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**The Applicability of The Test of Word
Knowledge To Hearing-Impaired Children**

Independent Study
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Central Institute for the Deaf
April, 1999
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LIBRARY
Central Institute for the Deaf

INTRODUCTION

When deaf children and children who have normal hearing are compared in academic areas, research shows that deaf children are behind their hearing peers in reading and language skills. Included in these language skills is the area of vocabulary. Deaf children experience vocabulary and language development problems according to Quigley (cited in Martin, 1978) and deficits that result from both a depletion of auditory input and a scarcity of normal interactions with others (Bamford & Saunders, 1991).

A prelingually deafened child will have problems with oral language development and deficient vocabulary. This leads to low reading competence. Studies show that deaf children make little progress after early plateaus. Heart (1978) noted a plateau in reading skills at the fourth grade level.

Since vocabulary is a very important component of both language and reading development, children at Central Institute for the Deaf are tested annually to determine both their receptive and expressive vocabulary ages, and to chart progress over time. Receptive as well as expressive vocabulary are two of the many areas reviewed when determining whether a student will be successful in a mainstream classroom.

Results from an Experimental Project in Instructional Concentration (EPIC), showed that the average receptive vocabulary age scores of the control group were less than half their chronological ages while the scores of the experimental group were slightly more than half their chronological ages (Moog & Geers, 1985). This suggests that while intensive instruction may improve the vocabulary of deaf children, their scores may still lag behind their hearing peers. deVilliers states that even overt, intense classroom instruction is insufficient in its ability to bring a deaf child's inadequate vocabulary up to average (deVilliers, 1991).

Then there is the area of expressive vocabulary. Unlike the trends of vocabulary development in normal hearing children where receptive language usually precedes expressive language, trends in the hearing impaired population are the opposite. Expressive language scores are usually higher than receptive scores for hearing-impaired children.

In a study done by Schafer and Lynch, it was noted that similar to hearing children, deaf children signed or spoke of people important in their lives, objects they could manipulate, and objects whose actions were apparent. The difference between hearing and deaf children's vocabulary was in its rate of development. The average profile of these children's first words were: 51% general nouns (doggie, ball), 14% specific nouns (Mommy, pet names), 14% action words (give, bye-bye, up), 9% modifiers

(red, dirty, mine), 8% social words (yes, no, please), and 4% functions words (what, for) (McAnally, 1987).

There is a discrepancy between the deaf and hearing student when infrequent or abstract words are tested (Walter, 1978); or when the children are required to indicate the various meanings of a word with multiple meanings (Paul, 1984). Failure to grasp words that may have more than one meaning will interfere with comprehension of text (deVilliers, 1991). "Deaf students use fewer English words across all the different form classes: nouns, verbs, adjectives, and connectives." (deVilliers, 1991)

The purpose of this study was to evaluate a receptive and expressive vocabulary test, The Test of Word Knowledge, to determine its applicability to deaf students and to compare its results to the results of the tests currently used at CID to measure vocabulary, such as the Peabody Picture Vocabulary Test (PPVT) and The Expressive One Word Picture Vocabulary Test (EOWPVT).

METHOD

The Tests

The Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn & Dunn, 1981) is a test used to assess the standard American English receptive vocabulary of individuals between the ages of 2 years, 6 months and 40 years (Compton, 1990). Like the Test of Word Knowledge, the PPVT-R test materials include score forms, a picture book with black and white line drawings printed four per page, and an examiner's manual. The PPVT-R (revised in 1965 and further modified in 1981) was normed on a nationwide sample balanced for age, socioeconomic level, geographic region, sex, ethnicity and community size and is a well normed and well designed test (Compton, 1990). The sample size was 5,028 persons of which 4,200 were children and adolescents.

The Expressive One Word Picture Vocabulary Test (EOWPVT) (Gardiner, 1979) measures expressive vocabulary. It was normed on 1,607 children age 2 to 12 in the San Francisco Bay area (Compton, 1990) and may appropriately be administered to children of that age range. In this test, the child names a series of line drawings. The test yields mental age scores, intelligence quotients, percentiles and stanines. One must be careful not to generalize the information due to the specificity of the group on which it was normed.

There is also an Upper Extension version of the EOWPVT, which is for children age 12 to 16 years. It is normed on 465 students aged 12 to 16 years. These students were from the San Francisco Bay area as well.

The Test of Word Knowledge is an in-depth vocabulary test. It was normed on 1,570 normal hearing students ages 5 through 17 years of age. It was stratified on the basis of age, parent education level, geographic region, race, and sex. A total of 66 school districts, located in 26 states participated in the Standardization of the TOWK. The TOWK configuration consists of two core batteries: Level 1 for ages 5 – 8 and Level 2 for ages 8 – 17. This study focuses on level 2.

