

A COMPARISON OF SIX TESTS OF LANGUAGE COMPREHENSION
ADMINISTERED BY A TOTAL COMMUNICATION APPROACH
TO HEARING-IMPAIRED CHILDREN

by

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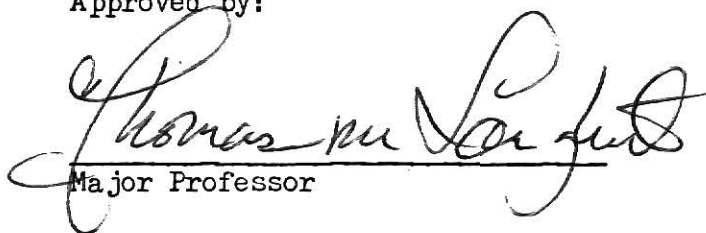
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INTRODUCTION

In the last several years standardized tests of language comprehension have acquired widespread use as diagnostic tools in the evaluation of children with suspected language impairments. These tests have, for the most part been based on research with children developing language comprehension normally. From this research three basic assumptions, which form the foundation for the development of language comprehension tests, can be stated. The first assumption is that normal language development in children occurs in an organized manner. More specifically, the acquisition of syntactic and morphologic structures in children occur in specific sequences within certain average age ranges (Brown, 1973). The second assumption is that comprehension of a linguistic structure precedes its production (Frazer, Bellugi & Brown, 1963; McNeill, 1970; Slobin, 1971). The final major assumption is that the production of grammatical structures emerges in the same order as their comprehension (Frazer, Bellugi & Brown, 1963; Carrow, 1968).

Usually, authors of language comprehension tests suggest that their tests were designed to separate from the normal population those children with language deficiencies. Children with physiological impairments such as mental retardation, cerebral palsy, hearing-impairment and deafness usually exhibit language deficiencies on language comprehension tests that have been standardized on the normal population. Children who are hearing-impaired or deaf form a special population in that with the loss or partial loss of the auditory channel, the primary modality by which normal language development is achieved and maintained is lost. This implies that if deaf and severely hearing-impaired

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children acquire language, they do so primarily by a different modality (vision) than normal hearing children. The amount of dependence on other modalities and the degree of language impairment is determined primarily by the age of onset and the degree of the hearing loss.

Little research has been attempted to determine the linguistic ability of the young deaf and hearing-impaired population. Research attempts with this population have been limited to the examination of reading and writing performance primarily because only a small percentage of the population achieve adequate verbal skills. The authors of these types of studies have implied that hearing-impaired individuals use more simple and rigid sentence structures than those of the normal hearing population. Also, they use fewer adverbs, auxiliaries and conjunctions (Thompson, 1936; Myklebust, 1948; Ross, 1953; Goetezinger & Rousey, 1957). Based on the assumption that the comprehension of a linguistic structure precedes its production, these studies implied that the errors in production were the result of deficiencies in the comprehension of the grammatical structures. These studies however fail to take into account the differences between the rates of occurrence of linguistic structures in written and spoken language (O'Donnel, Griffen & Norris, 1967).

The results of studies of language comprehension of the hearing-impaired population are influenced by the specific teaching method to which the child has been exposed. Until recently there were two major methods used for language intervention with the hearing-impaired population. The first of these were the oral methods which placed the emphasis on extensive training in oral skills and speechreading. The second were the manual methods which emphasized the use of a manual sign system, fingerspelling and gesturing. Recently a third methodology, usually referred to as total communication, has been used. The total communication approach attempts to combine the oral and manual methods

by incorporating a manual sign system, gestures, fingerspelling, facial expression accompanied by simultaneous speech and the training of speechreading and oral skills.

A few recent studies of language comprehension incorporating standardized test have been attempted with children instructed by the oral method. In one study (Presnell, 1973) the Northwestern Syntax Screening Test was administered to a group of hearing-impaired school children in an effort to compare the acquisition and use of syntactic structures between hearing-impaired and normal hearing children. The results indicated that hearing-impaired subjects were delayed in the acquisition of syntactic structures with some differences in sequential order of development, particularly verb constructions.

Studies of language comprehension in hearing-impaired children instructed in manual methods have been limited to reading and writing performance (Menyuk, 1971). The major reasons for this were the variations of sign language, depending upon the geographical location and the individuals involved and the fact that most testing methods for language comprehension are designed for oral presentation and response.

In the past the most commonly used signing system was the American Sign Language or Ameslan (Schiefelbusch & Lloyd, 1974; Northern & Downs, 1974). In recent years this system has been under criticism because (a) its syntax is crude and not conducive to the development of acceptable English, (b) its signs follow each other in order of convenience and not accepted word order for English, (c) the signs are concept based, that is, two signs may represent a four or five word phrase in English, and (d) American Sign Language uses no inflections, therefore morphological structures such as plural and past tense markers are not visible. These represent serious problems in the examination of language comprehension abilities in the hearing-impaired population using American Sign Language.

Recent authors (Stokoe, 1960; McCall, 1965; Schlesinger, 1967) who examined the semantic and syntactic structures of sign language have concluded that it is an independent language and not a true representation of English. This would seem to imply that children trained in American Sign Language learn this as their first language and standard English as a second language. Because of this, several manual sign systems have been developed in attempts to overcome the criticisms of the traditional American Sign Language. These new systems were usually designed to more closely represent English. Most of the new systems use American Sign Language and its traditional signs as the base to be modified by the addition of morphological and syntactical inflections to better represent oral English. Most proponents of these new signing systems feel they aid the child in the acquisition of English. It is generally felt that this easier acquisition of English is due to the ability of the child to "see" the actual word order and inflections of English. Therefore, he has a better opportunity to develop syntactic and morphological abilities comparable to those of normal-hearing children. There have been at least four new signing systems developed. They are Seeing Essential English (SEE₁) (Anthony et al., 1971), Signing Exact English (SEE₂) (Gustason, Pfetzing & Zawolkow, 1972), Linguistics of Visual English (LOVE) (Wampler, 1971) and Signed English (Siglish) (Bornstein et al., 1970).

Since the population for the present study used Signing Exact English (See₂), this paper will be limited to the examination of children using this signing system. This system was designed for use with children from early childhood and has a vocabulary of at least 2,000 words. It incorporates signs for 70 different affixes including contractions and inflections.

The purpose of this study was to examine the feasibility of using language comprehension tests standardized on normal-hearing children with hearing-impaired children that were being trained using Signing Exact English in a total

communication approach. Five commonly used tests of language comprehension and one privately developed test made specifically for the hearing-impaired population were chosen for administration to a group of 21 hearing-impaired children. The tests chosen were the (a) Peabody Picture Vocabulary Test, Form A (Dunn, 1965), (b) Assessment of Childrens Language Comprehension (Foster, Giddan & Stark, 1972), (c) Miller-Yoder Test of Grammatical Comprehension: (experimental edition. (Miller & Yoder, 1975), (d) Carrow Test for the Auditory Comprehension of Language (Carrow, 1973), (e) Northwestern Syntax Screening Test (Lee, 1969), (f) Ski-Hi Receptive Language Test (Longhurst, Briery & Emery, 1973).

Each test was evaluated using the following criteria: (a) What modifications were necessary to administer the test to a hearing-impaired population using a total communication approach? (b) How easily was the test administered? (c) How much information was obtained from the test about each child's language comprehension abilities? (d) What were the results in terms of their applicability to habilitation and rehabilitation? (e) Were there similarities or inconsistencies among items on the various tests?

