


1-1-2009

# Differences in Scores Derived from Age-Based Norms versus Grade-Based Norms on the Kaufman Test of Educational Achievement, Second Edition and Wechsler Individual Achievement Test, Second Edition

Carla Donahue  
donahue14@marshall.edu

Follow this and additional works at: <http://mds.marshall.edu/etd>

 Part of the [Educational Assessment, Evaluation, and Research Commons](#), and the [School Psychology Commons](#)

---

## Recommended Citation

Donahue, Carla, "Differences in Scores Derived from Age-Based Norms versus Grade-Based Norms on the Kaufman Test of Educational Achievement, Second Edition and Wechsler Individual Achievement Test, Second Edition" (2009). *Theses, Dissertations and Capstones*. Paper 572.

RUNNING HEAD: Age-Based Versus Grade-Based Norms

Differences in Scores Derived from  
Age-Based Norms versus Grade-Based Norms on the  
Kaufman Test of Educational Achievement, Second Edition and  
Wechsler Individual Achievement Test, Second Edition

Thesis Submitted to  
the Graduate College of  
Marshall University

In partial fulfillment of the  
Requirements for the degree of  
Education Specialist in  
School Psychology

By

Carla Donahue

Sandra Stroebel, PhD, Committee Chairperson  
Peter N. Prewett, PhD  
Stephen O'Keefe, PhD  
Fred Jay Krieg, PhD

Marshall University Graduate College  
May 2009

ABSTRACT

Traditionally, standardized achievement measures have provided only age-based norms for deriving standard scores from obtained raw scores. In recent years, publications of norm-referenced achievement test have begun to include norms based on grade level. With the addition of grade-based norms, test manuals and interpretation guides have not included clear guidelines indicating when it is advisable to use one type of norm over the other. The purpose of this study was to examine the differences between standard scores obtained using age- and grade-based norms, using the same raw score, for students in the appropriate grade for their age, students who are young for their grade level and students who are old for their grade level using the WIAT-II and the KTEA-2. Additionally, standard scores were obtained using age-based and grade-based norms using the same raw score for students with below average, average, and above average achievement. In general, for students who are in the appropriate grade for their age, grade-based norms yield scores that are not educationally significant, while grade-based standard scores for students who are young for their grade placement are lower than age-based standard scores and grade-based standard scores are higher than age-based standard scores for students who are old for their grade level. Further, results indicate that the differences between age- and grade-based standard scores are greater at lower grades than the higher grades.

## TABLE OF CONTENTS

Abstract.....	2
List of Tables .....	4
List of Figures.....	6
Chapter I: Literature Review.....	7
Need for Study.....	7
Review of Literature.....	9
Chapter II: Method.....	13
Instruments.....	13
Operational Definitions.....	13
Subjects.....	15
Procedure.....	15
Statement of Hypotheses.....	16
Data Analysis.....	18
Chapter III: Results.....	19
Hypothesis 1.....	20
Hypothesis 2.....	21
Hypothesis 3.....	22
Hypothesis 4.....	23
Hypothesis 5.....	24
Chapter IV: Discussion.....	25
Implications for School Psychologists.....	27
Future Research.....	28
References.....	58

## LIST OF TABLES

Table 1: Kindergarten WIAT-II.....	29
Table 2: First Grade WIAT-II .....	30
Table 3: Second Grade WIAT-II.....	31
Table 4: Third Grade WIAT-II.....	32
Table 5: Fourth Grade WIAT-II.....	33
Table 6: Fifth Grade WIAT-II.....	34
Table 7: Sixth Grade WIAT-II.....	35
Table 8: Seventh Grade WIAT-II.....	36
Table 9: Eighth Grade WIAT-II.....	37
Table 10: Kindergarten KTEA-2.....	39
Table 11: First Grade KTEA-2.....	39
Table 12: Second Grade KTEA-2.....	40
Table 13: Third Grade KTEA-2 .....	41
Table 14: Fourth Grade KTEA-2.....	42
Table 15: Fifth Grade KTEA-2.....	43
Table 16: Sixth Grade KTEA-2.....	44
Table 17: Seventh Grade KTEA-2.....	45
Table 18: Eighth Grade KTEA-2.....	46
Table 19: Kindergarten: Age- Versus Grade-Based Norm Difference.....	47
Table 20: First Grade: Age- Versus Grade-Based Norm Difference .....	48
Table 21: Second Grade: Age- Versus Grade-Based Norm Difference.....	49
Table 22: Third Grade: Age- Versus Grade-Based Norm Difference.....	50

Table 23: Fourth Grade: Age- Versus Grade-Based Norm Difference.....	51
Table 24: Fifth Grade: Age- Versus Grade-Based Norm Difference.....	52
Table 25: Sixth Grade: Age- Versus Grade-Based Norm Difference.....	53
Table 26: Seventh Grade: Age- Versus Grade-Based Norm Difference.....	54
Table 27: Eighth Grade: Age- Versus Grade-Based Norm Difference.....	55
Table 28: WIAT-II Average Differences.....	56
Table 29: KTEA-2 Average Differences.....	56
Table 30: Differences between WIAT-II and KTEA-2 Averages.....	57

