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Data on the PPVT-R for Black Kindergarteners

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In recent years, the attention of many speech-language pathologists has been focused on the development of language. Many assessment instruments are available to evaluate the language abilities of both children and adults. Speech-language pathologists administer tests which examine the receptive and expressive components of language since difficulties in these components result in a problem with communication.

The Peabody Picture Vocabulary Test-Revised (PPVT-R) is a frequently used instrument for assessing the subject's receptive or hearing vocabulary for Standard English (Dunn

and Dunn, 1981). The PPVT-R is a revised edition of the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959). This revised test broadened the standardization to be nationally standardized on children, adolescents, and adults ranging from two years, six months through forty years of age.

Research on the PPVT-R indicates that although the PPVT-R's standardization may be more broad based than the PPVT, black children and children from other ethnic backgrounds tend to score lower than white children of the same chronological age. The validity of the PPVT-R had been questioned when testing black children (Bracken and Prasse, 1981 and Bing and Bing, 1985).

The purpose of this study was to obtain data from the PPVT-R scores of low and middle SES black kindergarteners in the Portland area to determine if there is a difference between their scores and the scores reported in the PPVT-R. The primary question to be answered was do the scores of black kindergarteners in Portland vary significantly dependent upon SES? The secondary questions this study sought to answer were: what are the means, standard deviations, and ranges of scores for black kindergarteners in Portland and what are the means, standard deviations, and ranges for each two-month age group of black kindergarteners in Portland?

Eighty-two black children, ages five years, four months to six years, ten months from low and middle SES groups

participated in this study. The mean chronological age was five years, eleven months.

Mean raw scores and standard deviations were computed for the low and middle SES groups. The mean score for the low SES group was 55.15 with a standard deviation of 9.56, while the mean score for the middle SES group was 61.10 with a standard deviation of 13.50. A two-tailed *t*-test revealed a statistically significant difference at the .05 level. The mean raw score for the entire test group was 57.26 with a standard deviation of 11.40.

The data obtained in this study with black children differs significantly from the normative data compiled during the national standardization of the PPVT-R. Data from this investigation reflect a need for the speech-language pathologist to be aware of whether instrumentation utilized to test children is racially or culturally biased.

DATA ON THE PPVT-R FOR BLACK KINDERGARTENERS

by

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION AND STATEMENT OF PURPOSE

INTRODUCTION

The development of language is a research issue which is of great concern to the speech-language pathologist. Often research in language development looks at the "normal" development of language. As these investigations are conducted on language development, many language assessment instruments are being re-evaluated and revised, and new tests are being created to assess language.

Many assessment instruments are available which assess the language abilities of children and adults. Speech-language pathologists administer tests which are concerned with the receptive and expressive components of language since difficulties in these components result in a problem with communication.

When assessing the receptive components of language, a frequently used instrument is the Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn and Dunn, 1981). The PPVT-R measures the subject's receptive or hearing vocabulary for Standard English. This instrument is quick and easy to administer within a relatively short period of time and is appropriate for use with individuals from two years, six months through forty years of age.

The PPVT-R, which was published in 1981, is a revised edition of the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959). This new edition contains changes in the areas of standardization, test construction, and test administration from the original PPVT.

Research on the PPVT-R indicates that although the standardization may be more broad based than that of the PPVT, black children and children from other ethnic backgrounds tend to score lower than white children of the same chronological age. The PPVT-R has been found not to correlate with intelligence tests when testing black and hispanic children and the validity of the PPVT-R has been questioned for use with this population (Bracken and Prasse, 1981; Argulewicz and Abel, 1983; Robertson, 1983; and Bing and Bing, 1985). Socioeconomic status (SES) and possibly geographical location have also been found to affect PPVT-R scores (Argulewicz and Abel, 1983; Vance, Kitson, and Singer, 1983; and Bing and Bing, 1985).

STATEMENT OF PURPOSE

The purpose of this study was to obtain data from the PPVT-R scores of low and middle socioeconomic status (SES) black kindergarteners in the Portland area to determine if there is a difference between their scores and the scores reported in the PPVT-R.

The primary question to be answered was do the scores

of black kindergarten age children in Portland vary significantly dependent upon SES?

The secondary questions to be answered in this study were:

1. What are the means, standard deviations, and ranges of PPVT-R scores for black kindergarteners in Portland?
2. What are the means, standard deviations, and ranges for each two-month age group of black kindergarteners in Portland?

CHAPTER II

REVIEW OF THE LITERATURE

The development of language is an issue of primary concern to the speech-language pathologist. Five basic aspects of language have been recognized by researchers: morphology, phonology, pragmatics, semantics, and syntax. Research has been conducted in each of these areas regarding the normal development of each area (Gleason, 1985). In some children, one or more of the basic aspects of language may not develop in accordance with what researchers term the "normal" development pattern. If a child is suspected of not developing language normally, a diagnostic assessment is administered by the speech-language pathologist.

LANGUAGE ASSESSMENT

In order to decide whether or not a language intervention program is necessary for a child, the child must undergo an assessment of his or her language skills. The assessment instruments should reveal in which aspects of language the child is having difficulties or problems and how the child's language skills compare to those of other children the same age. Many assessments may also be used as teaching instruments (the Boehm Test of Basic Concepts) or as predictive indicators of future success (the Predictive Screening Test of Articulation). From the information revealed by the

assessment instruments, the speech-language pathologist should be able to determine if a problem exists and, if so, to plan an appropriate intervention program.

Today speech-language pathologists have many language assessment instruments available to them. An increasing number of investigations are being conducted on the assessment of children's language abilities (McLoughlin and Gullo, 1984). Through these investigations, many language tests have been and are being re-evaluated, revised, and new tests are being created. Speech-language pathologists must carefully examine a test to assure that the test measures what they are wanting to assess.

Traditional language assessments evaluate graphic (reading and writing), expressive (oral), and receptive (auditory) abilities of a child. Graphic evaluation techniques include a sample of the child's creative writing or a reading comprehension test. The expressive and receptive components of language are most noticeable in discourse since they are more frequently used than graphic language (May, 1980). Difficulties in expressive and receptive components of language usually result in a problem with communication. When assessing language, the speech-language pathologist may choose to assess one, or any combination of these components (Bush-James, 1976 and May, 1980).

Language assessments consist of instruments which

evaluate the expressive and receptive components of language. Tests of expressive language include the Carrow Elicited Language Inventory, Developmental Sentence Scoring, Mean Length of Utterance, and the One-Word Expressive Vocabulary Test. Measures of receptive language include the Assessment of Children's Language Comprehension, the Boehm Test of Basic Concepts, the One-Word Receptive Vocabulary Test, and the Peabody Picture Vocabulary Test-Revised (PPVT-R).