Due to the nature of this study, the results represent the subjective judgments of the strengths and weaknesses encountered by one examiner in the adaptation and administration of six tests of language comprehension to one group of hearing-impaired children.

METHOD

Subjects

The subjects for this study were 21 hearing-impaired children, including 10 males and 11 females. All of the subjects attended classrooms for the hearing-impaired in a public school system. The subjects were divided into two groups, primary and preschool according to the classroom they attended.

Descriptive information for the two groups is presented in Table 1. The first group consisted of 12 subjects, five males and seven females, with a mean chronological age of 9-4 years. The second group consisted on nine subjects, five males and four females, with a mean age of 5-1 years. The subjects classes utilized a total communication program incorporating Signing Exact English. This program had been in operation for three years. Data obtained from the subjects' records revealed that the degree of hearing impairment varied from severe to profound. In the classrooms, amplification was provided by auditory training units (Phronic Ear, Model 321-R with TDH-39 earphones housed in circumaural cushions). Nineteen of the 21 subjects used the auditory trainers, while the other two wore their personal hearing-aids in the classroom. Outside of the classroom all of the subjects wore their personal hearing-aids.

Setting

The tests were administered to the primary level class in a small area in one corner of the classroom. The corner was secluded by the placement of movable wall partitions around the area. The test site for the preschool group was an enclosed room set off to one end of the classroom. Each test site contained a table and two small chairs. During test administration the subject was seated across the table facing the examiner.

Procedures

The six tests of language comprehension were administered to the twenty-one subjects in a random order over a three week period. All of the tests incorporated pictures in combination with stimulus phrases or sentences and all required a pointing response. The instructions for each test were explained to the subjects as given in the test manual by verbalization accompanied by simultaneous signing. Following each set of instructions several practice items were presented. If the subject failed to respond correctly to the practice items

TABLE 1

Chronological Ages and Language Ages for the
Primary and Preschool Groups

<u>Primary</u>			<u>Preschool</u>		
Chronological	PPVT		Chronological	PPVT	
Age	Language		Age	Language	
	Age*			Age*	
1.	13-3	5-1	1.	6-5	3-3
2.	11-1	4-10	2.	6-3	2-8
3.	10-5	4-8	3.	5-6	2-8
4.	10-5	5-2	4.	5-3	3-3
5.	10-4	4-8	5.	5-0	2-8
6.	10-3	5-2	6.	4-9	3-6
7.	9-8	4-11	7.	4-7	2-2
8.	8-10	4-11	8.	4-2	2-3
9.	8-4	4-10	9.	3-9	2-8
10.	7-8	4-3			
11.	6-7	4-1			
12.	6-6	5-1			

* Language Age scores were obtained from the PPVT Form A.

the instructions were repeated until they could be completed correctly. In the special case of the Miller-Yoder test, where the instructions required the child to learn the names of the characters, i.e. Sally, John and Spot, signs were given for the names of the characters and the child was then required to correctly pair the names to the practice pictures before administration of the test instructions. The tests were administered according to the specific instructions given in the test manual with the following modifications: (a) the stimuli were presented by verbalization accompanied by simultaneous signing, (b) where possible, signs were from the Signing Exact English Manual and supplement, (c) when no sign was given in the manual or the supplement the classroom teacher was consulted as to whether there was a sign used consistently for the word in the classroom, (d) if no sign was used consistently in the classroom the word was fingerspelled.

The stimulus items for the tests were scored correct or incorrect according to the pointing responses given. All scoring procedures suggested in the test manuals were computed. Percent correct was also computed where possible.

For discussion purposes the tests are divided into three groups, vocabulary, memory span and syntactical and morphological structures according to test designs. Each group of tests will be discussed in terms of (a) modifications needed for the hearing-impaired population, (b) stimulus items used, (c) ease of administration, (d) available normative data, (e) test results and (f) effectiveness as a diagnostic tool in terms of habilitation and rehabilitation for the hearing-impaired population.

RESULTS AND DISCUSSION

Vocabulary

Four of the six tests examined vocabulary. The Peabody Picture Vocabulary Test (PPVT) was strictly a test of vocabulary comprehension while the other three tests, the Assessment of Childrens Language Comprehension (ACLC), the Ski-Hi Receptive Language Test (Ski-Hi) and the Carrow Test for the Auditory Comprehension of Language (TACL), incorporated vocabulary as a subtest.

Test Modifications

The major modification necessary for the administration of the tests in a total communication approach was the addition of signing. The ideal test would contain only words which had a standard sign that could be obtained from the signing system's manual. However, for most of the tests in this study that was not the case and one of two common classroom alternatives was employed. The first was to see if a sign, often made up by the classroom teacher, was consistently used for a specific word. If this alternative was not possible, the word was fingerspelled.

In terms of test modification the PPVT provided the most problems. Out of the first 75 vocabulary items, 34 words had no standard sign. Eight of the 34 words had a common room sign consistently used in the classroom while the remaining 26 items had to be fingerspelled. Fingerspelling in this test posed two major problems. Many of the words fingerspelled were lengthy, for example excavate and appliance. Of the 26 items fingerspelled 15 words ranged from 7 to 14 letters. Considering this, it was impossible to determine how many words were missed because of the limitation of memory span, lack of comprehension of the item presented, or some other reason. The second problem was that the instructions for the PPVT stated specifically that words were not to be spelled.

However, in the total communication approach fingerspelling is a primary form of communication and could not be ignored in the present testing procedure. Examination of the Ski-Hi revealed four words out of 100 vocabulary items for which there was no standard sign. Two of these, vacuum and hammer, had common room signs while the other two, rake and shovel, were fingerspelled. The fingerspelled words posed no apparent problem. The ACLC had only one vocabulary item out of 50 for which there was no standard sign. The word, horn, did have a common room sign so no fingerspelling was necessary. The vocabulary portion of the TACL included the first 41 test items. All items on the TACL had a standard sign.

Another major problem encountered in the addition of signs to the testing was that many of the standard signs and common room signs bore a striking resemblance to the visual stimuli. This made it difficult, if not impossible to determine if a child really knew the item or guessed at an answer in terms of the sign's resemblance to a pictured item.

Test Stimuli

All four tests incorporated pointing responses to stimulus pictures upon the presentation of a simultaneously verbalized and signed vocabulary item. Visual stimuli for the PPVT, the ACLC and the TACL were small black and white illustrations. One major problem encountered with these three tests, especially with the preschool population, was getting them to look at all the visual stimuli before making a response. Many times the examiner had to point out all of the stimuli to the subjects before requiring a response. In contrast to the above three tests, the illustrations for the Ski-Hi were larger and brightly colored. With the Ski-Hi the subjects were more attentive and the problem of looking at all of the visual stimuli before making a response was reduced. It was felt that this reduction was due at least in part to the size and coloring of the illustrations.

Vocabulary items for the PPVT were primarily nouns and verbs, arranged in order of difficulty with approximately an even number of plates per age level. The vocabulary items for the TACL included nouns, verbs, adjectives and adverbs. Several of the vocabulary items for the TACL were incorporated in later sections of the test. This allowed for a means of evaluating if failure in a later section of the test might have been due to the lack of knowledge of the vocabulary instead of a lack of comprehension of grammatical rules. The TACL probed more parts of speech than did the PPVT, so evaluation of vocabulary items on the TACL might yield more information in terms of where problems were occurring. Vocabulary items on the ACLC were a collection of words from other portions of the test. Like the ACLC the vocabulary items on the Ski-Hi contained all the critical elements used in the other three sections of the test. When compared to the ACLC however, the Ski-Hi vocabulary section contained 50 additional items. Vocabulary items for both tests included five critical elements of vocabulary (a) agents, (b) actions, (c) objects, (d) attributes and (e) relations. This arrangement provided for the testing of a wider range of word types than either the PPVT or the TACL. Both the TACL and the Ski-Hi tests examined three types of adjectives; numbers or quantity, colors and quality. Each test allowed for the individual types of adjectives to be subscored separately giving good diagnostic information as to where failure in the comprehension of adjectives could be occurring. In comparison, the ACLC tested only conditional or quality adjectives.

