THE TEST MATERIALS, TO EXTEND THE TEST, AND TO PROVIDE UP-TO-DATE NORMS ON DEAF SUBJECTS AND HEARING SUBJECTS. THE ITEMS CONSIDERED FOR THE REVISION WERE ADMINISTERED TO NORMAL HEARING, DEAF, AND RETARDED SUBJECTS AGED 3 TO 17 YEARS. FOLLOWING THE ANALYSIS, THE RETAINED ITEMS WERE GROUPED INTO 12 POWER SUBTESTS. FINAL SAMPLES CONTAINED 1,079 DEAF CHILDREN (MOSTLY FROM SCHOOLS FOR THE DEAF) AND 1,074 HEARING CHILDREN (SELECTED ON THE BASIS OF PARENTAL OCCUPATION) OVER A 10 STATE AREA. NORMATIVE, RELIABILITY, AND VALIDITY DATA ARE BRIEFLY DISCUSSED. THE PERFORMANCES OF DEAF AND HEARING CHILDREN ON OTHER TESTS AND ON THE H-NTLA ARE COMPARED AND DISCUSSED. THE H-NTLA MAKES POSSIBLE THE EVALUATION OF A DEAF CHILD USING NORMS BASED ON DEAF CHILDREN. RESEARCH POTENTIAL OF THE H-NTLA IS EVIDENT IN ITS CURRENT USE IN A NUMBER OF PROJECTS DEALING WITH DEAF, RETARDED, AND EMOTIONALLY DISTURBED CHILDREN. PRICE AND AVAILABILITY INFORMATION ARE INCLUDED. (MK)

A Summary Report

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The contributions of the professionally trained persons who participated in the project are inestimable. My special thanks to Dr. Clifford Casjens, now an Assistant Professor at Purdue University and Dr. Gerald Holmberg, now an Assistant Professor at the University of Arizona, who served as research assistants. Their help in the designing, tryouts and analyses of test items, as well as the coordination of the testing and the statistical work at the Computing Center, kept the project moving smoothly. Assisting us in the more routine but highly important tasks were Mrs. Wanda Kyker and Mrs. Michele Griepentrog, secretaries.

The adequacy of any test standardization is closely related to the competencies of the examiners. My most sincere appreciation is expressed to: Dr. C. Joseph Giangreco, Miss Melda Albers and Miss Janice Ebert, Council Bluffs, Iowa; Dr. Willard Nelson, Tallahassee, Florida; Dr. Ebert Miller, Muncie, Indiana; Dr. Monty Gustafson, Laramie, Wyoming; Dr. William Jones, Selinsgrove, Pennsylvania; Dr. Stanley Johnson, Plattsburg, New York: Mrs. Bonnie Dessauer, Norman, Oklahoma; Dr. Jack King, Mesa, Arizona; Mr. George Morris, Kearney, Nebraska; Dr. George Stone and Dr. Gerry Thompson, Lincoln, Nebraska. Often these examiners drove from 100 to 200 miles to get to the testing centers. Their many suggestions were helpful.

I express my gratitude to my colleagues and my graduate students for their suggestions and their "tryouts" of the materials and the directions for administering the scale. The work of Mr. Steve Harlow, Instructor and Mr. Ron Anderson, Graduate Assistant at the Clinic was especially noteworthy.

Finally, I am indebted to the members of my family who have contributed so much to this scale throughout the past. Their years of experience in the production of the original scale led to many suggestions concerning the modifications of items and the methods of assembling items for tryout purposes. To Olga, Mary Sue and Robert I not only express my thanks but I continue to look to you for help in the future.

REVISION AND RESTANDARDIZATION OF THE H-NTLA

The purpose of this project was the revision and restandardization of one of the first major individual tests of mental ability in the United States which was designed specifically for acoustically handicapped children and standardized upon them. This scale, the "Nebraska Test of Learning Aptitude for Young Deaf Children", was first published in 1941 in response to a need for a scale which could evaluate the young deaf child at the time when he was entering a program of formal education. It was designed for children 4 to 10 years of age and was an attempt to compare the deaf child with other deaf children of his chronological age. A separate standardization upon hearing children in 1955 permitted the scale's use with the speech handicapped, the retarded, and others who had hearing but had language or communication difficulties.