The PPVT and the PPVT-R

The Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn and Dunn, 1981) is utilized as a screening instrument in measuring receptive vocabulary skills. Two test forms, Form L and Form M are available. This revision of the Peabody Picture Vocabulary Test (PPVT) contains various changes in the areas of standardization, test construction, and test administration. The revised test has been standardized nationally on 5,025 children, adolescents, and adults from large cities, small towns, and rural areas. Ethnic groups comprised 14.7 percent of the total standardized population. The revised test is normed for persons two years, six months through forty years of age. Revision of the PPVT also resulted in increasing the number of stimulus words from 150 to 175 words. Separate sets of picture plates for both Form L and Form M are utilized. Different instructions are given to subjects below age eight than

to subjects ages eight through forty (Dunn, 1959; Dunn, 1971; and Dunn and Dunn, 1981).

Differences are apparent between the stated purposes of the PPVT and the PPVT-R. Measurement of a subject's hearing vocabulary in order to estimate the subject's verbal intelligence was the purpose of the PPVT. The PPVT-R measures the subject's receptive or hearing vocabulary for Standard American English. Furthermore, the authors (Dunn and Dunn, 1981) attest that the PPVT-R measures only one aspect of general intelligence, vocabulary; it is not a comprehensive test of general intelligence.

Revision of the PPVT has also resulted in changing the terminology used in interpreting the scores of the test. For the PPVT, a raw score was computed for the test, and from this raw score a mental age, percentile score, and the intelligence level could be computed. The PPVT-R replaces the term "mental age" score with an "age equivalent" score, and the "intelligence quotient" score is replaced by a "standard score equivalent." Although Dunn and Dunn (1981) feel the age equivalent is very important, some school districts are more concerned with the standard score equivalent. The receptive vocabulary abilities of a child are believed to be an indicator of overall language development (Kleffner, 1973).

Reliability and Validity of PPVT-R

Many investigations of the reliability and validity

of the PPVT-R are available in the literature (Dunn and Dunn, 1981; Naglieri, 1981; Naglieri and Naglieri, 1981; Bracken and Prasse, 1983; Choong and McMahon, 1983; and Worthing, Phye, and Nunn, 1984). Investigations also show that children score lower on the PPVT-R than on the PPVT. Dunn and Dunn (1981) administered the PPVT Form A and the PPVT-R Form L to 1,849 subjects. The authors found that for raw scores below fifty-five on Form L, Form A scores were lower. Choong and McMahon (1983) note that in sixty-five of eighty subjects tested, the PPVT scores were higher than the PPVT-R scores. PPVT IQ scores were found to be significantly higher than PPVT-R Standard Score Equivalents when testing a sample of eighty-eight preschool children (Naglieri and Naglieri, 1981). Bracken and Prasse (1983) found a correlation of .87 between Form L and Form M of the PPVT-R when testing a group of predominatly white children, and suggested that the two forms could be used interchangeably without loss of accuracy.

The PPVT-R and Other Language Tests

The PPVT-R has been compared to other language assessment instruments by McLoughlin and Gullo (1984). Twenty-five white, middle-class preschool children were administered the PPVT-R, the Test of Early Language Development (TELD) and the Preschool Language Scale-Revised (PLS). The authors sought to compare the predictive abilities of the PPVT-R and the TELD, which are screening tests, with the PLS

which is a diagnostic test. Significant differences were not found between the children's mean scores for the PPVT-R (110) and their mean scores for the TELD (112). Comparison of PLS mean scores (129) with the mean scores of the PPVT-R (110) indicate a significant difference (McLoughlin and Gullo, 1984).

The PPVT-R and Intelligence Tests

Dunn and Dunn (1981) do not purport that the PPVT-R is a test of general intelligence, yet many researchers have conducted investigations comparing the PPVT-R to intelligence tests (Naglieri, 1981; Kaufman and Kaufman, 1983; Vance et al., 1983; and McLoughlin and Ellison, 1984). Naglieri (1981) found that the PPVT-R correlated positively and significantly with related subtests of the Peabody Individual Achievement Test and the McCarthy Scales of Children's Abilities (MSCA) when testing primary students. When testing thirty-two white preschoolers, McLoughlin and Ellison (1984) found the mean standard scores of the PPVT-R (88.9) highly correlate with mean standard scores of the Kaufman Assessment Battery for Children (K-ABC) (89.5). Vance et al. (1983) note the PPVT-R highly correlates with the McCarthy Screening Test. The PPVT-R underestimates scores on the MSCA for three year olds as revealed in an investigation by Gullo and McLoughlin (1982).

The PPVT-R and Special Populations

When assessing special populations, discrepancies

have been shown between standard intelligence test scores and PPVT-R standard score equivalents (Bracken and Prasse, 1981, Prasse and Bracken, 1981; Breen, 1983; Vance et al., 1983; and Worthing et al., 1984). Results of assessing sixty-one educable mentally retarded students with the PPVT-R and WISC-R, showed the PPVT-R underestimated these children's intellectual ability by approximately five points (Bracken and Prasse, 1981 and Prasse and Bracken, 1981). Breen (1983) found no significant correlation between the PPVT-R and the Woodcock-Johnson Psycho-Educational Test Battery when administering the tests to learning disabled students.

The PPVT-R and Disadvantaged Children

When assessing disadvantaged children, the PPVT-R has been found to underestimate the abilities of these children (McCallum and Bracken, 1981; Naglieri and Naglieri, 1981; Robertson, 1983; and Bing and Bing, 1985). Thirty Head Start children scored significantly lower on both forms of the PPVT-R than on the K-ABC which is a test of general intelligence (Bing and Bing, 1985). Robertson (1983) also reports similar findings of black children scoring lower on the PPVT-R than on the K-ABC.

The findings on disadvantaged children are similar to earlier research pertaining to the PPVT (Rosenberg and Stroud, 1966; Johnson and Johnson, 1971; Matheny, 1971; Willis and Pishkin, 1974; and Goh and Lund, 1977). Johnson

and Johnson (1971) found when assessing Head Start children, the Stanford-Binet Intelligence Scale IQ means were significantly higher than the PPVT means. Kindergarten age children from a low socioeconomic status area were found to have significantly lower PPVT IQs than Columbia Mental Maturity Scale IQs (Rosenberg and Stroud, 1966). Matheny (1971) also notes that the PPVT IQs tend to underestimate WISC IQ scores, and overestimates the incidence of retardation in disadvantaged preschoolers.