Test Administration and Scoring

The administration time for the PPVT with the hearing-impaired population was approximately 15 minutes. The age range spanned by this test was 2-3 to 18-5. This was the major advantage of the PPVT because the age range was large enough to incorporate all of the subjects for this study while the other three tests could not. Normative data for the PPVT allowed for the computation

of three scores (a) a verbal intelligence quotient, (b) a language age and (c) a percentile rank.

The average administration time for the vocabulary section of the ACLC was ten minutes. The age range covered by the normative data of the test was 3-0 to 6-5, considerably less than for the PPVT. A major limitation of the ACLC was that all five vocabulary items shown on a page were presented in a random order before proceeding to the next plate. This procedure allowed for the possibility of obtaining a correct response to the last vocabulary item by the process of elimination. Scoring for the ACLC was simply a percent correct. Normative data for the ACLC allowed for the comparison of the subject's score to a mean for his or her chronological age.

The average administration time for the vocabulary subtest of the Ski-Hi was 15 minutes. The age range was approximately 1-6 to 6-0 years. The vocabulary section was designed to be administered until the subject reached a point where he missed 50% of a category. When this occurred the test was stopped. The test was designed to be readministered at 3 month intervals to follow the child's language development. This method of administration allowed for the testing of younger children. The Ski-Hi, like the ACLC, required five responses per plate. However, only three items were presented at a time. When all plates for a category had been given the remaining two stimuli for each plate were presented thus avoiding the possibility of a correct response by the process of elimination. No normative data was available for this test and as a result scoring involved only the computation of percent correct. In addition to a percent correct for the total vocabulary section, the five types of critical elements were scored separately so the examiner could easily see in what areas of vocabulary the child's comprehension was depressed. This type of scoring could be done with the ACLC but the examiner would have to classify and score the words himself, which would be a time consuming process.

The vocabulary subtest for the TACL required approximately ten minutes for administration. The age range for this test was 3-0 to 6-11 which was comparable to the ACLC. Normative data was not available for the individual subtests of the TACL, however the age at which 75 and 90 percent of children should pass each response was given on the test form. This type of normative data gave good information in terms of which items missed were significant with respect to the child's age. The TACL test could be scored similar to the Ski-Hi because the test form broke down the vocabulary into individual categories for subscore and each subscore could be calculated in percent correct.

Test Results

Percent correct on the ACLC, Ski-Hi and TACL are presented in Table 2. Scores for the primary group on the ACLC and the Ski-Hi were in agreement for all five critical elements. The vocabulary subtest scores for the TACL were in agreement with the ACLC and the Ski-Hi on verb comprehension but reflected lower achievement on nouns and adjectives. A comparison of noun and adjective stimulus items used on all three tests showed several items on the TACL to have a higher degree of difficulty. The word half, which according to normative data was passed by 75% of normal children at the 6-0 age level, and the word pair, which at no age level tested did 75% of normal children pass, were the two most commonly missed nouns. Another noun item which caused difficulty for the subjects was item number 30 in which the examiner said "Here is a star, now point to the bottle on the left". This item left the examiner confused regarding what the item was testing for because the sentence was simply scored as a noun. Normative data for this item showed 7-0+ as the age at which 75% of children should pass. The adjectives on the TACL were broken down into the categories of color, quantity, and quality. Those items most commonly missed were two quality adjectives, alike and different and three

TABLE 2

Percent Correct for Word Classes on the ACLC, Ski-Hi and TACL

		Nouns				Verbs				Adjectives				Prepositions				Adverb	
		Agent		Object		Noun		Actions		Verbs		Attributes		Adj.		Relations			
Primary		ACLC	Ski-Hi	ACLC	Ski-Hi	ACLC	Ski-Hi	ACLC	Ski-Hi	TACL	ACLC	Ski-Hi	TACL	ACLC	Ski-Hi	ACLC	Ski-Hi	TACL	
1.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	
2.	100	100	100	100	100	92	100	100	87	100	100	100	100	100	100	100	100	66	
3.	100	100	100	100	100	50	100	100	100	100	100	100	100	100	100	100	100	100	
4.	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	33	
5.	92	100	100	100	100	83	100	100	87	100	100	100	100	100	100	100	100	66	
6.	100	100	100	100	100	92	100	100	100	75	100	100	100	100	100	100	100	66	
7.	100	100	100	100	100	92	100	100	100	100	100	100	100	100	100	100	100	66	
8.	100	100	100	100	100	100	100	100	100	100	100	100	94	100	100	100	100	33	
9.	100	100	100	100	96	75	90	87	80	88	100	100	89	100	100	100	100	33	
10.	100	100	100	100	100	92	100	100	100	100	100	100	78	100	100	100	100	66	
11.	100	100	100	100	96	83	100	100	100	88	100	100	89	100	100	100	100	66	
12.	100	100	100	100	100	92	100	100	100	98	100	100	94	100	60	100	100	100	
Average	99.3	100	100	100	99.3	87.6	99.2	95.1	94.9	100	100	100	89.8	100	96.9	100	96.9	66.3	
Preschool																			
1.	83	100	100	94	90	75	100	87	88	88	40	100	67	0	100	0	100	33	
2.	92	100	100	89	98	66	100	87	63	63	60	100	61	0	40	0	100	100	
3.	92	100	100	100	88	75	100	100	88	88	60	100	67	0	100	0	100	66	
4.	100	100	100	100	94	58	100	87	100	100	100	100	83	0	80	0	100	100	
5.	92	100	100	100	98	75	90	80	38	38	100	100	78	0	0	0	100	66	
6.	92	100	100	66	76	75	50	60	75	75	40	80	33	0	0	0	100	66	
7.	100	100	100	94	87	66	60	67	63	63	60	87	67	60	0	0	100	33	
8.	75	60	100	78	58	66	70	67	50	50	20	63	56	0	0	0	100	33	
9.	92	100	100	89	90	58	60	73	100	100	40	80	44	0	0	0	100	0	
Average	90.9	95.6	90	86.6	86.6	68.2	81.1	78.7	73.9	57.8	90	61.8	6.6	35.5	55.2			55.2	

quantity adjectives, some, a few and many. Another item that caused considerable difficulty among the subjects was item number 15, fast. It was felt that the confusion over this item was due to the stimulus pictures used.

The TACL also examined the comprehension of three adverbs, which the other three tests failed to do. Easily and gently showed 7-0+ as the age at which 75% of children should pass. The difficulty encountered by the primary level classroom with adverbs may reflect the difficulty in picturing this type of stimuli. Incorporating adverbs was a strong point in favor of the use of the TACL as a diagnostic tool with the hearing-impaired, since studies have shown that this population used fewer adverbs than the normal hearing population (Myklebust 1948, Ross 1953, Goetzinger & Rousey, 1957).

For the primary group the average scores for all five critical elements of the ACLC and Ski-Hi were above 95%. The high scores indicated that little diagnostic information was being acquired from these two tests. The lower scores on the TACL and the examination of the items missed, however, gave good diagnostic information that could be used with this group. Scores for the primary class on the PPVT indicated that all of the subjects were severely delayed in language development. The percentile scores for the PPVT ranked 11 out of 12 subjects below the first percentile and one subject at the 6th percentile for their chronological ages. But these scores gave the examiner little diagnostic information on where intervention should begin. Examination of the stimulus items also gave little diagnostic information since most items were nouns and verbs arranged in order of increasing difficulty.