The TOWK assesses the student's skill in both receptive and expressive vocabulary as well as their knowledge of synonyms, antonyms, common phrases and idioms. The eight sub-tests of the TOWK are: synonyms, figurative usage, word definitions, multiple contexts, expressive vocabulary, receptive vocabulary, word opposites, and conjunctions and transition words. For scoring purposes, the test is divided into core and supplementary sub-tests. The core sub-tests for level 1 are Receptive vocabulary and Word Opposites in the receptive area and Synonyms and Figurative Usage in level 2. The core sub-tests for level 1 are Expressive Vocabulary and Word Definitions and Word Definitions and Multiple Contexts in level 2. The supplementary sub-tests are used to broaden the content and scope of TOWK. These sub-tests allow the examiner to further explore

the deficits in word and concept knowledge beyond the areas included in the core battery. It is a relatively new vocabulary measure, which was compared to the more traditional tests such as the PPVT-R and the EOWPVT.

This test takes an in depth look at word meaning.

Below, are sample questions from each of the eight sub-tests:

<u>Expressive Vocabulary</u>	Pictures of: lighthouse, faucet, diploma	Child would name the object in the picture. Same as PPVT.
<u>Receptive Vocabulary</u>	Four pictures to choose from: fountain, large mountain, male and female ballet dancers, and a bunch of grapes on a vine.	Examiner: "Point to massive." Same as EOWPVT.
<u>Word Opposites</u>	Stimulus word in bold with four choices underneath.	Courage: dishonesty, cowardice, distress, esteem. <i>(Not only does the child have to understand the stimuli, he also has to understand the four choices to make the correct decision.)</i>
<u>Word Definitions</u>	Each word to be defined is on a page. Definitions must include three components.	Lunch: "It's a <u>meal that you eat in the middle of the day</u> in the <u>cafeteria</u> . Aquarium: "It's a large <u>container, made of glass, that holds water that fish can swim in</u> . <i>(The child has to understand the word well enough to meet the three components, and formulate the language to describe the picture.)</i>
<u>Synonyms</u>	Stimulus word in bold with four choices underneath.	Separated: destroyed, disconnected, damaged, injured. <i>(Not only does the child have to understand the stimuli, he also has to understand the four choices to make the correct decision.)</i>
<u>Multiple Contexts</u>	Each word to be described is on a page. Descriptions must be of completely different things, not just different examples of the same thing.	Palm: 1. Inside part of the hand. 2. Tropical tree. Kind: 1. Positive quality of a person. 2. Variety, type, sort. <i>(The child needs to think beyond the concrete and obvious.)</i>

<p><u>Figurative Usage</u></p>	<p>Question at the top of the page, four choices to choose from underneath.</p>	<p>Which one tells about being too sure of yourself?</p> <ul style="list-style-type: none"> a. biting off more than you can chew. b. biting the hand that feeds you c. biting the dust d. biting the bullet <p><i>(The child needs to think beyond the concrete.)</i></p>
<p><u>Conjunctions and Transition Words</u></p>	<p>Item is presented with a cloze sentence. Four choices underneath.</p>	<p>Pam can keep her kite in the air for a long time. (_____), last Thursday she kept it up in the air for over an hour.</p> <p>instead, unlike, nevertheless, as a matter of fact</p> <p><i>(The child needs to add in the one component that is most often left off in their own language.)</i></p>

Subjects

Test participants were students attending Central Institute for the Deaf and ranged in age from 8 years to 14 years, 11 months. Permission slips were sent to the parents of all of the Middle and Upper school children. Ten slips were returned and all were used as subjects. Five were female and five were male. Four of the subjects were upper school students and 6 were from middle school. Five were cochlear implant users and five wore hearing aids.

Testing Conditions

The test was individually administered to the 10 subjects in a quiet room. Administration time was approximately 90 minutes which was separated into three one-half-hour sessions for most of the children. The test requires that

the students look at pictures and give a brief definition in their own words, or read words and choose the most appropriate answer out of a set of four.

The students were approximately three feet away, facing the examiner. The students received amplification from either a cochlear implant or hearing aids. The examiner spoke in a normal conversational tone, and waited for eye contact before each stimulus was presented.

Administration

While the students and the examiner got themselves comfortably situated, the examiner began by asking the students their names and their birthdates. Then, the examiner gave the students a brief description of the test and told them that it was for children from five years old, all the way to 17 years old. They were reminded that some of the questions would be very easy, and some of them would be hard (for the 17-year olds). They were told to guess if they did not know the answer. This was done to put the child at ease, establish rapport, and to make sure that the child and examiner could understand and were familiar with each other's speech.