LIST OF FIGURES

Figure 1: Total Average Differences between Age-Based and Grade-Based Standard Scores...21

Figure 2: Average Differences for Age Appropriate Students.....22

Figure 3: Average Differences for Young Students.....23

Figure 4: Average Differences for Old Students.....24

Figure 5: Difference between Averages.....25

## Chapter I

### Literature Review

J.B. Carroll (1993) defined achievement as “the degree of learning in some procedure intended to produce learning, such as formal or informal course of instruction, or a period of self-study of a topic or practice of a skill”. Standardized achievement tests are intended to assess this learning (Reynolds & Gutkin, 2009 p. 236). Academic achievement tests are used in a variety of school-related situations. For example, achievement test scores are a required part of the assessment information needed when making disability determination decisions for special education services.

Traditionally, when a standardized assessment instruments were developed, they were normed only on the basis of age. Recently, in addition to age-based norms, test developers and publishers have begun to include norms based on grade placement. The purpose of grade-based norms is to compare a student’s academic skills with the academic skills of other students who are at the same grade level. With the addition of grade-based norms, it remains unclear which norms, age- or grade-based, are most appropriate for use in certain situations.

Many tests of academic achievement provide both age-based and grade-based norms for deriving standard scores from raw scores; however, test manuals and other interpretation guidelines provide limited guidance as to which norms it is advisable to use and when to use one type of norm over the other.

#### *Need for Study*

The Essentials of WJ-III Tests of Achievement Assessment (Mather, Wendling, & Woodcock, 2001) states that when an achievement test provides both grade- and age-based norms for interpreting test results, it is advisable within a school setting to use grade-based



norms; however age-based norms should be used in a clinical setting and with adults (p. 100). However, the manual does not provide a rationale or data to support this recommendation. Likewise, although the WIAT-II and the KTEA-2 provide both grade and age based norms, the manuals do not provide any information concerning when to choose one type of norm over the other. Further, the manuals do not provide any technical information concerning the differences in scores that would occur when using one type of norm over the other.

Grade-based norms can be useful in providing valuable ancillary information as to the best educational placement for a student for determining the student's least restrictive environment, such as resource room or full inclusion. Additionally, grade-based norms can provide school psychologists and other school personnel with pertinent information that would aid them in making curriculum decisions and individualized educational programs for students.

Grade-based norms might be helpful in providing a better understanding of the academic skills of a student that is relatively old or young for their current grade placement, such as a student who has been retained, has skipped a grade, or are otherwise older or younger than is typically appropriate for their grade placement.

Age-based norms, on the other hand, compare students to same-aged peers. In the case of a previously retained student, the student's same-aged peers would be one grade level ahead, and as a result, the age-based norms would be expected to provide scores that are relatively low for that individual student, because the student would not have been exposed to the curriculum taught in the next grade level. In this circumstance, the grade-based norms would provide information about the how the student is achieving compared to the other students at the same grade-level and therefore students that have received the same amount of instructional content.

Despite research that shows that grade retention is an ineffective strategy for low-achieving students, retention rates have continued to rise over the past 25 years. It is estimated that three million students are retained in the United States every year (Jimerson, Pletcher, Graydon, Schnurr, Nickerson, & Kundert, 2006). Approximately 3% to 5% of students are considered gifted, that is, having an IQ above 125, but a report urging schools to accelerate the curriculum of gifted students does not indicate the rate of students who are skipping grades due to their giftedness (Viadero, 2004).

Consistent with these statistics, school psychologists are commonly asked to evaluate students who have been retained at some time in their academic career, e.g. an eight-year, nine-month old first grade student, as well as to evaluate students who have skipped a grade, such as a gifted student. This common occurrence in the role of a school psychologist leads to the question of which group it is most important to compare an individual child – his or her age group or his or her grade group.

The main focus of the present study is whether or not the difference between scores derived from age-based norms and scores derived from grade-based norms is different between achievement test batteries. As previously noted, the manuals for achievement tests do not provide this information. Therefore, the difference between the scores derived from age-based norms and scores derived from grade-based norms on the WIAT-II will be compared to the difference between the scores derived from age-based and scores derived from grade-based norms on the KTEA-2 in order to determine if an educationally significant difference exists.

#### *Review of Literature*

A 2005 study compared the use of grade-based norms versus age-based norms when making decisions regarding necessary accommodations for college students diagnosed with

learning disabilities (LD). The importance of this study comes from the ambiguous language regarding the “referent population” in laws such as the Americans with Disabilities Act (ADA) of 1990 and Section 504 of the Rehabilitation Act of 1973, as well as inconsistent court rulings on the issue. Because there is greater variability among the ages of college students than among the ages of students in grades kindergarten through twelve, the use of age-based norms rather than grade-based norms could yield very different scores and diagnoses such as LD versus not LD (Giovingo, Proctor, and Prevatt, 2005).