Scores for the preschool group were much lower than those for the primary group. Scores for the ACLC and the Ski-Hi were in close agreement for three of the five critical elements, agents, objects and actions. The two exceptions were attributes and relations. In both cases scores on the Ski-Hi were higher than for the ACLC. Examination of the stimulus items for relations revealed that all

five items tested were the same for both the ACLC and the Ski-Hi. One possible explanation for the discrepancy in the test scores was the differences in the size and color of the stimulus items between the two tests. The investigator noted that the younger group of children was much more attentive to the stimuli during the administration of the Ski-Hi than they were for the ACLC. Examination of the stimuli used by both tests for attributes shows that the Ski-Hi tested 15 attributes while the ACLC tested only five. Attributes on the Ski-Hi were broken down into three groups, five colors, five numbers and five conditions. The ACLC on the other hand tested only five conditions. Analysis of the errors on the Ski-Hi revealed that most occurred on numbers. Comparison of the five condition attributes on both tests revealed the items to be the same. Errors for attributes on the ACLC gave conflicting results when compared to the Ski-Hi. Six subjects who missed attributes on the ACLC gave correct responses for the same item on the Ski-Hi. Since the words were the same, the signs for the words also remained constant between the tests. The only visible difference between the tests was in the stimulus pictures. Apparently the best explanation for the discrepancies in the scores was the increased attention to larger and more colorful pictures.

Comparison of agent and object scores on the ACLC and the Ski-Hi to the noun score on the TACL for the preschool group, revealed much lower scores for the TACL. The major reason for the lower scores was presumed to be the higher degree of difficulty on many of the items. Verb scores for all three tests were similar. Examination of the stimuli on the three tests showed that several verbs were the same. Adjectives scores for the three tests showed both TACL and ACLC scores lower than the Ski-Hi. Examination of the stimulus items for both tests showed little similarity between them. The TACL again contained many items with a higher degree of difficulty than the other two tests.

For the preschool group the average scores for four of the five critical elements of the ACLC and Ski-Hi were below 90%. The lower scores and examination

of the items missed gave good diagnostic information in terms of where habilitation procedures should begin. The Ski-Hi seemed to give the most diagnostic information. It covered twice as many vocabulary items and had a more extensive scoring procedure. The TACL covered a wider range of items of varying degrees of difficulty. Many items on the TACL were too difficult for the preschool population. One advantage of the TACL however, was that the age ranges for each item were given. Therefore, when an item was failed it could readily be reviewed in terms of age level to see if it was relevant to habilitation and rehabilitation. The TACL results could easily be used to plan intervention programs. The clinician could concentrate on vocabulary represented by the items missed that were at or below the child's age level.

The PPVT scores for the preschool group gave little useful information. The scores indicated that all nine subjects were performing below their age level in language. The percentile scores ranked six subjects below the first percentile, one at the second percentile and two at the sixth percentile for their age. The scores and stimulus items gave little diagnostic information in terms of habilitation and rehabilitation.

MEMORY SPAN

Two of the six tests examined the ability of the subjects to comprehend increasingly longer utterances. The two tests were Parts B, C, and D of the Ski-Hi and the ACLC.

Test Modification

Because the vocabulary items of both tests were to make up the remaining sections, no further modifications were necessary for administration. Modification of items which had no standard sign and the problems encountered were discussed in the vocabulary section.

Test Stimuli

Both the ACLC and the Ski-Hi were designed to test the child's comprehension of increasingly longer sequences of syntactic elements. Both began with one word vocabulary items and proceeded through two, three and four critical element combinations. The tests were both designed to determine the level at

which a child was unable to process and remember lexical items in a sequence.

Both tests incorporated pointing responses to stimulus pictures upon the presentation of simultaneously verbalized and signed utterances. Visual stimuli for the ACLC were black and white illustrations while the Ski-Hi used colored pictures. This was the only major difference between the tests with the exception of differences in specific vocabulary used. The design of both tests was essentially the same, with the verbal stimuli increasing in length by one critical element for each section.

On both tests Part B consisted of ten utterances which contained two critical elements. The two critical element items were formed by various combinations of the five types of critical elements. For example, the ACLC used agent+action, attribute+object and attribute+agent combinations while the Ski-Hi used agent+agent, agent+action and attribute+agent or object combinations. Part C for both tests was ten utterances composed of three elements each, and Part D for both tests was ten utterances each containing four critical elements. Again, the critical element items were formed by various combinations of the five types of critical elements.

Test Administration and Scoring

Administration time for both the ACLC and the Ski-Hi Parts B, C, and D was approximately 15 minutes each. For all three sections of both tests scoring were done by circling the number that corresponded to the picture pointed out by the subject in response to the stimuli. The numbers for the pictured stimuli were arranged on the score sheet according to the critical element that was different from the correct response. In this way the examiner could easily determine if there was consistency in the pattern of words missed within a sequence. For example, was the first, second or third critical element missed with more consistency? When the test administration was completed a percent correct was obtained for each section of both tests. Percent correct

scores obtained by the subjects on each section of the ACLC were then compared to the mean scores given in the normative data for several age levels. Since no normative data were available for the Ski-Hi scoring was limited to percent correct.

Test Results

Mean scores on Parts B, C and D of the ACLC and Ski-Hi are presented in Table 3. Scores for the Ski-Hi were consistently higher than those of the ACLC for all sections in both populations. A comparison of scores for the primary level class on the ACLC and Ski-Hi showed close agreement on Part B, a 5.8% discrepancy between tests on Part C, and a 11.7% difference on Part D. With the primary group average scores for the Ski-Hi, on all three sections were 92% correct or better which gave no significant diagnostic information in terms of intervention. Average scores on the ACLC showed an increased level of difficulty from sections B through D. Even though the scores for sections B and C were high, the lower score on Part D indicated that an intervention program at this level might be indicated.

A comparison of scores for both the ACLC and Ski-Hi for the preschool group revealed a progressive level of difficulty from Parts B through D for both tests. A comparison of scores between the ACLC and the Ski-Hi revealed essential agreement between the tests for all three sections. For the preschool group both tests revealed good diagnostic information in terms of an intervention program. The results also showed that scores were depressed for all three sections with the four critical element section being the most difficult. No consistent pattern of errors was found for any of the nine subjects in the preschool group. The slight discrepancies between the scores of the two tests may have been related to the size and color of the stimulus items used and their ability to maintain the subjects attention. Also item number 31, on the ACLC (happy little girl jumping), was often missed by both groups. The answer

TABLE 3

Comparison of Mean Percent Correct on Parts B, C and D of the
 ACLC and Ski-Hi

Group	Part B	Part C	Part D
Primary			
ACLC	98.33%	92.5%	83.3%
Ski-Hi	100%	98.33%	95.0%
Preschool			
ACLC	77.77%	55.55%	38.8%
Ski-Hi	85.55%	61.11%	41.11%

most often given had the first critical element (happy) in error. In the examiner's opinion the facial expressions on the figures were difficult to determine for this item.

In terms of intervention, neither the ACLC nor the Ski-Hi gave useful information for primary level subjects. However, both tests gave valuable information on the memory span for preschool age subjects. The information obtained on the preschool level subjects could form the foundation for the development of an appropriate intervention program for hearing-impaired subjects of this age group.