Depending on the sub-test, appropriate directions were given. The stimuli were presented auditory-visually along with the print that was from the testing manual. Each subject completed two practice questions for each sub-test to ensure comprehension of the task. Although chronological age groupings and starting places were indicated on the test forms, the examiner did not obtain a basal score and started all of the children with question number one.

RESULTS

The children achieved total standard scores ranging from below the average range (51) to within the average range (93) on the TOWK. Overall, the children scored higher on the expressive portion of the test, with a mean of 77.1, than the receptive, which had a mean of 69.6. (Average range = 85 - 115). Scores on the PPVT-R ranges from <40 - 105 and on the EOWPVT from 62 - 97.

Standard Scores as a Function of Age (See Figure 1)

The negative correlation between total Standard Scores of the TOWK and age did not reach significance (-.49). The tendency for scores to decrease with age, so characteristic of deaf children, was not a significant one in this group. However, the oldest student received the lowest score, while the youngest student scored one point below the highest score. There are two possible reasons for this. The first is that the older one is, the more is required of them (It is harder to do better.). The second reason is that the younger implanted students have received their device at a younger age and have been receiving more auditory input, where the older implanted children received their devices at an older age. This means that these young children have had more exposure to vocabulary and language.

Mean Standard Scores (See Figure 2)

Below are the mean Standard Scores of the PPVT-R, EOWPVT, and receptive and expressive components of the TOWK.

Test	Mean Standard Score
TOWK (Rec)	69.6
PPVT-R	57.8
TOWK (Exp)	77.1
EOWPVT	83.0

Typically, the children received higher scores on either of the expressive tests than on both of the receptive tests.

Comparison of Expressive Tests (See Figure 3)

A significant correlation was found between the expressive portion of the TOWK and the EOWPVT (.85). This means that typically, if a child does well on one test, he will do well on the other, and if he does poorly on one, he will do poorly on the other.

Comparison of Receptive Tests (See Figure 4)

The TOWK and the PPVT-R had a very weak correlation (.23) which is not statistically significant. This means that one can not predict performance on one test based on the performance on the other. However,

if the two outlying scores are taken out, a trend can be seen. It is known that the PPVT-R generally provides low scores, which is the case here. However, there are gaps of up to 34 points between the two tests (see chart 2). Not only are there wide gaps between the scores of the tests, but there is a discrepancy between some high and low scores. For example, Student 3 scored 33 points higher on the PPVT-R than the TOWK, while Student 6 scored 34 points lower on the PPVT-R than the TOWK. This is one example that shows that these two tests do not correlate well.

Average Language Profile (See Figure 5)

Below, are high and low scores for the eight sub-tests (average range = 7 – 13).

<u>Sub-test</u>	<u>High Score</u>	<u>Low Score</u>	<u>Mean</u>
Synonyms	8	3	4.3
Figurative Usage	9	3	5.3
Receptive Vocabulary	9	3	5.9
Conjunctions and Transitions Words	6	3	4.2
Word Definitions	10	3	5.8
Multiple Contexts	9	3	6.1
Expressive Vocabulary	10	3	5.8
Word Opposites	11	3	6.5

For most children, the Conjunctions and Transition Words sub-test provided their lowest score. As can be seen from the above chart, it was

also the only sub-test whose high score was not in the average range. Word Opposites has the highest mean score, even though it requires considerable verbal abstract thought.

An Average Language Profile is displayed on Figure 5. The first four columns which represent Receptive Vocabulary are: synonyms, figurative usage, receptive vocabulary and conjunctions and transition words respectively. The second four columns which represent Expressive Vocabulary are: word definitions, multiple contexts, expressive vocabulary, and word opposites respectively.

DISCUSSION

This study was performed to assess the applicability of the Test of Word Knowledge to hearing impaired children. Although this test is very thorough and tests several aspects of language through the eight sub-tests, I do not feel that this test is the best choice for hearing impaired children. In my conclusion, I will discuss three potential problems of assessing hearing impaired children's vocabulary skills with this test.

The first issue that I encountered with this test was attaining a basal score. The examiner should find the child's age on the score sheet, and begin testing at that point. As most deaf educators know, a hearing impaired child's vocabulary level is most likely a couple of years lower than their age. Therefore, I could not begin testing the child at the pre-determined age level. Since I knew all of the test subjects, I could have estimated the point to begin administering the test, but in order to administer the test in a uniform manner, I started all of the children on the first question. I feel that the additional questions the children had to answer may have fatigued them earlier than what would have occurred naturally.

Another problem with finding a basal score was that most of the subjects answered very inconsistently. This may be due to what we call "gaps" in the child's language and vocabulary development. Most of the children did not correctly answer five consecutive questions, even on levels much lower than what corresponded to their age.