Participants in the study were 155 college students who were struggling in their course work and were subsequently referred to a clinic for evaluation to determine if a learning disability was the cause of their academic struggles. Of the participants, 49.7% were men and 50.3% were women, their ages ranged from 18 to 53 ( $M = 24.45$ ,  $SD = 7.08$ ), and their mean GPA was 2.47 ( $SD = .54$ ) and ranged from 1.0 – 4.0 on a 4-point scale (Giovingo et al., 2005).

All participants were administered the Wechsler Adult Intelligence Scale, Third Edition (WAIS-III) (1997), Woodcock-Johnson III Tests of Achievement (WJ-III ACH) (2001), and the Woodcock-Johnson III Tests of Cognitive Abilities (WJ-III COG) (2001). Only the results from the WJ-III ACH and WJ-III COG were used because the WAIS-III does not provide grade-based norms. The participants’ scores on the WJ-III ACH and WJ-III COG were derived using both age-based and grade-based norms. All scores were then compared using three commonly used methods of diagnosing LD, intra-individual discrepancy, intellectual ability-achievement discrepancy, and underachievement. Results of the study revealed that using grade-based norms yielded the most LD diagnoses when using two of the three, intra-individual and underachievement methods of diagnosing a learning disability, however, no differences were

found between age-based and grade-based norms using the intellectual ability – achievement discrepancy model of diagnosing LD (Giovingo et al., 2005).

Further results of the study concluded that the intellectual ability – achievement discrepancy model yields the most consistent results. That is, when using this model, a student who is diagnosed LD using age-based norms will also likely receive the same diagnosis using grade-based norms. The same is also true for students determined to not have a learning disability. An additional finding of the study indicated that when using grade-based norms, each individual participant was revealed to be exhibiting more significant struggles when compared to their grade-level peers (Giovingo et al., 2005).

A 2008 study utilized a method similar to that of this present study. In order to assess the differences in standard scores obtained using the Woodcock-Johnson III Test of Achievement (WJ-III ACH) original norms and the updated norms provided in the 2007 Normative Update. In this 2008 study, raw scores were entered into the WJ-III ACH Compuscore program to obtain standard scores as close as possible to 70, 85, 100, 115, and 130. Those raw scores were subsequently entered into the Compuscore program for the WJ-III ACH Normative Update to assess the difference in the standard scores obtained (Cummings, 2008). Like the present study, the 2008 study did not use live participants but scores that could hypothetically be obtained by students of a given age, fifteen- and eighteen-years old, for example.

Findings of the 2008 study indicated that the original scoring norms generally yielded slightly higher standard scores for a given raw scores compared to the updated norms for fifteen-year old students. This was generally true across all given standard scores and subtests examined with few exceptions. The original norms produced higher standard scores; however, the difference was relatively low, usually between zero and three points. For eighteen-year old

students, the updated norms yielded identical scores for students with average academic abilities and slightly higher scores for students with achievement falling in the below average and above average ranges (Cummings, 2008).

A review of related literature has produced few previous studies related to the present study, the Giovingo et al, 2005 study only begins to illustrate the need for further research. Also, the Giovingo et al 2005 study focuses on a much different hypothesis than the present study. Specifically, students in grades kindergarten through twelve are evaluated using measures of ability and achievement to determine the amount information they have acquired through classroom instruction compared to their peers. At the college level, it is reasonably assumed that students have received the same amount of instruction and an evaluation would ascertain how much of that information they have forgotten subsequent to their completion of those courses.

The purpose of the present study is to determine the degree of variability of age-based scores compared to grade-based scores among age groups and across two assessment instruments. This study will be of particular interest to school psychologists because they routinely use achievement measures in diagnosing learning disabilities and in recommending academic placement options.

## Chapter II

### Method

This is a causal-comparative design study that examines the differences between using age-based versus grade-based norms in scoring standardized achievement measures. The first dependent variable is the standard score that is derived from the raw score, which, along with age and grade, are the independent variables. An additional dependent variable is the difference between the age-based and grade-based norms on the WIAT-II and the KTEA-2. The independent variables are the test batteries of the WIAT-II and the KTEA-2.

#### *Instruments*

The Wechsler Individual Achievement Test, Second Edition, WIAT-II, (Wechsler, 2002) and the Kaufman Test of Educational Achievement, Second Edition, KTEA-2, (Kaufman & Kaufman, 2004) are two widely used measures of achievement.

The reliability of the WIAT-II is described in the WIAT-II Examiner's Manual. According to the manual, reliability coefficients range between .82 and .99 depending on the age of the subject and the subtest. Complete reliability information is detailed in Chapter 6 of the Examiner's Manual. Information regarding the standard error of measurement for each subtest is also provided (Wechsler, 2002).

The reliability of the KTEA-2 is described in the manual for the test. According to the manual, reliability coefficients range from .85 to .97 depending on the age of the subject and the subtest. Complete reliability information is detailed in Chapter 7 of the manual (Kaufman & Kaufman, 2004).

#### *Operational Definitions*

Norm-referenced tests are tests in which an individual's performance is compared to others in the same age or grade group (Sattler & Hoge, 2006, p.43). Age-based norms compare

the performance of an individual of a specified age to others of the same age. When grade-based norms are used, a student of a specified grade is compared to others in that same grade.