GRAMMATICAL STRUCTURES

Three of the six tests examined the use of morphological and syntactic structures. The three tests were the Northwestern Syntax Screening Test (NSST), the Miller-Yoder (M-Y), and the Carrow Test for the Auditory Comprehension of Language (TACL).

Test Modification

The major modification necessary for the administration of these three tests was the addition of signing. Only the TACL had a standard sign for all items. The NSST contained two words with no standard sign, cupboard and shelf, and both were fingerspelled. The M-Y test contained three names, John, Sally and Spot, for which signs had to be created. In the classroom, names were signed by spelling the first letter of the name at a specific area of the body like the forehead or the cheek. The three names used in this test were signed by making a J on the forehead for John, an S on the forehead for Sally and a S on the shoulder for Spot. Two other words on the M-Y, marble and squirting, had no standard sign. No common room signs were available for either word so both items were fingerspelled. In all three tests the majority of words had standard

signs.

Test Stimuli

Visual stimuli for all three tests were black and white illustrations with the exception of a few items on both the M-Y and the TACL where a color response was required. For both the M-Y and the NSST there were four illustrations per plate, two foils and two responses. Each plate was first presented to the subject for one response item. When all plates had been presented, they were repeated for the second response. The TACL however, contained only three illustrations per plate, one response and two foils. For all three tests the illustrations were approximately equal in size.

All 84 of the verbal stimuli on the M-Y were in the form of declarative sentences. Of 40 items on the NSST, 36 were declarative sentences while the other four were interrogatives. The 60 stimuli on the TACL incorporated one word items, declarative sentences, commands and interrogatives. The variety of verbal stimuli on the TACL allowed the examiner to observe a child's performance on different sentence types as well as specific grammatical structures.

For the M-Y and NSST two responses were required per plate. In all cases the two responses were different by one syntactic or morphological unit; for example, "John sits on the table" and "John sits under the table" (M-Y items 3a & 3b). The specific linguistic structures examined and their item numbers for each test are listed in Table 4.

Test Administration and Scoring

Administration time for the M-Y test was approximately 35 minutes depending on the individual subject. Administration time for preschool subjects was generally longer and maintaining attention span for this test was difficult. The children appeared to become tired due to the lengthiness of the test. The age range given by the normative data for the M-Y test was 3-0 to 6-0. The M-Y

TABLE 4

Comparison of Linguistic Structures on the M-Y, TACL and NSST.

Linguistic Structure	M-Y	TACL	NSST
<u>Prepositions</u>			
on	3a, 4a	44	3a
under	3b, 4b	45	1b
in	5a, 6a	46	3b
beside	5b, 6b	-	-
at the side of	-	47	-
between	-	48	-
in front of	-	49	-
behind	-	-	1a
<u>Possessives</u>			
's	7a, 7b 8a, 8b	-	11b
<u>Pronouns</u>			
Object:			
her	15a, 16a	-	-
them	15b, 17b	-	-
him	16b, 17a	-	-
Subject:			
he	18a, 20a	60	2b
she	19b, 20b	61	2a
they	18b, 19a	59	-
we	-	65	-
Subject/Object:			
he/her	21a	-	-
she/him	21b	-	-
he/them	22a	-	-
they/him	22b	-	-
she/them	23a	-	-
they/her	23b	-	-
Possessive:			
their	-	-	10a
him	-	63	-
her	-	-	10b
Demonstrative:			
these	-	43	-
that	-	46	19b
this	-	-	19a
<u>Singular/Plural</u>			
Nouns:			
singular	24b, 25b	69	6a
plural	24a, 25a	66, 67, 68	6b
Verbs:			
is	28a, 29a	70	5a
are	28b, 29b	71	5b

TABLE 4 (cont.)

Linguistic Structure	M-Y	TACL	NSST
<u>Noun/Verb Inflections</u>			
Singular	26a, 27a	-	15a
Plural	26b, 27b	-	15b
<u>Verb Tenses</u>			
Present Tense	-	91, 92	8b
Present Progressive	30a, 31a	72, 73	12b
Future	30b, 32a	76	12a
Past	31b, 32b	74	8a
Present Perfect	-	75	-
Present Perfect Progressive	-	77	-
<u>Active Subject/Object</u>			
Reversibles	1a, 1b, 2a, 2b	78, 79	9a, 9b
<u>Passive Subject/Object</u>			
Reversibles	39a, 39b, 40a, 40b	80, 81	18a, 18b
<u>Direct/Indirect Object</u>			
Reversibles	-	95	20a, 20b
<u>Negative/Affirmative</u>			
Has	9a, 10a	-	-
Doesn't Have	9b, 10b	-	-
Can	11a, 12a	-	-
Can't	11b, 12b	-	-
Is	13a, 14a	85	4a
Is Not	13b, 14b	98	4b
It's Not	-	86	-
Isn't	-	87	-
Neither	-	88	-
Nor	-	88	-
Don't	-	90	-
No	-	94	-
<u>Reflexivization</u>			
Her	41a	-	-
Herself	41b	-	-
Him	42a	-	-
Himself	42b	-	7a
<u>Modification</u>			
Objects	33a, 33b, 34a, 34b	-	11a
Subjects:			
1 modifier	35a, 35b, 36a, 36b	-	-
2 modifiers	-	96, 97	-
Subject/Object	37a, 37b, 38a, 38b	-	-

contained 84 verbal stimuli represented on 42 picture plates. The stimulus pictures were given to each subject twice with two different verbal stimuli. For administration the 42 test plates were placed in a predetermined random order, so the items were not presented in order of their degree of difficulty.

Normative data for the M-Y test included age levels for which 60% of normal subjects passed the items and a comparison of the age levels for comparable items between the M-Y and TACL. This data showed age levels for the development of specific linguistic structures on the M-Y test to either be in agreement with the TACL or slightly later in development. The M-Y test was designed to be a relatively informal type of test for language comprehension and no scores are generally computed. The test includes three scoring forms. The first was a data sheet for initial scoring. When administration of the test was completed the examiner then transferred the results to another form in which the items were arranged into ten basic grammatical forms; (1) active, (2) preposition, (3) possessive, (4) affirmative/negative statements, (5) pronouns, object and subject, (6) singular/plural, noun and verb, (7) verb inflections, (8) modification, subject and object, (9) passive reversible and (10) reflexivization. From this form the examiner could view the errors in terms of specific grammatical items. If further analysis was necessary items could be transferred to another form called Sentence Description Form. This form provided sentences for both test items plus the foils. The basic problem encountered with the informal scoring of this test was the necessity to keep transferring the data from one form to another. This was a time consuming process and opened up the possibility of examiner error. The test booklet gave little information on scoring and interpretation of the data.

The age range covered by the NSST was 3-0 to 7-0. Administration time for the NSST was approximately twenty minutes depending on the individual subject. For the preschool subjects administration time was generally longer and near

the end of the test the subjects became rather tired.

A raw score was obtained by counting the number of correct items. Normative data allowed for a percentile rank to be derived from the raw score. The NSST was designed to be a screening test and it was recommended by the author that any child who scores below the 10th percentile for his age be referred for further testing. The grammatical items on the test were not broken down into individual items as they were for the M-Y and the TACL so the examiner had to determine those areas of syntax where the child was deficient. This was a time consuming process for the amount of reliable information obtained.

Administration time for the TACL was approximately 30 minutes depending on the individual subject. The age range for the test was 3-0 to 6-11.

The TACL contained 60 stimulus items represented by 60 plates. The test items were divided and arranged for presentation into three groups, (1) morphological constructions, (2) grammatical categories and (3) syntactic structures.