The second issue I have with this test is that it has the children performing metalinguistic tasks. Defining words is a very high level function. This task requires that the children have a good understanding of the word, are able to think about what it means and the ways one can use it, and put it in language clear enough to convey the information to someone else. Young children are most likely to describe an appearance rather than give a meaning. Gradually, children are able to give synonyms or explain meanings (Schirmer, 1994). This seems to be a particularly difficult task for hearing impaired children to tackle since most of them have language problems compounded with depressed vocabulary levels. Scores may reflect syntactic in addition to semantic delays.

The third issue that I have with this test is that I was unable to find age-equivalent scores for children who scored poorly on the test. Since all of the children were eight years old or older, they were all scored on level two of the TOWK, which was designed for children eight to 17 years of age. Age-equivalent scores under eight could not be attained on level two of this test. For children older than eight that scored poorly (less than the average eight year old) corresponding age equivalent scores were not provided in the level two normative tables. In addition, when they were scored on level one, their scores were above the highest score provided on the level one normative tables (due to the fact that core sub-tests to be scored on level one are different from the core sub-tests of level two).

Two sub-tests of the TOWK on which deaf children received scores considerably lower than the others were Synonyms and Conjunctions and Transition words. In the synonym portion of the test, the children not only had to read and understand the word, but they also had to read and understand the other four choices in order to choose the one that matched best. The low scores on that portion could be attributed not only to low vocabulary levels, but also poor reading ability, phonetic coding, and phonics skills. As far as conjunctions and transition words go, although they are words frequently occurring in spoken English, they are the words that are most frequently left off a deaf child's language or vocabulary profile.

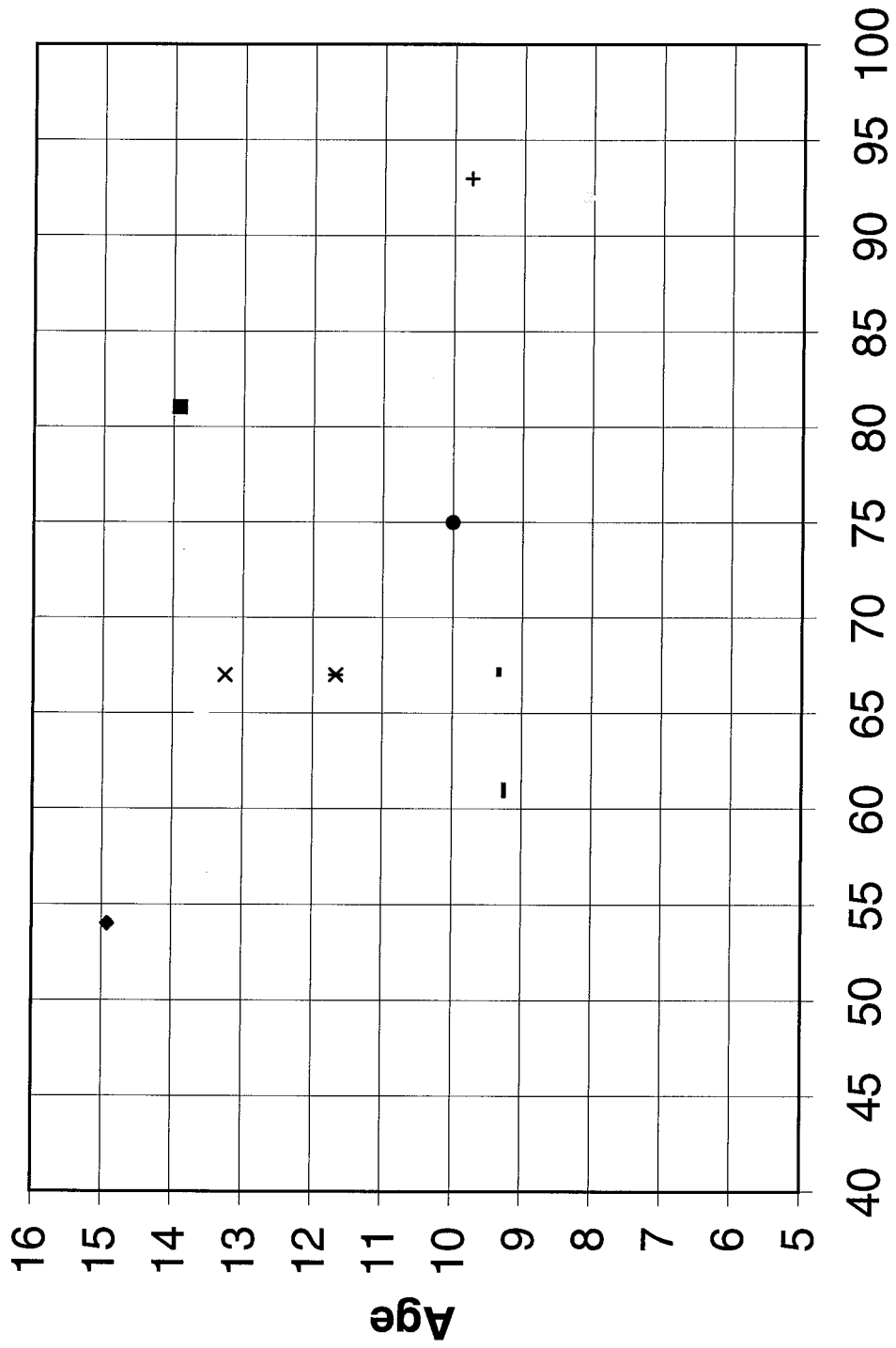
This information could be useful for teachers in developing future language and vocabulary curriculum. Since the eight sub-tests highlight specific facets of vocabulary, one could easily see which areas are strong and which areas need improvement. I feel that the TOWK may be an excellent source of information for teachers as a rating system. However, it should be used as a supplement to rather than a replacement for traditional vocabulary measures such as the PPVT-R and the EOWPVT. I feel that the PPVT-R and the EOWPVT are the most appropriate tests to use to assess the vocabulary abilities of the hearing impaired children in relation to normal hearing children.