The specific purposes of the present project were:

(1) To modernize all materials in the scale
(2) To extend the limits of the scale especially at the upper end
(3) To provide up-to-date norms on deaf subjects and on hearing subjects which were based on larger and more representative samples
(4) To permit with hearing children the interpretation of test results on a more uniform basis from age to age as well as comparison of ratings with other widely used scales such as the WISC and the Stanford-Binet (L-M)
(5) To assemble each subtest in such a manner that it could be administered more easily and effectively
(6) To present a more complete record form which could be used with either the deaf or the hearing
(7) To package the materials in easily identifiable containers in cases that would be compact and easy to transport

Objectives Accomplished by the Revision and Restandardization

The revised and restandardized scale has been titled the "Hiskey-Nebraska Test of Learning Aptitude" (H-NTLA) in order to distinguish it from the original scale. The H-NTLA was standardized separately upon deaf children and upon children with hearing. Over 1100 children between the ages of 2-6 years and 17-5 years were tested in each group. The children came from ten widely separated states.

All of the pictures utilized in the revised scale were drawn especially for this project. Many of the original picture sequences and the corresponding response pictures were changed and new sequences were added. All subtests were modified and one new subtest (Spatial Reasoning) has been added. In the original scale, the pictures in each series were mounted on formica or heavy cardboard and were in separate envelopes. All the picture series in subtests of the revision are in booklets thus making the scale easier to administer and also making it more compact and of less weight.

The record form of the revised scale provides for a complete recording of the subject's (either deaf or hearing) responses to each item on each subtest. The methods for scoring each subtest are reviewed briefly in the record form so that the experienced examiner need not refer to the test manual. On the final page of the record booklet are the separate norms for deaf children and for children with hearing. Deviation I.Q.s are available for hearing subjects.

Selection and Modification of Items in the Subtests

A number of persons throughout the United States who had utilized the scale were asked to present their suggestions concerning its strengths and weaknesses as well as ideas concerning the modification of items and the construction of new items. Suggestions were also obtained from advanced doctoral students who had been utilizing the scale. This procedure produced a broad, varied selection of item suggestions. The suggestions were then screened by the writer, his research assistants and two other staff members. Those items which were retained were assembled in workable form for tryout purposes.

All of the items were administered to three groups of children - the normal hearing, the deaf, and the retarded, age 3 to 17 years. Following this tryout each item was subjected to an individual analysis which included the examiner's reactions to the item. Those items were retained which most closely met the modified criteria. The criteria used were: (1) type of item known to correlate highly with acceptable criteria of intelligence or learning ability; (2) increase in percents passing from one age to the next; (3) attractiveness or interest in the subject; (4) ease of administration; (5) ease and objectivity of scoring; (6) credit at the lower levels not dependent upon speed of response; (7) reasonable administration time; (8) variety. The sifting process at this point eliminated 41 individual parts from the scale. The 163 remaining parts were grouped into 12 subtests. The individual parts of each subtest were arranged in a tentative order of difficulty.

The 12 subtests are listed in the record form which appears at the end of this report. Each subtest is a small power test and the subject can be rated on each one individually. The total rating on the scale is the median of the ratings on the subtests. Separate norms permit subjects to be compared with members of their own group (deaf or hearing). To make the results at different age levels more comparable and to permit comparisons with ratings on such scales as the Stanford-Binet (L-M) and the WISC, a table of deviation IQs was calculated for hearing children.

The Standardization Sample

The scale was administered to children in ten widely separated states extending from New York to Utah to Florida. The final samples contained 1,079 deaf children and 1,074 hearing children. The majority of the deaf children came from state schools for the deaf. Hearing children were selected on the basis of the occupational levels of their parents. Children in each group varied in age from 2-6 years to 17-5 years. An individual was placed in the 3 year group if he was between 2-6 years and 3-5 years, and in the 4 year group if he was between 3-6 years and 4-5 years, and so on.

Derivation of Norms

The performances of each child were evaluated, coded, and punched on IBM cards. The percent at each age passing each item was determined and the curves of percent passing each item at each age were plotted. Those items which appeared to function most satisfactorily and continued to approximate the criteria were retained. Thus, test items were selected chiefly on the basis of discriminative ability. Judgments were based on the increased

percents passing from one age to the next. As a result of this analysis, the items in each subtest were arranged in their final order of difficulty. This order was based on the percentage of total group passing each individual part of each subtest. Since the test was developed primarily for handicapped children, the retention of items and the final order of difficulty were based upon the performances of the acoustically handicapped group.