Students who are relatively old for their grade placement are students who have been retained. A student who has been retained will have a birthday of February 14 a year prior to that of their peers who are in the appropriate grade for their age according to Mather & Jaffe, 2002 (p.15). For example, a student with a birthday of February 14, 2000 who will be beginning second grade in the fall of 2009 would be considered old for his/her grade placement.

Students who are relatively young for their grade placement are students who have been accelerated, or have skipped a grade. A student who has skipped a grade will have a birthday of February 14 in the year after that of their peers who are in the appropriate grade for their age according to Mather & Jaffe, 2002 (p. 15). For example, a student with a birthday of February 14, 2000 who will be beginning fourth grade in the fall of 2009 would be considered young for his/her grade placement.

Students who are appropriate for their grade placement are students that have a birthday of February 14 in the year that makes them the average age for their grade placement according to Mather & Jaffe, 2002 (p. 15). For example, a student who is age appropriate for his/her grade placement would be one with a birthday of February 14, 2000 and beginning third grade in the fall of 2009.

For the purposes of data analysis in this study, “educational significance” will be determined by a difference of one-half standard deviation between standard scores derived from age-based and grade-based norms.

*Subjects*

No live subjects will be used in the study. Hypothetical students, three from each grade from kindergarten through eighth grade, will be given birthdays that make them young for their grade placement, February 14, 2003 and beginning first grade in September 2009, age appropriate for their grade placement, February 14, 2003 and beginning first grade in September 2009, and old for their grade placement February 14, 2002 and beginning first grade in September 2009.

*Procedure*

Three fictitious students from each grade, kindergarten through eighth grade, will be assigned raw scores on the KTEA-2 and the WIAT-II. Students will be given birthdates that will make them young for their grade placement, age appropriate for their grade placement, and old for their grade placement. Each student will be assigned raw scores on five subtests of the KTEA-2 that correspond standard scores, according to age-based norms, of 70, 100, and 130. The subtests are: Letter and Word Recognition, Reading Comprehension, Math Concepts and Applications, Math Computation, and Written Expression. The raw scores associated with these standard scores will be used to determine the standard scores for each subtest according to grade-based norms. This procedure will be repeated for the WIAT-II using the five subtests Word Reading, Reading Comprehension, Numerical Operations, Math Reasoning, and Written Expression. The magnitude of the difference between the age and grade based scores between the two tests will be compared for educational significance.

The five subtests on each measure will be compared to its counterpart on the other measure. In other words, the basic reading subtest will be compared to each other, e.g. the Word Reading subtest of the WIAT-II will be compared to the Letter and Word Recognition subtest of



the KTEA-2. The Reading Comprehension subtest on the WIAT-II will be compared to the Reading Comprehension subtest of the KTEA-2, the Numerical Operations subtest of the WIAT-II will be compared to the Math Computation on the KTEA-2 to yield the Math Computation difference average, the Math Reasoning subtest of the WIAT-II will be compared to the Math Concepts and Applications subtest of the KTEA-2 to yield the Math Reasoning difference average, and the Written Expression subtests on each measure will be compared.

*Statement of Hypotheses*

NULL #1:               The difference between the standard scores derived from subtest raw scores using age-based or grade-based norms will not be educationally significant on neither the WIAT-II nor the KTEA-2.

RESEARCH #1:        The difference between standard scores derived from subtest raw scores using age-based norms will be educationally significant compared to using grade-based norms for all grade levels.

NULL #2:               The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will not be educationally significant compared to scores derived the same way on the KTEA-2 for students who are age-appropriate for their grade placement.

RESEARCH #2:        The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will be educationally significant compared to scores derived the same way on the KTEA-2 for students who are age-appropriate for their grade placement.

NULL #3:               The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will not be educationally

significant compared to scores derived the same way on the KTEA-2 for students who are relatively old for their grade placement.

RESEARCH #3: The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will be educationally significant compared to scores derived the same way on the KTEA-2 for students who are relatively old for their grade placement.

NULL #4: The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will not be educationally significant compared to scores derived the same way on the KTEA-2 for students who are relatively young for their grade placement.

RESEARCH #4: The difference between the standard scores derived from raw scores using age-based or grade-based norms on the WIAT-II will be educationally significant compared to scores derived the same way on the KTEA-2 for students who are relatively young for their grade placement.

NULL #5 When the average differences between standard scores derived from age-based and grade-based norms on the WIAT-II are compared to the average differences between standard scores derived from age-based and grade-based norms KTEA-2, the difference will not be educationally significant.

RESEARCH #5 When the average differences between standard scores derived from age-based and grade-based norms on the WIAT-II are compared to the average differences between standard scores derived from age-based and grade-based norms KTEA-2, the difference will be educationally significant.

*Data Analysis*

The hypotheses for this study state that the difference between the standard scores derived from subtest raw scores using age-based or grade-based norms will not be educationally significant. To determine whether an educationally significant difference exists; the data obtained in the study will be presented in tables according to age and grade-level. The difference between the standard scores derived from age-based norms and grade-based norms will also be in tables and important findings will be presented in graphs. It is inappropriate to use statistical tests, such as a t-test, because any difference between standard scores derived using age-based and grade-based norms are considered “true” differences as no actual subjects were evaluated; thus there is no need to assume a confidence interval. Further, no statistical tests will be used to analyze the obtained data because the specific number that represents an educationally significant difference is arbitrary and is likely to differ according to the individual interpreting the results and the reasons for which the achievement test was administered.