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Standard Scores as a Function of Age



Standard Scores

Figure 1

Mean Standard Scores

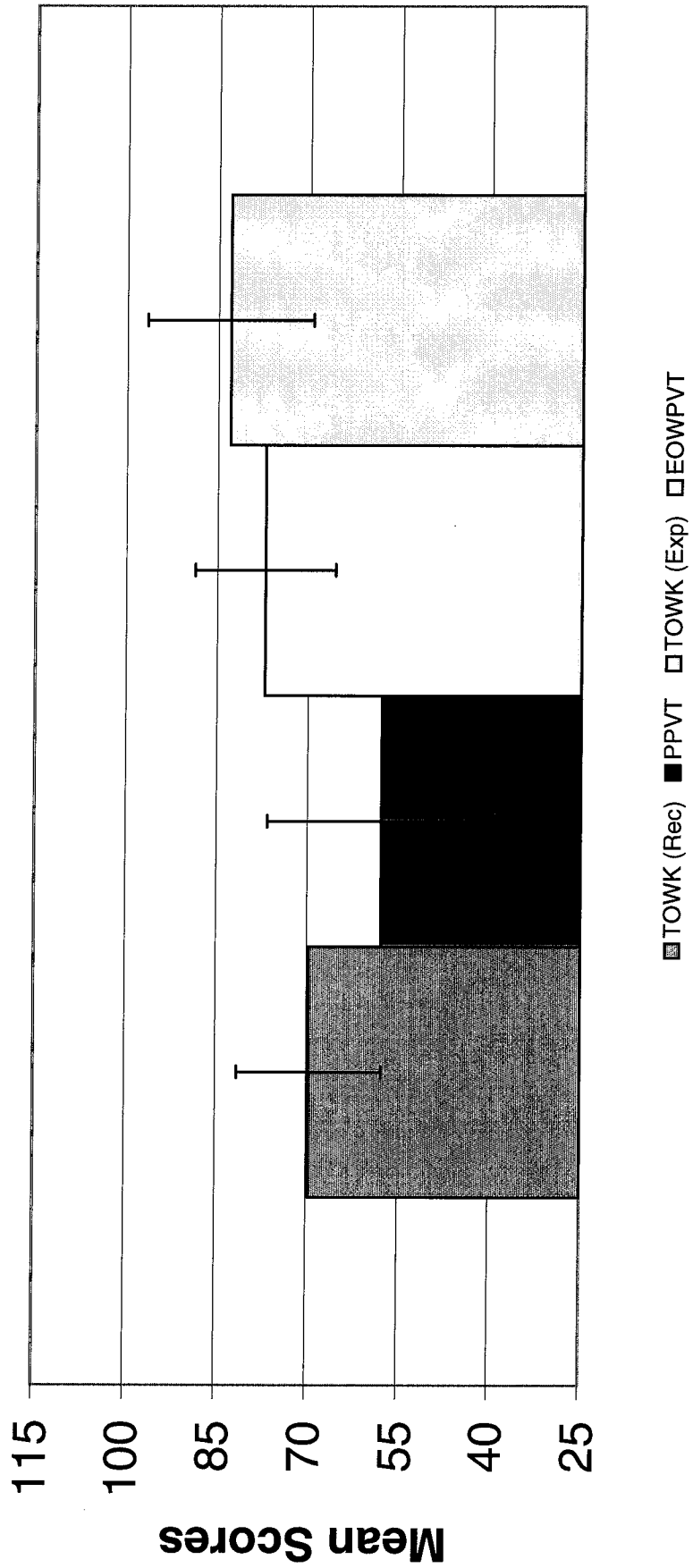
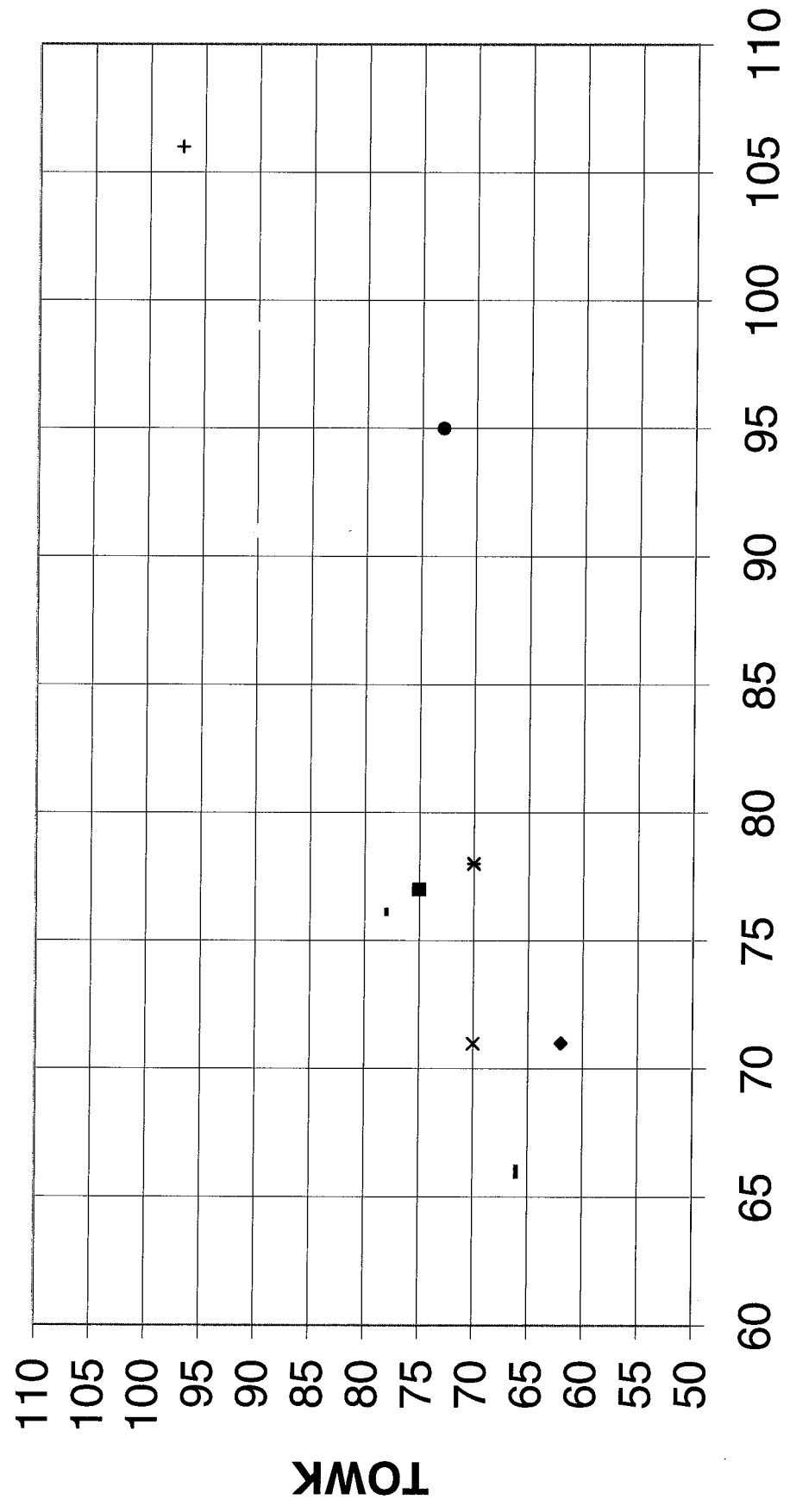