The PPVT-R and Ethnic Children

Utilizing the PPVT-R to test black children and children of other ethnic backgrounds should be done cautiously. Research has shown that low SES black children score lower on the PPVT-R than on standardized intelligence tests (Bing and Bing, 1985). Black children score lower on the PPVT-R than on the K-ABC according to Robertson (1983). When testing thirty black children, Bing and Bing (1985) found the mean standard scores of the K-ABC (91.7) and the mean standard scores of the PPVT-R (79.6) to reveal a significant difference. Minority children such as blacks and American Indians tend to score lower on the PPVT-R than on the K-ABC, and appear weak in verbal reception skills perhaps because of their limited background experiences (Bing and Bing, 1985). Bracken and Prasse (1981) found the PPVT-R does not correlate with intelligence tests when testing black and hispanic children.

Results of the research on utilizing the PPVT-R with black children and children from other minority groups are consistent with research on the PPVT, which suggests that the PPVT-R revisions have not eliminated the cultural bias from the test. Kresheck and Nicolosi (1973) found black children's PPVT IQ scores were approximately one year, ten months lower than the white children's scores. Neal (1976) suggested that the PPVT's validity is questionable when used with blacks and other minority groups, and to be aware of the limitations of the test when assessing these children. This suggestion regarding the PPVT may be applicable to the PPVT-R in view of the research conducted to date (McCallum and Bracken, 1981; Robertson, 1983; Bing and Bing, 1985).

The PPVT-R and SES/Geographical Variation

Research studies have been conducted in various parts of the United States utilizing the PPVT-R. In Maryland, Bing and Bing (1985) tested black preschoolers and found they scored over one year below their chronological age. Argulewicz and Abel (1983) found eight year old Mexican-American students in Arizona scored one year below their chronological age, and white students scored eight months below their chronological age. Studies in the North Central United States showed widely varying results. Vance et al. (1983) found white low and middle SES four year olds in Northeastern Ohio scored nine months below chronological age while McLoughlin and Gullo (1984) found white middle-

class four year olds in Northeastern Ohio scored six months above age level. In Illinois, Stoner's (1981) four year olds scored four months below chronological age. Results of these studies suggest that SES and/or geographical location may affect PPVT-R scores although it is difficult to separate the two variables in the above studies.

Consistency and Reliability of PPVT-R

Researchers have also considered internal consistency and alternate form reliability of the PPVT-R utilizing populations of black children (McCallum and Bracken, 1981 and Stoner, 1981) and hispanic children (Argulewicz and Abel, 1983). After testing 132 Mexican-American and Anglo-American children, Argulewicz and Abel (1983) suggest that there is minimal bias in the content of the PPVT-R. They could not discern a pattern of items that were more difficult for either test group. McCallum and Bracken (1981) tested seventy-two black and white children ages three through six, with both Form L and Form M of the PPVT-R. Differences of standard score equivalents between Form L and Form M were nonsignificant when testing the white preschoolers. Standard score equivalents of black children, however, show that Form L was more difficult than Form M. Stoner (1981) found the mean scores for Form L to be 89.5 and the mean scores for Form M to be 93.73, thus indicating a significant difference.

SUMMARY

The PPVT-R is a widely used screening instrument of receptive vocabulary, yet it is not without its limitations. Research indicates that black children score lower on the PPVT-R than white children of a similar chronological age. When assessing black children with the PPVT-R, the test scores derived should be compared to the standardization sample with caution.

This review of the literature suggests a need to establish criteria for screening the vocabulary of black children. Data needs to be gathered on the receptive language abilities of a black population as reflected by the PPVT-R so that the language abilities of black children in Portland being tested may be compared to a similar standardized population.

CHAPTER III

METHODS AND PROCEDURES

METHODS

Subjects

Eighty-two black children, 38 males and 44 females, comprised the subjects for this study. Sex was not a controlled variable and the subjects were divided into two SES groups. The low SES group contained 53 children, with an age range of five years, six months to six years, seven months, and a mean of six years. The middle SES group contained 29 children, with an age range of five years, four months to six years, ten months, with a mean of five years, eleven months. For the total population, the age range was five years, four months to six years, ten months, with a mean of five years, eleven months. In addition, each subject met the following criteria:

1) The child's parent or guardian signed and returned a release form for participation in the study.
2) The child was a kindergarten age child who was not repeating kindergarten.
3) The child's hearing was within normal limits based on an audiometric screening test for the better ear administered at 25 dBHL for the frequencies of 500, 1000, 2000, and 4000 Hz.

4) The child had received no more than 9 months of preschool as indicated by the kindergarten teacher.

5) The child did not have any obvious physical, intellectual or emotional handicaps (such as blindness, Down's Syndrome, or Autism) as indicated by the kindergarten teacher.

The SES grouping was determined by using a modification of the United States Bureau Census Working Paper Number 15, Methodology and Scoring of Socioeconomic Status (1963). This procedure involved assigning a numerical value ranging from 1 to 100 to the reported SES variables obtained from the school. Ratings from 1 to 40 were considered low SES and ratings from 41 to 83 were considered middle SES.

Instrumentation

The Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn and Dunn, 1981) is a nonverbal test of hearing or receptive language which is nationally normed for ages two years, six months through forty years of age. 175 picture plates with four pictures per plate comprise the test. Two alternate forms, L and M are available. Each test form has a separate book of picture plates. A stimulus word is read aloud by the examiner, and the subject is asked to "point to" or "show me" the picture which best illustrates the stimulus word. It is an untimed test which usually takes 5 to 20 minutes to administer.

The examiner begins testing at a point determined

by the subject's chronological age. Testing progresses until the subject makes an error. If eight or more consecutive correct responses have been made by the subject, a "basal" has been achieved, and testing continues. If not, the examiner will work backward from the starting point until a basal is achieved. Testing then continues from the point of error and proceeds until a "ceiling" is established. This ceiling is established at the last picture plate presented when the subject makes six errors in eight consecutive test items. Once the ceiling is obtained the test is terminated, and a raw score is obtained by subtracting the number of errors from the number of the ceiling. The raw score is then converted to a standard score equivalent (SSE) (identical to the PPVT intelligence quotient), age equivalent score, percentile ranks, and stanine scores.

Normative data for ages two years, six months through forty years of age are available. The standardization sample consisted of 4,200 children and adolescents, and 828 adults. Testing was done nationally in rural areas, suburban and small towns, and large cities.

PROCEDURES

Test Administration

The PPVT-R, Form M and a pure-tone audiometric screening were administered to eighty-two black kindergarteners in Portland, Oregon. One-half day was spent with the kinder-

garten classes, establishing rapport with the students. A few days later, each child received an audiometric evaluation and was administered the PPVT-R. The audiometric evaluations and the PPVT-R were administered by this investigator and two other second year graduate students in Speech-Language Pathology and Audiology.