To develop a table of norms, it was necessary to plot the curves of the scores obtained by approximately 50% of each age on each subtest. This was done independently for the deaf and the hearing samples. The curves were then smoothed and the scores, at the points where the curves crossed the age levels (on a half year basis), were listed on the tables of norms. The norms for both hearing and deaf are printed on the record form which appears at the end of this report.

Evidence of Validity and Reliability

Since this scale consists of separately scored parts or subtests, the correlations between the subtests are important. The test manual lists the intercorrelations of subtests for the lower age group and for the upper age group for both the deaf and the hearing. The intercorrelations are quite encouraging. Likewise correlations were obtained between the age ratings on each subtest and the median age rating on the total test. These correlations varied from a low of .514 to a high of .889 and gave evidence to the internal consistency of the scale. Selected samples showed correlations with the Stanford-Binet (L-M) of .86 for the hearing children 3 to 10 years of age and .78 for hearing children 11 to 17 years of age. A correlation of .82 was obtained when hearing children's ratings on the H-NTLA were compared with their ratings on the WISC.

A parallel study using deaf children showed high correlations between the H-NTLA ratings and the ratings on selected achievement tests at the lower and upper grade levels, with modest correlations at the intermediate levels. A review of the data indicated that the H-NTLA showed consistent gains from the second to the twelfth grades but the achievement test ratings on the deaf children showed a distinct plateau between grades 5 and 9. Apparently this contributed heavily to the lower correlations at the intermediate levels. When the split-half method and the Spearman-Brown formula were utilized the coefficients of reliability were found to be .947 for the deaf 3 to 10 year group; .918 for the deaf 11 to 17 year group; .933 for the hearing 3 to 10 year group; and .904 for the hearing 11 to 17 year group.

Comparison of Performances of Deaf and of Hearing Children

The controversy over the mean level of intelligence of deaf children as compared to the mean level of hearing children has been prominent in the literature since the turn of the century. Pintner in a summation of the data to 1940 listed the probable mean intelligence quotients for the deaf as: Performance tests, 91; drawing-on-paper tests, 86; and the Draw-a-Man test, 88. His overall evaluations suggested a ten-point "inferiority" of the deaf in comparison with the hearing. Myklebust in 1953, took exception to this conclusion when he stated that "during the past fifteen years various workers have uniformly concluded that...deaf children are not generally inferior in

intelligence as concluded by Pintner." However, Myklebust hastened to add that in spite of the quantitative equality, qualitative differences still exist in perceptual and conceptual functioning and reasoning.

Hiskey (1956) compared deaf children and hearing children on the basis of their performances on the separate standardizations of the Nebraska Test of Learning Aptitude. A study of the norms for the two groups showed that the deaf children rated as high as, or higher than, the hearing children on 28.8% of the scores and were no more than six months behind on an additional 41.1% of the scores. Thus, in seven cases out of ten the deaf child equalled, or was within six months of, the hearing child, suggesting a mean intelligence quotient for the deaf in the mid 90's when compared with hearing norms.

The present dual standardizations provide much data for further comparisons of the two groups and it is the writer's intent to make several such studies, as well as studies concerning sex differences within the various subtests. Space does not permit a lengthy analysis of data but a few interesting facts can be obtained from brief comparisons of the ratings on the tables of norms. In the 3-8 year group 81.5% of the ratings of the deaf children were below the ratings of hearing children. By contrast, the 13-17 age group showed 48.3% of the deaf ratings to be at the same level or above the hearing. A breakdown of the ratings according to subtests is not shown in this report. A comparison of the subtest norms by the writer, however, revealed that of the 44.8% of the scores for the 13-17 year old deaf group which were one year or more below the hearing, 41.4% resulted from ratings on the Visual Attention Span, the Memory for Digits, and the Picture Analogies subtests. The 34.5% of the ratings of this same group that were above the hearing were all on the Block Patterns, the Puzzle Blocks, and the Spatial Reasoning subtests. With the 3-8 group, almost three-fourths of the ratings that were one or more years below the hearing were on the Completion of Drawings and the Picture Association subtests. On these same subtests the older deaf and older hearing were about equal.