Figure 2

Comparison of Expressive Test Scores



EOWPVT

TOWK

Figure 3

Comparison of Receptive Test Scores

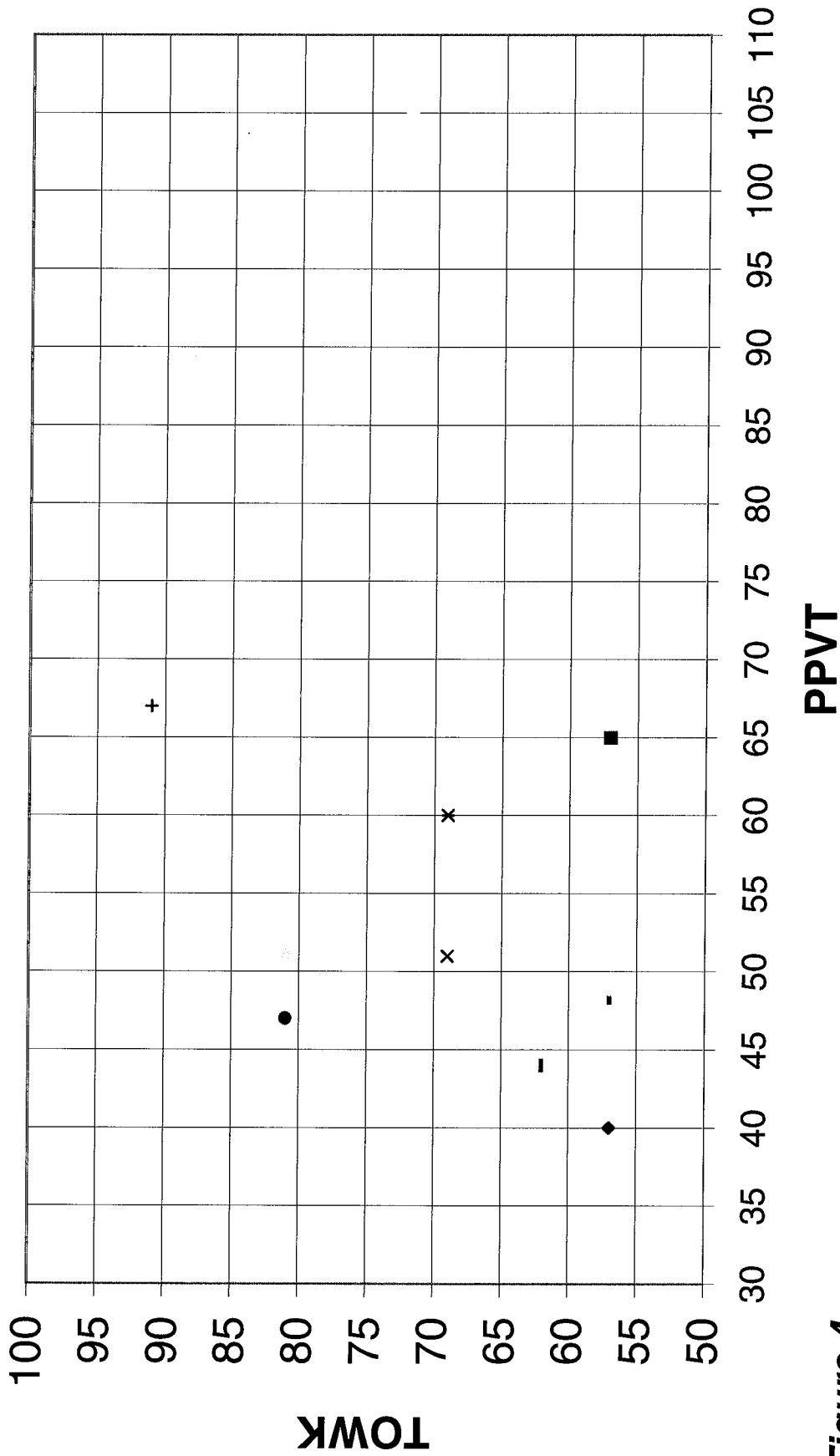


Figure 4

Average Language Profile

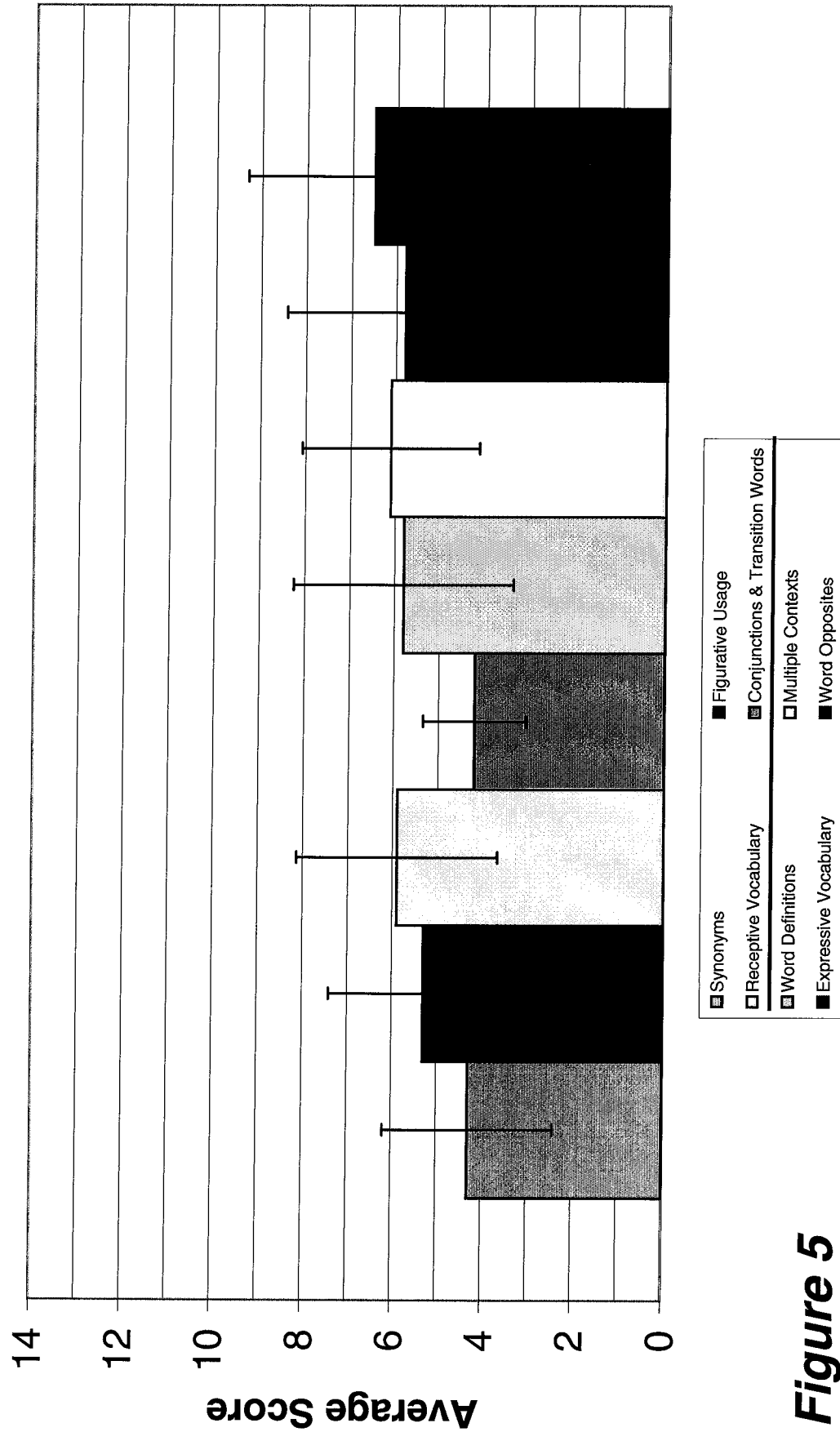


Figure 5

Age Equivalent Scores

<u>Name</u>	<u>Age</u>		<u>Age-Equivalent</u>		<u>Peabody Score</u>		<u>EOWPVT Score</u>	
	<u>Years</u>	<u>Months</u>	<u>Years</u>	<u>Months</u>	<u>Years</u>	<u>Months</u>	<u>Years</u>	<u>Months</u>
Student 1	14	11	<8		5	4	8	4
Student 2	13	11	11	3	13	7	12	9
Student 3	13	7	8	9	8	1	9	8
Student 4	13	3	9	0	6	7	8	9
Student 5	11	8	<8		6	10	8	6
Student 6	10	0	<8		5	2	9	2
Student 7	9	9	8	9	6	4	10	3
Student 8	9	4	9	1	4	11	6	0
Student 9	9	3	<8		4	6	5	1
Student 10	8	1	<8		4	1	6	9

Standard Scores

<u>Name</u>	<u>Receptive</u>		<u>Expressive</u>	
	<u>TOWK</u>	<u>PPVT</u>	<u>TOWK</u>	<u>EOWPVT</u>
Student 1	57	<40	62	71
Student 2	57	65	75	77
Student 3	72	105	90	99
Student 4	69	51	70	71
Student 5	69	60	70	78
Student 6	81	47	73	95
Student 7	91	67	97	106
Student 8	57	48	78	76
Student 9	62	44	66	66
Student 10	81	51	90	91

Percentile Rank

<u>Name</u>	<u>Receptive</u>		<u>Expressive</u>	
	<u>TOWK</u>	<u>PPVT</u>	<u>TOWK</u>	<u>EOWPVT</u>
Student 1	1	4	1	3
Student 2	1	1	5	6
Student 3	3	63	25	48
Student 4	2	1	2	3
Student 5	2	1	2	7
Student 6	10	1	4	37
Student 7	27	1	42	66
Student 8	1	1	7	5
Student 9	1	1	1	1
Student 10	10	1	25	27

Total Standard Score

<u>Name</u>	<u>TOWK</u>
Student 1	54
Student 2	65
Student 3	81
Student 4	67
Student 5	67
Student 6	75
Student 7	93
Student 8	67
Student 9	61
Student 10	92