The audiometric screening was conducted in a quiet room. A portable audiometer equipped with earphones was used to administer the air-conducted pure-tone screening test bilaterally. The right ear was screened first. Those subjects who responded to the pure-tone of 25 dBHL at 500, 1000, 2000, and 4000 Hz in the better ear were given the PPVT-R.

The PPVT-R was also conducted in a quiet room. Test instructions were followed for administering the PPVT-R to subjects under eight years of age. Instructions were given verbatim from the test manual and results for each question were recorded in the manner indicated by the test manual.

Test Reliability

Interjudge reliability on the PPVT-R was established between this investigator and two other second year graduate students in Speech-Language Pathology and Audiology. To establish interjudge reliability, five children ranging from five years, four months through six years, ten months were randomly chosen from the kindergarteners to be tested.

Initially, this investigator set up a training session with the other judges to review the administration and scoring procedures of the PPVT-R. After the training session, the investigator administered the PPVT-R to each of the children in front of the other judges. The other judges were also scoring the test on their own score sheets as it was administered. After testing each child, the investigator and the judges compared the scores, with an interjudge reliability of 1.0.

Data Analysis

The data analysis consisted of calculating the means, standard deviations, ranges of scores, a one-way analysis of variance, and a Pearson Product Moment Coefficient (Pearson r). For each SES group the mean standard deviation, and ranges of scores were calculated. A one-way analysis of variance was also calculated to determine if there was a difference among SES groups. Since a significant difference was noted, a *t*-test for independent measures was utilized to calculate the differences. The Pearson Product Moment Coefficient was utilized to determine if there was a correlation between age and test scores or a correlation between SES and test scores.

CHAPTER IV

RESULTS AND DISCUSSION

RESULTS

The stated purpose of this study was to obtain data from the PPVT-R scores of low and middle socioeconomic status (SES) black kindergarteners in the Portland area to determine if there is a difference between their scores and the scores reported in the PPVT-R.

The Introductory Statistics Program for the Apple IIe Computer was utilized to analyze the data (Elzey, 1984). The data analysis in this study consisted of two-tailed *t*-tests for independent means, a one-way analysis of variance, and the Pearson Product Moment Coefficient. A one-way analysis of variance was utilized to examine the distribution of PPVT-R scores among the low and middle SES groups. The means, standard deviations, and ranges were computed for each SES group and for each SES group at each two-month age level. To determine if there was a correlation between age and test scores or a correlation between SES and test scores the Pearson Product Moment Coefficient was utilized. The statistical program also yielded the means, standard deviations, and ranges for the entire test sample and for each two-month age group.

The first research question posed was: do the scores

of black kindergarten age children in Portland vary significantly dependent upon SES? A one-way analysis of variance was performed to determine the distribution of PPVT-R scores among low and middle SES groups (Table I). The raw scores for the low SES group ranged from 30 to 83, and raw scores for the middle SES group ranged from 34 to 95. The one-way analysis of variance yielded a *f*-ratio of 5.389, which is significant at the .05 level.

Results of a two-tailed *t*-test between the low and middle SES groups revealed a *t*-value of -2.31, which was significant at the .05 level (Table II). A series of *t*-tests was also conducted between the SES groups for each two-month age group which contained both the low and middle SES groups. No significant differences were found between any of the two-month age groups (Table III).

Results of the Pearson Product Moment Coefficient found a substantial correlation between the middle SES groups' PPVT-R scores and SES and the middle SES groups' ages and PPVT-R scores (Table IV).

The second research question posed was: what are the means, standard deviations, and ranges of PPVT-R scores for black kindergarteners? Black kindergarten students ranging from five years, four months to six years, ten months were tested in this study. Their mean chronological age was five years, eleven months. Test scores for the group ranged from 30 to 95, with a mean raw score of 57.26 and

TABLE I

ONE-WAY ANALYSIS OF VARIANCE
COMPARING LOW AND MIDDLE SES GROUPS

Source	SS	MS	df	f
Between Groups	664.14	664.14	1	5.389*
Within Groups	985.48	123.24	80	

*Significant at p .05.

TABLE II

ENTIRE GROUP $\bar{x}$, SD, RANGE,
AND t-TEST FOR SES GROUPS

SES	n	$\bar{x}$ age	$\bar{x}$	SD	SSE	Range	df	t
Low	53	6-0	55.15	9.56	86	30-83	80	-2.31
Middle	29	5-11	61.10	13.26	92	34-95		

*Significant at p .05.

TABLE III

$\bar{x}$, SD, RANGE, AND t-TEST
FOR SES GROUPS FOR EACH

TWO-MONTH AGE GROUP

Age Group	SES	n	$\bar{x}$	SD	Range	df	t
5-6 - 5-7							
	Low	8	49.75	9.36	30-59	11	- .08
	Middle	6	67.50	21.08	46-95		
5-8 - 5-9							
	Low	9	55.89	7.85	48-73	12	1.44
	Middle	6	61.17	5.08	58-70		
5-10 - 5-11							
	Low	11	56.27	9.56	44-76	13	- .51
	Middle	5	59.00	10.51	48-73		
6-0 - 6-1							
	Low	5	53.40	11.10	37-63	4	1.43
	Middle	2	40.50	9.19	34-47		
6-2 - 6-3							
	Low	11	58.09	12.57	44-83	12	- .09
	Middle	4	58.75	7.97	50-69		
6-4 - 6-5							
	Low	7	55.00	6.14	46-62	6	-1.63
	Middle	2	62.50	2.12	61-64		

TABLE IV

CORRELATIONAL ANALYSIS OF
AGE AND RAW SCORES
AND SES AND RAW SCORES

SES	n	r for Age and Raw Scores	r for Age and Raw Scores
Low	53	.09	.04
Middle	29	-.40	.44

and a standard deviation of 11.40 (Table V). The mean Age Equivalent for the entire group was four years, eleven months.

TABLE V

$\bar{x}$, SD, AND RANGE OF ENTIRE
TEST GROUP'S RAW SCORES AND AGES

	n	$\bar{x}$	SD	Range
Test Scores	82	57.26	11.40	30 to 95
Ages	82	5-11	3.99	5-4 to 6-10

The third research question posed was: what are the

means, standard deviations, and ranges of PPVT-R scores for each two-month age group of black kindergarteners? Table VI shows that subjects were grouped into 10 two-month age groups containing from 1 to 16 subjects per age group. Standard deviations and ranges were not computed for the 6-8 to 6-9 and 6-10 to 6-11 age groups as there was only 1 subject per group. In Table VI, the mean age equivalent for each group, and the difference between the converted age and the group's chronological age can also be found. The 5-4 to 5-5 age group (comprised of two subjects) scored above chronological age level, yet all the other groups scored below chronological age level.