Normative data for the TACL allowed for the computation of an age equivalency and a percentile rank, when all sections including vocabulary were scored together. The test also allowed for the subscoreing of the vocabulary, morphology and syntax sections. In addition to this, the test form broke down each section into various categories. For example under morphology some of the categories were verbs, prepositions and interrogatives, which could also be subscored. In some instances the categories were broken down even further. Under morphology, for example, the verb category was broken down into number, tense, voice and status in order to aid the examiner in determining which specific verb types might be in need of remediation. Each item on the TACL listed the age at which 75% and 90% of normal children should pass. This aided in determining which items were relevant for an intervention program. The basic problem found in scoring this test was much the same as for the M-Y test. The scores had to

be transferred from one section to another for evaluation.

Test Results

Results of the M-Y test were difficult to interpret because there were no formal scoring procedures. Once the data was transferred to the Test Results Form, the items were classified into grammatical categories that could be evaluated individually. The authors suggested that an intervention program be initiated for areas where 50% or more of the items were in error. Category scores for the primary group revealed three areas, possessives, verb inflections and passive reversibles, where 75% or more of the subjects received less than 50% correct. Scores for each subject in the primary group showed individual differences among the areas where development was delayed. For the preschool group all but two categories, prepositions and adjectives, showed 55% or more of the subjects failing at least half the stimulus items.

Percentile rankings on the NSST for the primary group revealed 11 out of 12 subjects to be below the first percentile for their age group or for the oldest age group (7-6 to 7-11) when the subject's chronological age passed the limits of the test. The other subject ranked in the sixth percentile for his age. The age limits of the normative data were a major problem because they did not go far enough to encompass all the subjects for this study. For the preschool group six of nine subjects ranked below the first percentile for their chronological age. Of the other three subjects, one ranked in the second percentile and the other two subjects ranked in the sixth percentile.

Examination of the errors on the NSST by the primary group showed that 65% of the subjects failed in the areas of future tense, direct/indirect object reversible and present tense. Scores for the preschool showed only two areas, singular/plural nouns and the reflexive himself, where half the subjects correctly responded to 50% of the items.

Percentile rankings for the TACL could not be obtained due to the age of many of the subjects and the low scores. The use of this type of normative data with hearing-impaired subjects was of little use and often the data simply did not go low enough to cover all the subjects. A language age for the TACL was computed for both the preschool and the primary group showing all children to be significantly below their chronological age in language development. Examination of specific grammatical structures for the primary group revealed two areas of difficulty, future tense and direct/indirect object reversibles, where 50% or more of the subjects failed. For the preschool group the TACL showed at least five out of nine subjects missing every grammatical item.

Interrogatives sentences on the TACL and the NSST showed poor performance for both groups with all but one subject missing at least 50% of these items. Imperative sentences on the TACL revealed nine of the 12 primary subjects and eight of nine preschool subjects missing at least 50% of the items. The poor performance on both interrogative and imperative sentences, may indicate that an intervention program should include training for various sentence types. This result may also suggest that pointing to pictures is not a good way of showing that one understands questions and imperatives.

Because of the disagreements among the three tests on the areas of difficulty, a percent agreement was computed for three combinations of the tests, M-Y/TACL, NSST/TACL and NSST/M-Y. These comparisons are presented in Table 5. Percent agreement here was based on the assumption that if a child knew a linguistic item he should have been able to respond correctly on all three tests. Percent agreement for the primary group revealed that with the exception of prepositions and subject pronouns, there was little agreement between the three tests. Comparison of the primary and preschool groups on each combination of the tests showed that generally the percentage of agreement for the primary group was higher. The numerical differences between the three percent agreement scores for the

TABLE 5

Percent Agreement Between Subjects' Responses on the M-Y and TACL, NSST and TACL,
and the NSST and M-Y for the Preschool and Primary Groups on the Common
Linguistic Structures.

Linguistic Structure	M-Y/TACL		NSST/TACL		NSST/M-Y	
	Primary	Preschool	Primary	Preschool	Primary	Preschool
<u>Preposition</u>						
on	91.6%	0%	91.6%	66.6%	100%	33.3%
under	91.6	44.4	100	77.7	91.6	33.3
in	100	22.2	91.6	66.6	91.6	33.3
<u>Possessive</u> 's	N.C.	N.C.	N.C.	N.C.	0	11.1
<u>Subject Pronoun</u>						
he	100	44.4	100	55.5	100	88.8
she	100	66.6	100	77.7	100	44.4
they	58.3	11.1	N.C.	N.C.	N.C.	N.C.
<u>Demonstrative</u> Pronoun that	N.C.	N.C.	75	55.5	N.C.	N.C.
<u>Noun</u>						
Singular	33.3	33.3	75	44.4	41.7	33.3
Plural	25	11.1	66.7	22.2	25	44.4
<u>Verb</u>						
is	41.7	55.5	50	33.3	41.7	44.4
are	83.3	11.1	66.7	11.1	58.3	55.5
<u>Noun/Verb Inflection</u>						
Singular	N.C.	N.C.	N.C.	N.C.	83.3	55.5
Plural	N.C.	N.C.	N.C.	N.C.	66.7	22.2

TABLE 5 (Cont.)

Linguistic Structure	M-Y/ TACL		NSST/TACL		NSST/M-Y	
	Primary	Preschool	Primary	Preschool	Primary	Preschool
<u>Verb Tense</u>						
present		N.C.	33.3%	44.4%	N.C.	N.C.
present progressive	66.7%	11.1%	75	33.3	58.3%	11.1%
future	8.4	77.7	75	55.5	8.4	33.3
past	41.7	11.1	58.3	66.6	33.3	22.2
<u>Active</u>						
<u>Subject/Object</u>						
<u>Reversible</u>	33.3	0	33.3	11.1	25	0
<u>Passive</u>						
<u>Subject/Object</u>						
<u>Reversible</u>	8.4	0	33.3	11.1	25	0
<u>Indirect/Direct</u>						
<u>Object</u>						
<u>Reversible</u>	N.C.	N.C.	33.3	55.5	N.C.	N.C.
<u>Affirmative/Negative</u>						
is	83.3	33.3	91.6	77.7	91.6	44.4
is not	66.7	44.4	58.3	55.5	83.3	22.2
<u>Reflexivization</u>						
himself	N.C.	N.C.	N.C.	N.C.	66.7	55.5

Note. The abbreviation N.C. represents No Comparison between tests.

preschool group was generally much larger and more varied than for the primary group. These results suggest that items missed by an individual depend on which test he or she was given.

In general none of the tests reflected consistent results with any other test, even though many structures were comparable and should have revealed the same results. No pattern was evident in terms of one test being easier or better than the other two. The M-Y did test each item at least twice giving the examiner more information on a grammatical structure than either the TACL or the NSST. Because of the poor agreement among the tests in determining which items were in error the results of these tests should be used only for determining which grammatical structures need further analysis.

SUMMARY AND CONCLUSIONS

The present study investigated the use of six language comprehension tests with 21 hearing-impaired children enrolled in a total communication program. None of the tests proved to be completely sufficient in providing diagnostic information for use in an intervention program. Each test was examined in terms of the areas (vocabulary, memory span and grammatical structures) they were designed to evaluate.

The administration of the PPVT was of little value in terms of both groups of hearing-impaired children. The test provided for the determination of a language age and a percentile rank which showed all subjects to be well below their chronological age. The language age derived for each subject, however, was not new information; observation of the child's language performance indicated that he or she was below normal hearing children of the same age. Modification of the PPVT to a total communication procedure proved to be lengthy and made administration difficult. The amount of fingerspelling and the close resemblance of many signs to a pictured item probably reduced the validity of the test

results. Analysis of the PPVT revealed little diagnostic information which could be used for an intervention program.