Further observations concerning the above will appear in a later report. The findings do substantiate the results of the earlier study. The younger deaf children have more difficulty grasping the directions than the hearing children of equal age. Since ratings are based on total scores, the deaf child fails the beginning items and thereby lowers his total for the subtest. In other words the hearing child "gets the jump" on the deaf child since he comprehends verbal directions better and earlier than the deaf child grasps pantomimed directions. Likewise, the hearing children do better on memory items where retention can be reinforced through vocalization. The hearing children far surpass the deaf on those subtests which indirectly involve verbal concepts such as the Picture Associations and the Picture Analogies. The older deaf children, having done tasks similar to those in the scale, grasp directions readily. They use their training in visual discrimination to advantage and equal or surpass the hearing on those items where visual perception is paramount.

The Utilization of the Scale

The more one studies the discrepancies in the performances of deaf children and hearing children (on the same scale) the more it becomes evident that

serious errors in assessment occur when the deaf are evaluated with tests standardized on the hearing. It is evident that even with non-verbal scales such as the H-NTLA, the ratings of the deaf would be distorted grossly if norms for the hearing were used. The H-NTLA makes it possible to compare deaf children with members of the peer group and to plan to counsel with them in a meaningful and realistic manner. It also provides an instrument which can be used to check and to supplement the information obtained on other children with communication difficulties who have been tested with highly verbal scales. The extension of the upper level of the scale through age seventeen makes it useable with handicapped youth who are being considered for vocational rehabilitation services.

Research Completed or in Progress

The H-NTLA has not been available for a sufficient amount of time for much research to have been completed. Two doctoral students at the University of Nebraska have completed theses utilizing the revised scale. The results of these studies are as yet unpublished. Giangreco, utilizing 225 students at the Iowa School for the Deaf, compared ratings on the H-NTLA with ratings of students on selected achievement tests, reading tests, and the ratings of the subjects by their teachers. He found that the H-NTLA gave quite high correlations with the results of the achievement tests and of the teacher's ratings at the lower grade levels and at the upper grade levels. The correlations were rather modest for the intermediate grades but this appeared to reflect, at least to a degree, the fact that the achievement ratings of the deaf did not show much progress between grades five and nine. Giangreco concluded that the significant correlations indicated that it might be possible to predict academic achievement at most levels by using the Hiskey-Nebraska Test.

Casjens studied the performances of brain-injured and non-brain-injured mentally retarded children on the H-NTLA. He utilized sixty subjects (thirty in each group) from the state home for the mentally retarded. The total group had a mean CA of 17-5 and a mean IQ of 59.3. He found significant differences at the .03 level of confidence between the performances of the two groups on Block Patterns, Memory for Digits, Picture Analogies, and the totals of the subtests scores. He noted that the Puzzle Blocks and Spatial Reasoning subtests were too difficult for most of the retarded subjects and suggested further research using brain-injured and non-brain-injured subjects of higher intelligence. Certainly much further research is necessary before any attempt is made to utilize the scale to identify brain-injured individuals.

Several other studies are underway but no results or conclusions can be stated at this time. When completed, they should give us more information concerning the predictive or diagnostic values of the scale when used in connection with "headstart" programs, the deaf retarded, the moderately to severely retarded, and the emotionally disturbed. One proposal includes the use of the H-NTLA and the Illinois Test of Psycholinguistic Abilities in the diagnosis and appraisal of the retarded. It seems quite probable that a number of research projects will be reported within the next two or three years.

Availability of the Scale

Those persons who are interested in securing the scale should direct their communications to:

HISKEY-NEBRASKA TEST OF LEARNING APTITUDE
MARSHALL S. HISKEY, PH.D.
5640 BALDWIN
LINCOLN, NEBRASKA

Although subject to change without notice, the materials are priced as follows:

H-NTLA (Complete with Manual, Record Forms, Completion of Drawings and Vinyl Plastic Case)	$48 plus postage
Manual	$ 2.25 post paid
Record Forms (50)	$ 2.10 post paid
Completion of Drawings (50)	$ 1.10 post paid