TABLE VI

$\bar{x}$, SD, RANGE, STANDARD SCORE EQUIVALENT (SSE), PPVT-R AGE EQUIVALENT (AE), AND AGE DIFFERENCE BETWEEN CHRONOLOGICAL AGE AND TEST AGE FOR EACH TWO-MONTH AGE GROUP

Age Group	n	$\bar{x}$	SD	Range	SSE	AE	Difference
5-4 - 5-5	2	79.0	4.24	76-82	118	6-9	+ 1.5
5-6 - 5-7	14	57.36	17.35	30-95	92	4-11	- .7
5-8 - 5-9	14	58.0	7.18	48-73	91	5-0	- .8
5-10- 5-11	16	57.13	9.60	44-76	88	4-11	- .11
6-0 - 6-1	7	49.71	11.66	34-64	79	4-5	- 1.7
6-2 - 6-3	15	58.27	11.25	44-83	85	5-0	- 1.2
6-4 - 6-5	9	56.67	6.31	46-63	81	4-11	- 1.5
6-6 - 6-7	2	56.0	8.49	50-62	77	4-10	- 1.8
6-8 - 6-9	1	46.0			63	4-1	- 2.7
6-10- 6-11	1	60.0			77	5-2	- 1.8

For additional information, results of a two-tailed t-test between the males and females yielded a t-value of -1.16, which was not significant to the .05 level (Table VII).

TABLE VII

$\bar{x}$, SD, AND RANGE FOR MALES AND FEMALES

Sex	n	$\bar{x}$	SD	Range	df	t
Males	38	58.87	11.405	44-95	80	-1.157
Females	44	55.96	11.338	30-83		

DISCUSSION

The first research question posed in this study was: do the scores of black kindergarten age children in Portland vary significantly dependent upon their SES? This study's results reveal a statistically significant difference in the performance of low and middle SES kindergarteners on the PPVT-R. A one-way analysis of variance between low and middle SES groups was significant at the .05 level (Table I). Results of the t-test between the low and middle SES groups were significant at the .05 level (Table II). For each two-month age group that contained both low and

middle SES groups, t-tests were performed between the SES groups, with no results significant at the .05 level (Table III).

The mean chronological age of the low SES group was six years, while the mean chronological age of the middle SES group was five years, eleven months (Table VIII). Only four of the fifty-three students in the low SES group scored at or above their age level, and seven of the twenty-nine middle SES students scored at or above age level. All seven of the middle SES students scoring at or above age level were of an age at or below the mean age for the middle SES group which was five years, eleven months. In the low SES group, two of the students scoring at or above age level were younger than the mean age of six years, while the other

TABLE VIII

STUDENTS SCORING BELOW CHRONOLOGICAL AGE AND AT OR ABOVE CHRONOLOGICAL AGE

	Below	At or Above
Low SES n = 53 x age = 6-0	49	4
Middle SES n = 29 x age = 5-11	22	7

two students were older than the mean age of the low SES group. It is important to note that in the middle SES group which scored at or above age level, all of the students were younger than the mean age of the middle SES group.

Further differences between the low and middle SES groups can be seen when the results of the Pearson Product Moment Coefficient test are analyzed. When comparing SES to raw scores, a substantial correlation was found for the middle SES group, while an almost negligible correlation was found for the low SES group (Table IV). A substantial correlation was also found for the middle SES group when comparing their ages and raw scores, while an almost negligible correlation was found for the low SES group. Results of this study show that in the middle SES group, the younger children performed better than the older children. In the low SES group, no such difference was found.

In the literature, significant differences between low and middle SES groups have been reported, however, no studies reported younger children scoring better than older children. In Willis and Pishkin's (1974) and Goh and Lund's (1977) studies, significant differences were found between the performance of low and middle SES children on the PPVT. Significant differences have also been found between the performance of low and middle SES black children on language tests other than the PPVT and the PPVT-R (Bush-James, 1976).

The results of Willis and Pishkin's (1974) and Goh and Lund's (1977) studies with the PPVT support the suggestion that the significant differences between low and middle SES groups are not uncommon. In Willis and Pishkin's (1974) study, the kindergarteners tested yielded a difference between the low and middle SES mean Standard Score Equivalent (SSE) of 12.0. In Goh and Lund's (1977) study, the mean age for the test group was four years, eight months and the differences between the low and middle SES groups' mean SES is 11.0. The difference between the low and middle SES groups' mean SSE in the present study is 6.0, while the mean chronological age for the entire test sample is five years, eleven months. This difference is slightly less than the difference of the kindergarteners in Goh and Lund's (1977) study, and of the four year olds in Willis and Pishkin's (1974) study. It is important to remember, however, that both Willis and Pishkin (1974) and Goh and Lund (1977) utilized the PPVT which has been reported to yield higher scores than the PPVT-R (Choong and McMahon, 1983).

The scores of low and middle SES males and females were also compared in Willis and Pishkin (1974) and in the present study. Willis and Pishkin (1974) found a difference between the mean SSE for males and females was 8.0, with the females scoring lower. For both the low and middle SES groups the difference between the mean SSE for the males

and females was 8.0 with the females scoring lower than the males in both instances. The present study found a difference between the mean raw scores for males and females was 2.91, with the females scoring lower. The difference between the mean raw scores for the males and females in the present study was not significant.

The second question posed in this study was: what are the means, standard deviations, and ranges of PPVT-R scores for black kindergarteners? Form M of the PPVT-R was administered to eighty-two black kindergarteners in the Portland area. The mean chronological age for the group was five years, eleven months. The mean raw score for the group was 57.26 (an age equivalent of four years, eleven months) and the standard deviation was 11.40 (Table I). The difference between the converted age equivalent and the mean chronological age of the test group is twelve months, resulting in the test group scoring twelve months below the actual mean chronological age of the test group.

The chronological versus age equivalent results of this study are supported by Stoner (1981), Harnett and Fellendorf (1983), and Bing and Bing (1985). Stoner (1981) tested 79 black Head Start children with the PPVT-R and found a mean chronological age of four years, nine months, and an age equivalent five months below the group's mean chronological age. Harnett and Fellendorf (1983) utilized 40 children from all SES levels whose mean chronological

age was five years with a mean age equivalent of one year, two months below chronological age level. Bing and Bing's (1985) study with the PPVT-R utilized 30 black Head Start subjects whose mean chronological age was four years, two months yielded an age equivalent of one year, two months below chronological age level.