Achievement on the ACLC by the primary level children revealed no significant information in terms of intervention. However, the ACLC did reveal relevant diagnostic information in terms of the preschool group's ability to comprehend increasingly longer utterances. Test modification and administration with a total communication procedure revealed no essential problems. The major disadvantages of the ACLC were the failure of the test to reveal information on the primary level children and the design of the test, which called for five responses per plate on the vocabulary section. The major advantages of the ACLC were ease by which the test was modified for use in a total communication approach and the large variety of vocabulary items tested.

The Ski-Hi also failed to show any relevant diagnostic information in terms of the ability of primary level hearing-impaired children to comprehend increasing longer utterances. Relevant information, however, was obtained from the test for the preschool level hearing-impaired children. Since the test was designed specifically for the hearing-impaired many of the vocabulary items had a relationship to this population, i.e. hearing aid. Modifications necessary to adapt this test in a total communication program represented no significant problems. The major advantages of this test included the division of vocabulary items into specific categories which were scored both individually and as a whole, the selection of stimulus items, the ease by which the test could be modified to a total communications procedure and the ability to administer only part of the test if performance was poor.

For the primary level group the ACL revealed diagnostic information significant to a language intervention program. Examination of the errors made by the preschool group on the TACL showed every test item was missed by at least five of the nine subjects. Raw scores showed all preschool subjects achieved

less than 50% of the test items correct. This large number of incorrect responses made analysis of the preschool errors and subsequent diagnostic information difficult to determine. Modifications necessary for the administration of this test to the hearing-impaired population were easy to make and caused no apparent problem. The major disadvantages of this test were the length of time required for administration and the fact that the complexity of many of the items made it difficult to administer to the preschool group. The major advantages were the age norms given for each test item, the scoring procedures and the ease by which the test was modified to total communication procedure.

The NSST revealed specific diagnostic information for the primary group but showed extreme variability with the preschool group. All nine subjects in the preschool group scored less than 50% correct on the NSST. Little difficulty was encountered with the modifications necessary for administration of the NSST to the hearing-impaired population. The major problem with the test was that out of 40 items 11 had no comparable counterparts on more extensive grammatical tests such as the TACL and the M-Y. Since the NSST was a screening test one would expect that more extensive grammatical tests would cover all the items examined on the NSST. The major advantage of the NSST was the administration time.

The M-Y test revealed generally lower scores for the preschool than the primary group. The preschool group showed all scores to be less than 60% correct. Diagnostic information obtained on the preschool group was limited by inconsistencies in scores and the large number of errors. For the primary group relevant diagnostic information was obtained. Modifications for administration of the M-Y test in a total communication setting required training the proper names of the characters before administration. The major advantage of this test, especially with the preschool group, was that the grammatical structures tested were not as complex as many items on the TACL.

This allowed for determination of more practical diagnostic information in terms of the language achievement of the hearing-impaired population. The major limitation, especially with the preschool population, was the length of the test.

The present investigation also revealed that the percentage of agreement among the three grammatical tests (TACL, M-Y & NSST) on similar items was generally low. The low percent of agreement among the three tests indicates that the information obtained depended on which test the subject was given. Any diagnostic information obtained should be used primarily as an indicator of those areas that are in need of further investigation before an intervention program is established.

The results of this study indicate that language comprehension tests can be modified for use with the hearing-impaired population in a total communication setting, provided the information obtained is used as supporting material to more specific evaluations. With the preschool group, the tests yielding the most information were those involving vocabulary and memory span rather than specific grammatical structures. For the primary group, the tests giving the most diagnostic information were the M-Y test and the TACL, both of which tested specific grammatical structures.

APPENDIX

Critiques of the six tests of language comprehension used for this study.

Peabody Picture Vocabulary Test (PPVT); Lloyd Dunn; American Guidance Service Inc., Circle Pines, Minnesota; \$12.00.

The PPVT was designed to provide an estimate of a subject's verbal intelligence by measurement of his hearing vocabulary. The age range for the test is from 2-6 to adult. Administration time for the PPVT is approximately 10-15 minutes.

The test consists of 150 plates, each containing four black and white illustrations. There are two test forms, A and B. Administration of the PPVT requires the child to point to the pictured item that represents the word given by the examiner. One response is required per plate.

Administration of the PPVT should start on the beginning plate (given in the manual) for the subjects chronological age. Continue with the administration of the plates until the subject makes his first error. If at this point the subject has not made eight consecutive correct responses, drop back to the starting point and work backwards until a total of eight consecutive responses has been made by the subject. This point is referred to as the basal. When the basal is established continue testing forward from the point of first error until the subject makes six errors in any eight consecutive presentations. The last item presented is referred to as the ceiling. If the test is started at too advanced a level, the subject will immediately make errors. If this occurs drop back 15 or 20 items and begin again.

Verbal reinforcement may be used during the test administration to keep the

subject motivated. The examiner should avoid allowing the subject to see the printed words, using the words in sentences, and defining or spelling the items.

A raw score for the PPVT is derived by subtracting the number of errors from the number of the ceiling item. All items below the basal are assumed to be correct. The raw score can be used to derive a mental age equivalent, an intelligence quotient, and a percentile equivalent.

Normative data for these derived scores were obtained on 4,012 subjects whose ages ranged from 2-6 to 18 years. All subjects were given both forms of the test.

Assessment of Children's Language Comprehension (ACLIC); R. Foster, J. Ciddan and J. Stark; Consulting Psychologist Press, 577 College Avenue, Palo Alto, California 94306; \$42.25.

The ACLIC is a receptive language test that measures the child's ability to comprehend increasingly longer utterances. The test is designed to enable the clinician to determine at what level the child is unable to process and remember lexical items in syntactic sequences. The age range for the ACLIC is from 3-0 to 6-6 years of age. Administration time is approximately 15 to 20 minutes.

The ACLIC incorporates five types of syntactic structures, (a) agents, (b) objects, (c) actions, (d) relations, and (e) attributes. These are referred to as critical elements. The test is divided into four areas of assessment, consisting of core vocabulary and two, three and four critical element sequences.

The test materials consist of 40 plates of black and white illustrations, 10 for each of the four sections of the test. Administration of the ACLIC requires the child to point to the pictured item that represents the word or phrase given by the examiner. On Part A the child is required to identify 50 core vocabulary items, consisting of common count nouns, present progressive verbs, prepositions and modifiers, which are represented by five illustrations per plate. Part B, C, and D contain the same vocabulary as Part A, but in longer constructions. For Part B (two critical element combinations) and Part C (three critical element combinations) there are four black and white illustrations per plate. Each plate consists of the correct item and three foils each differing from the correct response by one critical element. For Part D (four critical element combinations) the response and four foils. For Parts B, C and D only one response is required per plate.

The score for Part A is the total number of correct responses. Scores for Parts B, C and D are computed by taking the number correct/10 x 100 to

give a percent correct for each section. The arrangement of the responses on the score sheet allows for the assessment of the pattern of words missed within a sequence to see if one element is missed with more consistency than the others.

Normative data, in the form of mean scores, for the ACLC was gathered from 365 nursery school and kindergarten children. The kindergarten group consisted of 50% White children, 30% with Spanish surnames, 11% Native Americans and 9% Black children. Approximately 20% of the nursery school children were Black.

Ski-Hi Receptive Language Test; T. Longhurst, D. Briery and M. Emery; 1973; Kansas State University; Unpublished.