In order to most concisely present the findings of the study, the mathematical means of the differences will be calculated for each grade, each test, and for each subtest examined. In order to determine educational significance, one half of a standard deviation, 7.5, will serve as the cut-off point. A score of 7.5 or above will be deemed as educationally significant.

## Chapter III

### Results

The data collected is presented in Tables 1 through 30. Tables 1 through 9 show the differences between standard scores derived from age-based and grade-based norms on the WIAT-II and Tables 10 through 18 show the differences between standard scores derived from age-based and grade-based norms on the KTEA-2. The tables are separated by grade level, kindergarten through eighth grade, and display scores for age appropriate, young for grade placement, and old for grade placement students. Tables 19 through 27 illustrate the differences in scores across the two achievement tests for each grade.

As can be seen in Tables 1 through 18, the scores derived from grade-based norms using raw scores that correspond to age-based standard scores of 70, 100, 130, unless otherwise indicated, are all lower for young students and higher for older students than for age-appropriate students on both instruments.

The differences between the standard scores derived from grade-based norms compared to age-based norms range from 0 to 30 points across all grade levels, ages, and both achievement test used in the study. For both the WIAT-II and the KTEA-2, the greatest difference can be seen in the younger grades, such as kindergarten, first and second grade. By eighth grade, the differences are less dramatic.

In general, the differences between scores, across both test batteries, is the greatest in students who are young for their grade placement and the smallest differences are seen in students who are the appropriate age for their grade placement. Again, the magnitude of these differences lessens as grade level increases.

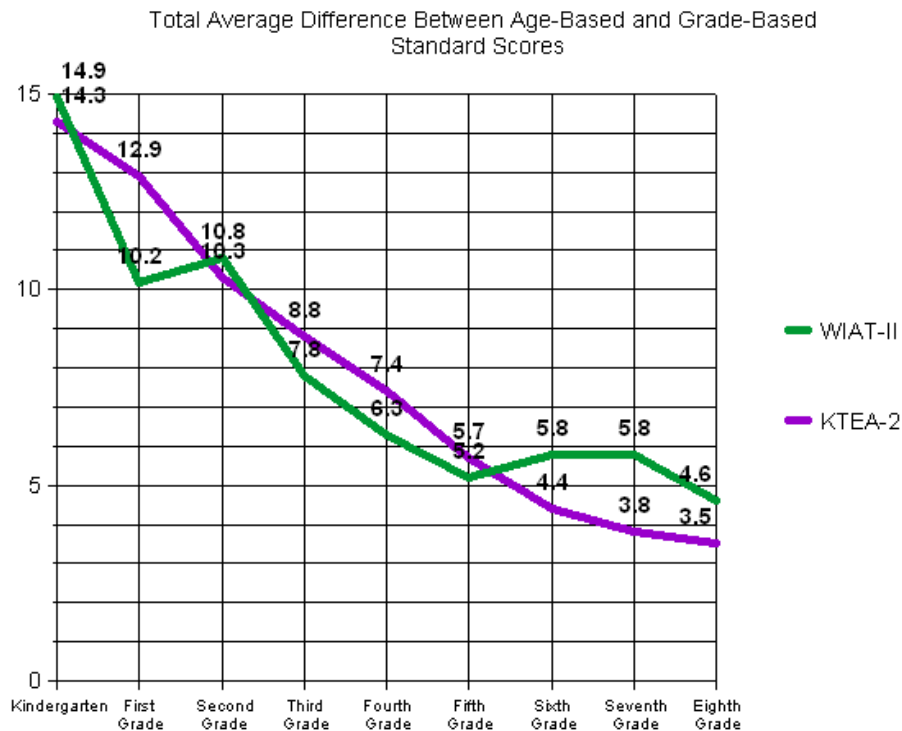
*Hypothesis 1*

The first hypothesis that the difference between the standard scores derived using age-based versus grade-based norms on neither the WIAT-II nor the KTEA-2 will be educationally significant. Results indicate that the difference between standard scores derived using grade-based norms are largely commensurate with standard scores derived using age-based norms for students who are the appropriate age for their grade placement. On average, the standard scores derived using grade-based norms are lower for students who are young for their grade placement and higher for students who are old for their grade placement compared to the standard scores obtained using age-based norms.

Based on the data presented in Tables 28 and 29, the differences that are greater than half of one standard deviation,  $\geq 7.5$ , for grades kindergarten, first grade, second grade, and third grade the null hypothesis is rejected in favor of the research hypothesis that states that the difference will be educationally significant. These scores are 14.9, 10.2, 10.8, and 7.8 respectively for the WIAT-II and 14.3, 12.9, 10.3, and 8.8 respectively for the KTEA-2. The difference being educationally significant is particularly true in the younger grades.

Figure 1 illustrates the findings for this hypothesis.