In the forementioned studies, the black students' mean chronological ages were less than the mean chronological age of the students in the present study. Bing and Bing's (1985) study, with the youngest mean chronological age of the studies mentioned, revealed a significant difference between the age equivalent and the chronological age. Studies in which the students tested are older than Bing and Bing's (1985) students still reveal this significant difference between age equivalent and chronological age (Stoner, 1981; Abel and Arguelwica, 1983; Harnett and Fellendorf, 1983). This seems to indicate that the gap between a child's chronological age and PPVT-R age equivalent may begin to occur very early in the child's life, and as the child becomes older the gap does not appear to narrow. The overall results of the present study indicate that this assumption may be true. Of the 10 two-month age groups in this study, 9 of them support these findings. Several factors may enter into the 1 test group contradicting these findings, including a small sample size and environmental factors.

A third question posed in this study was: what are

the means, standard deviations, and ranges of PPVT-R scores for each two-month age group of black kindergarteners? All 10 two-month age groups tested yielded a significant difference between the chronological age and the converted age equivalent (Table II). Students in 1 group scored 1-7 years above their chronological age level while students in the other 9 groups scored from 7 months to 2-7 years below their age level. When grouping results together, the following results were noted: 1) ages 5-4 to 5-5 scored 1-7 years above age level, 2) ages 5-6 to 5-11 scored less than 1 year below age level, 3) ages 6-0 to 6-11 scored over 1 year below age level.

The age groups 6-8 to 6-9 and 6-10 to 6-11 contained one subject per group, and the age groups 5-4 to 5-5 and 6-6 to 6-7 contained two subjects per group. Two of these groups (5-4 to 5-5 and 6-8 to 6-9) yielded the most variant scores of the entire test sample. Test results for these four groups cannot be regarded as statistically valid due to the small sample of these groups. Larger samples for each of these four groups would be necessary for the results to be statistically valid.

By way of summary, the mean PPVT-R scores for this investigation indicate a significant difference between the mean age equivalent for the group and their chronological age. The results of this study indicate that black kindergarteners in the Portland area score twelve months

below their chronological age when the PPVT-R is utilized. Results of this study also indicate that of 10 two-month age groups, 9 of these groups yield depressed Age Equivalent's when compared to chronological age. This study also reveals that there is a significant difference between the low and middle SES groups, with the low SES group scoring significantly lower. It has been established in this study, that the PPVT-R scores of kindergarten age black children in Portland are depressed an average of twelve months below their chronological age level. Hence, it is important to keep this data in mind when interpreting the normative data for the PPVT-R.

CHAPTER V

SUMMARY AND IMPLICATIONS

SUMMARY

In recent years, the attention of many speech-language pathologists has been focused on the development of language. Many assessment instruments are available to evaluate the language abilities of both children and adults. Speech-language pathologists administer tests which examine the receptive and expressive components of language since difficulties in these components result in a problem with communication.

The Peabody Picture Vocabulary Test-Revised (PPVT-R) is a frequently used instrument for assessing the subject's receptive or hearing vocabulary for Standard English (Dunn and Dunn, 1981). The PPVT-R is a revised edition of the Peabody Picture Vocabulary Test (PPVT) (Dunn, 1959). This revised test broadened the standardization to be nationally standardized on children, adolescents, and adults ranging from two years, six months through forty years of age.

Research on the PPVT-R indicates that although the PPVT-R's standardization may be more broad based than the PPVT, black children and children from other ethnic backgrounds tend to score lower than white children of the same chronological age. The validity of the PPVT-R had been

questioned when testing black children (Bracken and Prasse, 1981 and Bing and Bing, 1985).

The purpose of this study was to obtain data from the PPVT-R scores of low and middle SES black kindergarteners in the Portland area to determine if there is a difference between their scores and the scores reported in the PPVT-R. The primary question to be answered was do the scores of black kindergarteners in Portland vary significantly dependent upon SES? The secondary questions this study sought to answer were: what are the means, standard deviations, and ranges of scores for black kindergarteners in Portland and what are the means, standard deviations, and ranges for each two-month age group of black kindergarteners in Portland?

Eighty-two black children, ages five years, four months to six years, ten months from low and middle SES groups participated in this study. The mean chronological age was five years, eleven months.

Mean raw scores and standard deviations were computed for the low and middle SES groups. The mean score for the low SES group was 55.15 with a standard deviation of 9.56, while the mean score for the middle SES group was 61.10 with a standard deviation of 13.50. A two-tailed t-test revealed a statistically significant difference at the .50 level. The mean raw score for the entire test group was 57.26 with a standard deviation of 11.40.

The data obtained in this study with black children differs significantly from the normative data compiled during the national standardization of the PPVT-R. Data from this investigation reflect a need for the speech-language pathologist to be aware of whether instrumentation utilized to test children is racially or culturally biased.

IMPLICATIONS

Research

Further research on the PPVT-R with ethnic populations is indicated. A replication of this study with older black children could be conducted to determine if older black children follow the same pattern of scoring as the kindergarteners in the present study. The present study could also be replicated using a different ethnic population of kindergarteners to determine possible differences from the standardization group.

Future research examining SES effects on PPVT-R scores is also indicated. This research should involve equally balancing the number of subjects in each SES group. If a researcher utilizes two-month age groups, equally balancing the number of subjects in each SES group is indicated. A high SES group should also be included in future research.

An item analysis would also be helpful in determining error patterns of black children or other ethnic children on the PPVT-R. This information would be useful in deter-

mining test items which may be biased.

Research utilizing the PPVT-R could also investigate what factors might be responsible for the higher scores of the middle SES group on this test so that language skills might be targeted to improve the low SES group's scores.

Clinical

Results of this current study indicate that Portland, Oregon black kindergarteners' age equivalents on the PPVT-R are twelve months lower than their chronological age. Black kindergarteners in the Portland area achieve scores similar to black kindergarteners on the East Coast and to Mexican-American children in the Southwest. In comparison to children from the Central Midwest, however, black kindergarteners in Portland score lower than children from the Central Midwest. For this reason caution should be used in interpreting the results of Portland black kindergarteners' performace on the PPVT-R. Based on the results of this study, the PPVT-R is not an appropriate instrument to use with black kindergarteners for diagnostic purposes, and there is a demonstrated need for a more appropriate instrument for testing receptive vocabulary with this population. When only eleven of eighty-two children score at or above age level, this speaks more to the instrument than to the children tested.

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APPENDIX A

PERMISSION LETTER

Dear Parent:

My name is Christy Stocks, and I am a graduate student at Portland State University. I am conducting a study regarding language development in children. I am attempting to find out the accuracy of a language test available to speech-language pathologists. To do this I am asking children at your child's school to be participants in my study.

In this study each child will be administered a brief hearing test and a language test. The language test involves pointing to pictures, and will let us know how many words your child understands. Total testing time will take about 5 minutes of your child's time.