The Ski-Hi is designed to probe the child's ability to comprehend single word utterances as well as two, three and four word combinations. It is designed primarily for hearing-impaired children and is to be readministered at three month intervals throughout the child's language development. The age range for the test is approximately 1-6 to 6-0 years. Administration time for the Ski-Hi is approximately 20 minutes.

The Ski-Hi incorporates five categories of syntactic structures, agents (animate nouns), objects (inanimate nouns), actions (verbs), attributes (Modifiers), and relations (prepositions). The test is divided into four areas of assessment, consisting of vocabulary and two, three and four critical element sequences.

Test materials consist of 50 plates of brightly colored illustrations. Administration of the Ski-Hi requires the child to point to the pictured item that represents the word or phrase given by the examiner. On Part A the child is required to identify 100 vocabulary items consisting of nouns, verbs, prepositions and modifiers, represented by five illustrations per plate.

Only three vocabulary items are presented per plate. When a category is completed the remaining two items on each plate are administered. Scoring requires the computation of a percent correct for Part A and each of its five categories. Criteria for Part A is 50% of the items correct for each category to proceed to the next category. The total score for Part A must be at least 70% before beginning Part B.

Part B (two word combinations) and Part C (three word combinations) consists of 10 plates each with four brightly colored illustrations (the correct item and three foils). For Part D (four word combinations) the subject is shown 10 plates with five illustrations per plate (one correct

response and four foils). For parts B, C and D only one response is required per plate.

Scoring for Parts B, C and D is done by taking the number correct/10 x 100 to give a percent correct for each section. The score sheet provides for the assessment of the pattern of words missed within a sequence to see if one element is missed with more consistency than the others.

No normative data is available for the Ski-Hi.

Test For Auditory Comprehension of Language (TACL); Elizabeth Carrow; 1973; Learning Concepts, 2501 N. Lamar, Austin, Texas 78705; \$35.25.

The TACL was designed to measure the auditory comprehension of linguistic structures and to allow the examiner to determine the areas of linguistic difficulty for an individual. The age range for the test is from 3-0 to 6-11. Administration time for the TACL is approximately 20 minutes.

The test consists of a set of 101 plates each containing three black and white illustrations designed to represent vocabulary items, grammatical categories, and morphological and syntactic structures. A correct response consists of a child correctly pointing to a picture representing a word, phrase or sentence presented by the examiner. Each item is presented exactly as it appears on the score sheet, and tag phrases such as "show me" are not used unless specifically indicated. Each correct response counts as one point and the total score is the total number of items passed. The raw score is divided into subscores for broad categories. Percentile scores and language ages can be derived for comparison with norms ranging from 3-0 to 6-11 years of age. The norms were based on 2,000 middle class Black, Mexican-American, and Anglo children ranging in age from three through six.

The score sheet consists of a response section and an analysis section. On the response section, the examiner writes the child's responses in the appropriate column. Each item on the response sheet is followed by ages at which 75 and 90 percent of subjects should pass the item. The examiner then transfers the items to the analysis section in one of three subscores which include vocabulary, morphology and syntax. The procedure provides an indication of the areas of difficulty and also serves as a method for judging maturation or change in previous performance.

Northwestern Syntax Screening Test (NSST); Laura Lee; 1969; Northwestern University, Evanston, Illinois; \$10.00.

The NSST is intended to be used as a screening instrument only. It is designed for use by school clinicians for screening large numbers of children who need a quick estimate of syntactic development. The NSST is designed to isolate those children between 3 and 8 years of age who are sufficiently delayed in syntactic development. Administration time for the NSST is approximately 15 minutes.

The NSST measures both receptive and expressive syntactic forms using identical linguistic structures in both parts. For this study only the receptive portion was used.

Receptive

The test materials consists of 20 plates with four black and white illustrations per page, two foils and two responses. Administration of the NSST requires the child to point to the pictured item that represents the verbal stimulus presented by the examiner. Two responses are required per plate. The asterisked sentence of each pair should be elicited first. The sentence pairs have been prearranged in the order in which 242 children age 3-0 to 7-11 accomplished the tasks. If a child does not respond readily, the examiner may repeat the sentence.

A score of 1 is given for each correct response. The total scores for all items on the receptive part are added at the bottom of the score sheet for a raw score. This can be used to derive a percentile ranking.

Normative data for the NSST was collected from 242 children, ages 3-0 to 7-11. The author states that any child whose score is below the 10th percentile for his chronological age warrants further study.

The Miller-Yoder Test of Grammatical Comprehension (M-Y) experimental edition; Jon Miller and David Yoder. David E. Yoder, Department of Communication Disorders, University of Wisconsin, Madison, Wisconsin; Unpublished.

The M-Y Test is a picture selection test designed to measure children's grammatical comprehension. The test was originally designed to examine and compare the language development of the retarded with the language development at normal children. The age range for the M-Y test is from 3-0 to 7-0 years of age. Administration time is approximately 40 minutes.

The test consists of 84 sentences forming 42 sentences pairs composed of ten basic grammatical forms; (1) active, (2) Prepositions, (3) Possessive, (4) Negative/Affirmative Statements, (5) Pronoun, (6) Singular/Plural, noun and verb, (7) Verb Inflections, (8) Modification, subject and object, (9) Passive Reversible, and (10) Reflexivization.

The stimulus materials include 42 plates, each containing 4 black and white illustrations (two foils and two pictures identifiable from the stimulus sentences). The 42 plates are presented twice requiring a total of two responses per plate. A correct response consists of a picture representing a sentence presented by the examiner.

Responses are recorded on a data sheet, which are then transferred to a Comprehension Test Results Form which lists the grammatical categories in order so the items missed can be reviewed. The test scoring is informal so no raw score is obtained, thus no percentile score or language age may be derived. No norms are available for the M-Y test.

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A COMPARISON OF SIX TESTS OF LANGUAGE COMPREHENSION
ADMINISTERED BY A TOTAL COMMUNICATION APPROACH
TO HEARING-IMPAIRED CHILDREN

by

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ABSTRACT

This study examined the use of language comprehension tests with hearing-impaired children trained in a total communication approach. It attempted to find a viable method to assess the language comprehension of hearing-impaired children who incorporate signing as a major means of communication.

Six tests of language comprehension; the Peabody Picture Vocabulary Test, the Assessment of Childrens Language Comprehension, the Miller Yoder Test of Grammatical Comprehension (experimental edition), the Carrow Test for the Auditory Comprehension of Language, the Northwestern Syntax Screening Test, and the Ski-Hi Receptive Language Test, were chosen for administration to a group of twenty-one hearing-impaired children. All the children attended public school classrooms for the hearing-impaired. The subjects were being instructed in a total communication approach using Signing Exact English as their manual signing system. They were divided into two groups, primary and preschool, according to the classroom attended. The six tests were administered to all of the subjects by verbalization of the stimulus items accompanied by simultaneous signing.

Each of the six tests was evaluated in terms of the modifications necessary for the administration of the test in a total communication approach, the ease of administration, the diagnostic information obtained, and the applicability of the diagnostic information to an intervention program.

The results of this study indicated that language comprehension tests can be modified for use with the hearing-impaired population in a total communication approach. The diagnostic information obtained from these tests should be used as supporting material to more specific evaluations of the

child's language comprehension. With the preschool group, the tests yielding the greatest information were the Assessment of Children Language Comprehension and the Ski-Hi Receptive Language Test, both of which tested vocabulary and memory span rather than specific grammatical structures. For the primary group, the tests giving the greatest diagnostic information were the Miller-Yoder Test and the Carrow Test both of which tested specific grammatical structures.