Figure 1

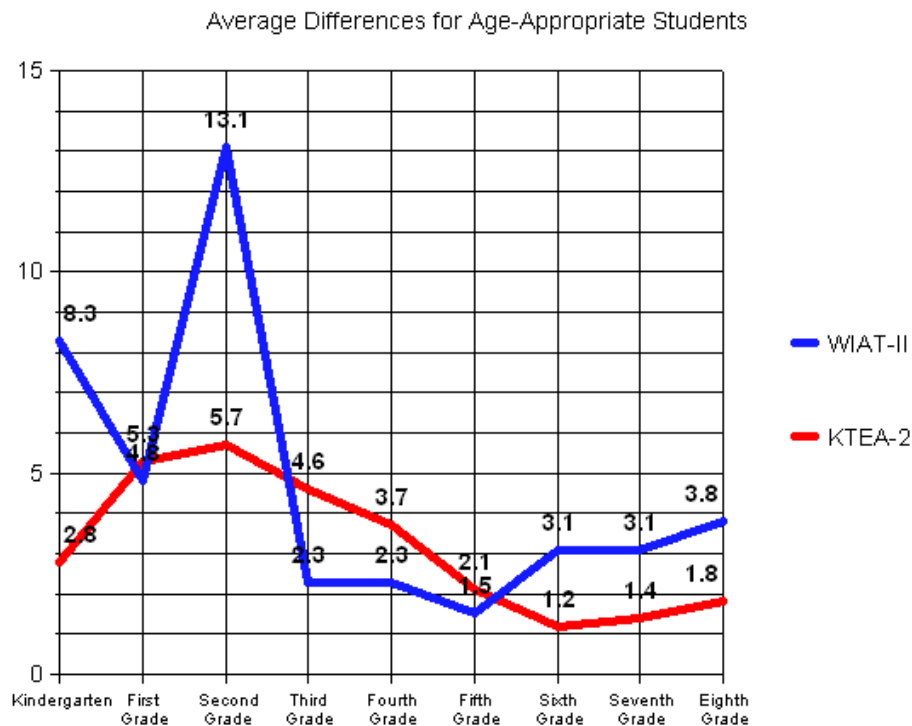


### *Hypothesis 2*

The second hypothesis of the study states that the difference between scores obtained using grade-based norms versus age-based norms will not be educationally significant for students who are the appropriate age for their grade placement using neither the WIAT-II nor the KTEA-2. Based on the average differences presented in Table 28 and Table 29, the null hypothesis is accepted for the KTEA-2, with average differences ranging from 1.2 in sixth grade to 5.7 in second grade and all of which are lower than the one half standard deviation being used to measure educational significance. On the WIAT-II; however, the null hypothesis is accepted for all grade levels except kindergarten with an average difference of 8.3 and second grade with an average difference of 13.1 and is rejected for first grade and grades three through eight.

Figure 2 shows the findings for this hypothesis.