There are no risks or dangers inherent in the procedures of this study. This study will be supervised by Joan McMahon, Associate Professor in the Portland State University Speech and Hearing Sciences Program. You child's identity will remain anonymous at all times. If at any time you wish to withdraw your child from the study, you will be free to do so.

_____ may participate in the study.

_____
Signature of Parent/Guardian

_____
Date

_____
Child's Birthdate

Please return this form with your child tomorrow. If you have any questions leave a message in the office and I will return your call.

Thank you for your time.

Christy Stocks

If your child experiences problems as a result of participating in this study, please contact the Office of Graduate Studies and Research at Portland State University, 229-3423.

APPENDIX B

PPVT-R SCORE FORM

FORM M — TEST ITEMS AND ABBREVIATED INSTRUCTIONS

Administering the TRAINING ITEMS

For most subjects under age 8: Use Plates A, B, and C. Administer as many training item series as necessary to secure three consecutive correct responses.
For most subjects age 8 and over: Use Plates D and E. Administer as many training item series as necessary to secure two consecutive correct responses.

Training Plate	INITIAL PRACTICE SERIES WORDS & KEYS	ADDITIONAL PRACTICE WORDS & KEYS Alternate Series Y	Alternate Series Z	Alternate Series Z
A	bed (1)	baby (2)	spoon (4)	dog (3)
B	chair (4)	banana (3)	knife (1)	kitten (2)
C	sleeping (2)	eating (1)	crawling (3)	crying (4)
D	ship (2)	airplane (4)	canoe (3)	truck (1)
E	mopping (1)	riding (2)	sawing (4)	mowing (3)

(Complete directions are given in Part I of the Manual.)

Administering the TEST ITEMS

Basal: Highest 8 consecutive correct responses
Ceiling: Lowest 8 consecutive responses containing 6 errors
Starting Point: For a subject assumed to be of average ability, find the person's age circled in the margin, and begin the test with that item. Otherwise consult Part I of the Manual for further instructions.
Recording Responses and Errors: Record the subject's response (1, 2, 3, or 4) for each item administered. For each error, draw an oblique line either through the plate number of the item missed, or through the geometric figure, as illustrated below:

12 full .....(3) 2 ♡ or 12 full .....(3) 2 ♡

Every eighth figure is identical to help determine the basal and ceiling. *(Complete directions are given in Part I of the Manual.)*

NOTE: Ages in circles refer to the lowest age in a 6- or 12-month interval. For example, item 1 is the starting item for ages 2-6 through 3-5, and item 30 for ages 5-0 through 5-5. Use item 110 for ages 16-0 and over.

Plate Number	Word	Key	Response	Error
1	car .....(2)			○
2	ball .....(4)			□
3	money.....(3)			△
4	broom.....(2)			Ω
5	bee .....(3)			♡
6	bottle.....(1)			☆
7	circle.....(4)			◇
8	candle.....(2)			○
9	plant .....(1)			□
10	reading.....(4)			△
11	ladder.....(2)			Ω
12	full.....(3)			♡
13	mail.....(4)			☆
14	horn .....(1)			◇
15	pulling.....(1)			○
16	neck .....(3)			□
17	gate .....(2)			△
18	kangaroo .....(2)			Ω
19	lock.....(3)			♡
20	kite .....(1)			☆
21	desk .....(3)			◇
22	pouring.....(4)			○
23	farmer.....(4)			□
24	broken .....(1)			△
25	picking .....(4)			Ω
26	ambulance ....(1)			♡
27	somersault ....(2)			☆
28	time.....(3)			◇
29	bush .....(1)			○
30	whale .....(2)			□
31	wooden.....(2)			△
32	catching .....(4)			Ω
33	cobweb.....(3)			♡
34	river .....(3)			☆
35	track .....(1)			◇
36	peeking.....(4)			○
37	pail .....(1)			□
38	sharing .....(3)			△
39	caterpillar .....(3)			Ω
40	branch .....(2)			♡
41	saddle.....(2)			☆
42	dentist.....(3)			◇
43	eagle.....(2)			○
44	rough .....(4)			□
45	counter .....(1)			△
46	uniform .....(4)			Ω
47	jewelry .....(1)			♡
48	furniture .....(3)			☆
49	coin.....(1)			◇
50	tugging .....(2)			○
51	liquid.....(4)			□
52	ankle.....(4)			△
53	floating .....(1)			Ω
54	binocular.....(3)			♡
55	wrist .....(2)			☆
56	hive.....(4)			◇
57	argument .....(1)			○
58	printing .....(4)			□
59	waiter .....(3)			△
60	root .....(2)			Ω
61	walrus.....(2)			♡
62	swamp .....(1)			☆
63	angle.....(2)			◇
64	jaw .....(4)			○
65	entertainer ....(1)			□
66	directing .....(2)			△
67	artist .....(3)			Ω
68	shore .....(2)			♡
69	pair .....(3)			☆
70	ceiling.....(4)			◇
71	secretary.....(4)			○
72	cliff .....(1)			□
73	flaming .....(3)			△
74	funnel .....(3)			Ω
75	woolly .....(4)			♡
76	nutritious.....(3)			☆
77	construction ...(2)			◇
78	thimble .....(1)			○
79	grain .....(4)			□
80	furious.....(1)			△
81	sorting .....(1)			Ω
82	musician .....(2)			♡
83	greeting .....(3)			☆
84	competition....(3)			◇
85	weary .....(3)			○
86	antler .....(4)			□
87	harvesting.....(1)			△
88	snarling.....(1)			Ω
89	plastering .....(3)			♡
90	triplet.....(4)			☆
91	assisting .....(1)			◇
92	grooming ....(2)			○
93	tropical .....(2)			□
94	scholar .....(4)			△
95	applauding ....(4)			Ω
96	bugle.....(2)			♡
97	nuisance.....(1)			☆
98	gnawing .....(3)			◇
99	easel.....(3)			○
100	compass.....(2)			□
101	escorting.....(4)			△
102	wedge.....(3)			Ω
103	beverage .....(1)			♡
104	cubical .....(4)			☆
105	arctic.....(2)			◇
106	pod .....(3)			○
107	fragment .....(3)			□
108	banister.....(1)			△
109	composer .....(4)			Ω
110	archaeologist ..(4)			♡
111	parallel .....(4)			☆
112	astonished ....(3)			◇
113	liberated .....(1)			○
114	portable .....(2)			□
115	physician .....(4)			△
116	canine.....(3)			Ω
117	agriculture.....(4)			♡
118	solar .....(2)			☆
119	precipitation ...(2)			◇
120	hovering .....(3)			○
121	amphibian.....(1)			□
122	dome .....(3)			△
123	descending....(1)			Ω
124	embracing.....(1)			♡
125	judicial .....(2)			☆
126	mason.....(4)			◇
127	fowl.....(3)			○
128	lubricating.....(1)			□
129	porcelain.....(2)			△
130	appraising.....(3)			Ω
131	beacon .....(4)			♡
132	attire .....(4)			☆
133	nape .....(2)			◇
134	salutation .....(2)			○
135	concave .....(3)			□
136	incisor.....(1)			△
137	dwelling .....(1)			Ω
138	orating .....(1)			♡
139	illumination....(4)			☆
140	submerging....(4)			◇
141	laminated .....(2)			○
142	convergence...(2)			□
143	angler .....(2)			△
144	receptacle.....(1)			Ω
145	enticing.....(3)			♡
146	stamen .....(3)			☆
147	expunging.....(3)			◇
148	prodigy .....(1)			○
149	encumbered ...(3)			□
150	depleted .....(4)			△
151	recumbent ....(1)			Ω
152	equestrian.....(2)			♡
153	caliper.....(4)			☆
154	impale .....(1)			◇
155	ellipse.....(4)			○
156	apparition .....(2)			□
157	gable.....(4)			△
158	rapture .....(3)			Ω
159	edifice.....(4)			♡
160	perusing .....(2)			☆
161	portal .....(1)			◇
162	bovine.....(2)			○
163	mendicant.....(3)			□
164	arable .....(3)			△
165	morass .....(3)			Ω
166	ingenious .....(2)			♡
167	sibling.....(1)			☆
168	laciniate .....(1)			◇
169	deciduous.....(4)			○
170	casement .....(4)			□
171	copious.....(2)			△
172	bumptious.....(4)			Ω
173	imbibing .....(4)			♡
174	consternation ..(3)			☆
175	pedagogue ....(1)			◇