Figure 2

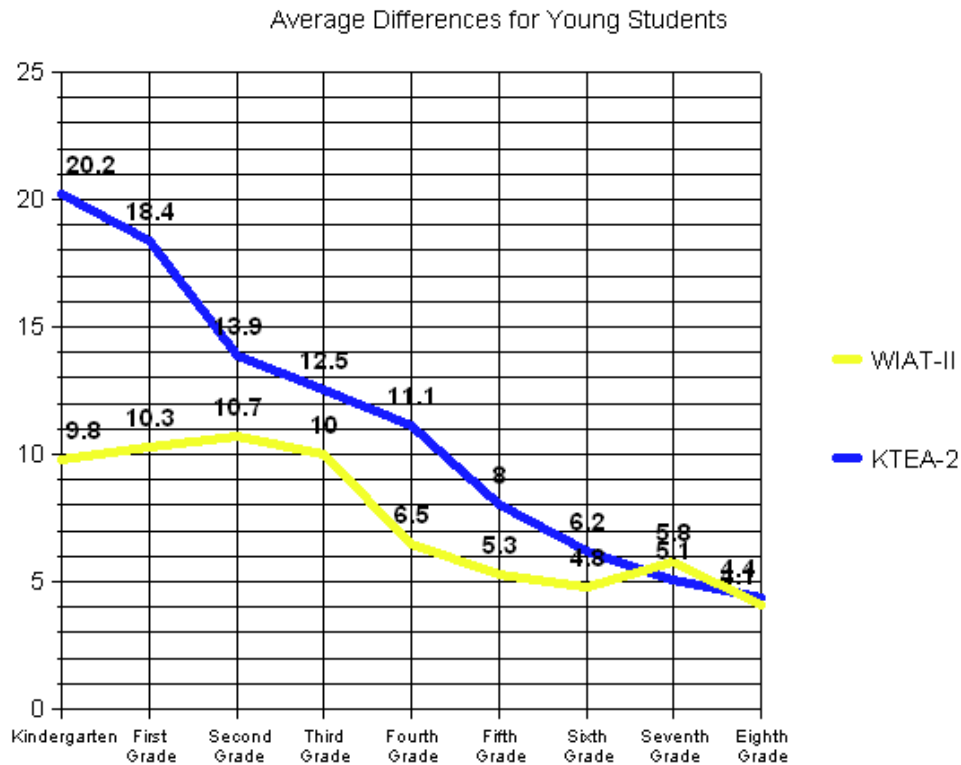


### *Hypothesis 3*

The next hypothesis states that the difference between the standard scores obtained using grade-based norms versus age-based norms on neither the WIAT-II nor KTEA-2 will be educationally significant for students who are relatively young for their grade placement. Based on the average differences presented in Tables 28 and 29, the null hypothesis is rejected for grades kindergarten through third on the WIAT-II and grades kindergarten through fifth grade on the KTEA-2. With average differences of 9.8 in kindergarten, 10.3 in first grade, 10.7 in second grade, and 10 for third grade on the WIAT-II and 20.2 in kindergarten, 18.4 in first grade, 13.9 in second grade, 12.5 in third grade, 11.1 in fourth grade, and 8 in fifth grade on the KTEA-2, these differences in scores are above the one-half standard deviation being used to gauge educational significance.

Figure 3 illustrates the findings of this hypothesis.

Figure 3



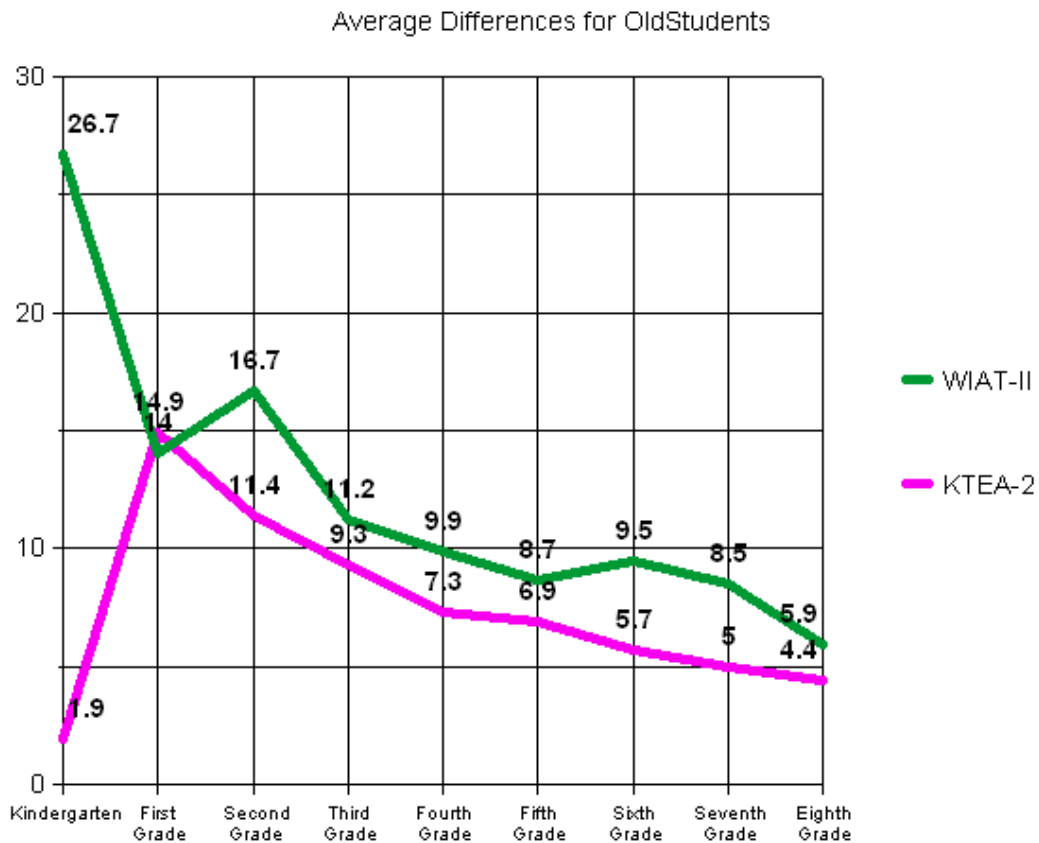
#### *Hypothesis 4*

Another hypothesis for this study states that the difference in scores derived using grade-based norms compared to age-based norms for neither the WIAT-II nor KTEA-2 will be educationally significant for students who are relatively old for their grade placement. Based on the average differences presented in Tables 28 and 29, the null hypothesis is rejected in grades kindergarten through seventh grade for the WIAT-II and in first through third grades on the KTEA-2. With average differences of 26.7, 14, 16.7, 11.2, 9.9, 8.7, 9.5, and 8.5 respectively on the WIAT-II and 14.9 in first grade, 11.4 in second grade, and 9.3 in third grade, these standard scores are above the one-half standard deviation being used to determine educational significance.



Figure 4 illustrates the findings for this hypothesis.