Calculating Raw Score

Ceiling Item .....
minus errors* .....
Raw score .....
*Count errors between highest basal and lowest ceiling or

APPENDIX C

SCORING DATA

5-4 to 5-5

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
63	Mid	5-4	76	6-6	115	84	7
64	Mid	5-4	82	7-0	121	92	8

5-6 to 5-7

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
1	Mid	5-6	95	8-4	132	98	9
5	Mid	5-6	91	7-11	128	97	9
7	Low	5-7	58	5-0	93	32	4
8	Mid	5-7	46	4-1	81	10	3
15	Low	5-7	30	3-3	53	1	1
19	Low	5-7	59	5-1	94	34	4
22	Low	5-7	51	4-5	86	18	3
29	Mid	5-6	68	5-10	104	61	6
32	Mid	5-6	53	4-7	88	21	3
42	Mid	5-7	52	4-6	87	19	3
47	Low	5-6	43	4-0	78	7	2
60	Low	5-6	53	4-7	88	21	3
33	Low	5-7	53	4-7	88	21	3
72	Low	5-6	51	4-5	86	18	3

5-8 to 5-9

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
3	Mid	5-9	55	4-9	88	21	3
16	Mid	5-9	58	5-0	91	27	4
18	Low	5-9	48	4-3	81	10	3
23	Mid	5-9	62	5-4	95	37	4
24	Low	5-8	48	4-3	81	10	3
26	Mid	5-9	62	5-4	95	37	4
36	Low	5-9	58	5-0	91	25	4
38	Low	5-9	61	5-3	94	34	4
41	Low	5-8	73	6-3	106	66	6
49	Low	5-8	53	4-7	86	18	3
57	Low	5-9	53	4-7	86	18	3
62	Mid	5-8	70	6-0	103	58	5
69	Low	5-8	51	4-5	84	14	3
70	Low	5-8	58	5-0	91	27	4
77	Mid	5-8	60	5-2	93	32	4

5-10 to 5-11

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
4	Low	5-11	54	4-8	85	16	3
6	Low	5-10	54	4-8	85	16	3
12	Mid	5-11	73	6-3	105	63	6
13	Low	5-11	76	6-6	108	70	6
14	Low	5-11	66	5-8	97	42	5
34	Mid	5-10	48	4-3	79	8	2
37	Low	5-10	51	4-6	82	12	3
39	Low	5-11	44	4-0	75	5	2
48	Low	5-10	45	4-1	76	5	2
50	Low	5-10	55	4-9	86	18	3
51	Low	5-11	50	4-5	81	10	3
53	Low	5-11	60	5-2	91	27	4
55	Mid	5-11	49	4-4	80	9	2
56	Mid	5-11	63	5-5	94	34	4
66	Low	5-11	64	5-6	95	37	4
71	Mid	5-10	62	5-4	93	32	4

6-0 to 6-1

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
9	Mid	6-1	34	3-6	61	1	1
28	Low	6-1	49	4-4	78	7	2
46	Mid	6-1	47	4-2	76	5	2
54	Low	6-0	64	5-6	95	37	4
58	Low	6-1	37	3-8	85	16	3
73	Low	6-1	54	4-8	83	13	3
75	Low	6-0	63	5-5	93	32	4

6-2 to 6-3

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
2	Low	6-2	63	5-5	91	27	4
10	Low	6-2	83	7-2	112	79	7
27	Low	6-2	58	5-0	87	19	3
30	Mid	6-3	50	4-5	77	6	2
40	Low	6-3	55	4-9	82	12	3
44	Mid	6-2	56	4-10	83	13	3
59	Low	6-3	46	4-1	72	3	1
61	Mid	6-3	60	5-2	87	19	3
68	Low	6-2	46	4-1	72	3	1
74	Low	6-2	77	6-7	106	66	6
76	Low	6-3	56	4-10	83	13	3
78	Mid	6-3	69	5-11	97	42	5
80	Low	6-3	44	4-0	70	2	1
81	Low	6-3	50	4-5	77	6	2
82	Low	6-2	61	5-3	88	21	3

6-4 to 6-5

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
17	Low	6-4	46	4-1	72	3	1
20	Low	6-4	58	5-0	82	12	3
21	Low	6-4	62	5-4	87	19	3
25	Low	6-5	61	5-3	86	18	3
31	Mid	6-4	61	5-3	86	18	3
35	Mid	6-4	64	5-6	89	23	4
43	Low	6-5	48	4-3	81	3	1
45	Low	6-4	56	4-10	80	9	2
67	Low	6-5	54	4-8	78	7	2

6-6 to 6-7

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
65	Low	6-6	50	4-5	70	2	1
79	Low	6-7	62	5-4	84	14	3

6-8 to 6-9

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
11	Mid	6-8	46	4-1	63	1	1

6-10 to 6-11

#	SES	CA	Raw Score	Age Equiv.	SSE	Percentile	Stanine
52	Mid	6-10	60	5-2	77	6	2