Figure 4

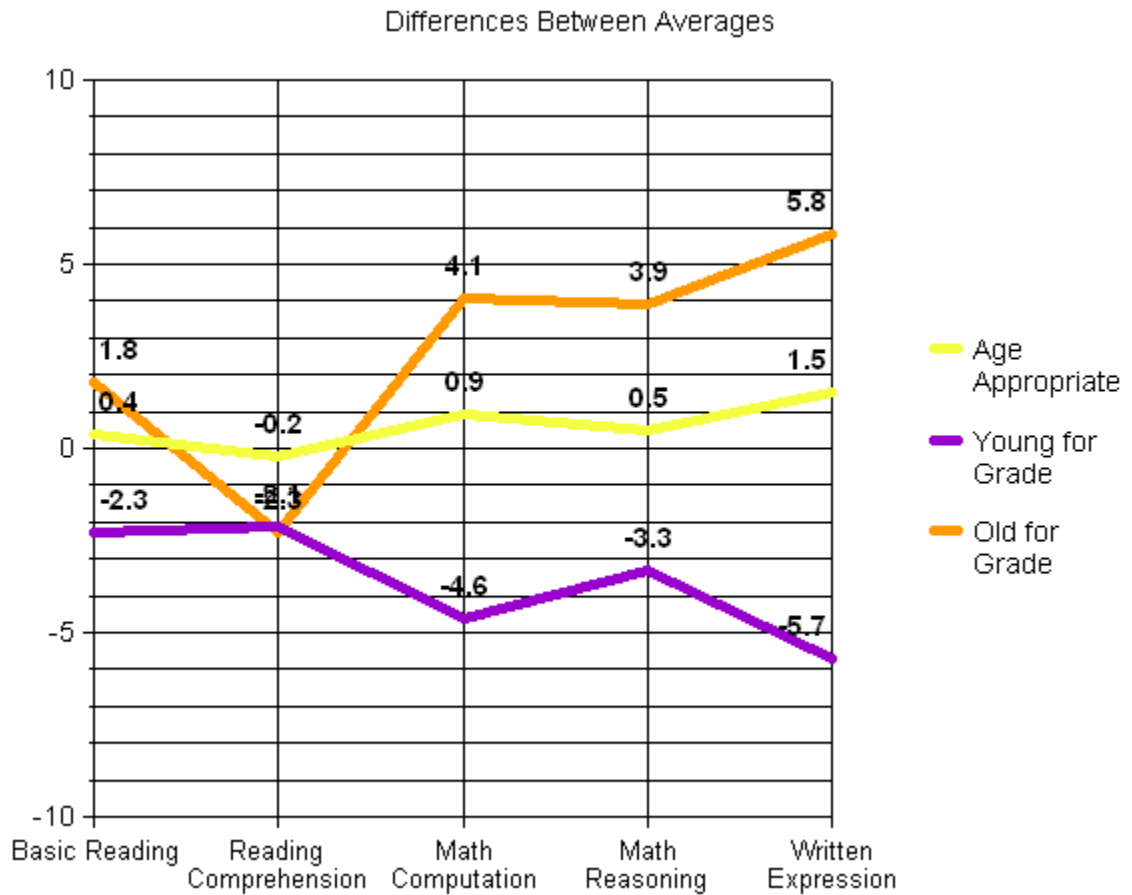


### Hypothesis 5

The final hypothesis states the comparison between the WIAT-II and KTEA-2 average differences will not be educationally significant. Tables 19 through 27 display the actual difference between standard scores. The average differences are displayed in Table 30. Based on the average difference presented in Table 30, the standard score differences are greater for the KTEA-2 than for the WIAT-II. The differences in scores are greatest between Written Expression subtests, with a difference of -5.7. The Math Calculation subtests yield a standard score difference of -4.6, Math Word problems yields a difference of -3.3, -2.3 for the Word Reading subtests and -2.1 for the Reading Comprehension subtests. As there is no specific

gauge by which to measure the educational significance, it cannot be said definitively whether the difference is educationally significant. This null hypothesis can neither be accepted nor rejected.

Figure 5 illustrates the findings for this hypothesis.



## Chapter IV

### Discussion

The purpose of this present study is to evaluate the difference between standard scores derived using age-based norms versus grade-based norms when considering students who are the appropriate age for their grade placement, relatively young for their grade placement, and relatively old for their grade placement. The differences between standard scores derived using the age-based norms versus the grade-based norms on the WIAT-II were compared to the standard scores obtained using the age-based norms versus the grade-based norms on the KTEA-2.

A search for related literature yielded limited results, indicating a need for the present study. Manuals for various standardized achievement measures provide both age-based and grade-based norms; however the examiner's manuals and technical manuals for such achievement tests provide limited guidance for choosing one type of norms over the other when scoring the achievement measures. One reference was found advocating the use of grade-based norms within school settings and age-based norms in clinical settings; however no rationale or reasoning is provided. Therefore, it is reasonable to assume that clinicians, including school psychologists, do not and are not considering the educational implications of their choice to use one type of norm over the other. Additionally, in contrast to the statement that advocates grade-based norms be used in school settings, federal law requires that students be compared to same-aged peers when making disability determinations, such as the for determining the presence of a Specific Learning Disability.

Results of this study indicate that school psychologists should use caution when interpreting standard scores based on age-based or grade-based norms, particularly with regard to

students who are relatively young or relatively old for their grade placement as well as in younger grades such as kindergarten and first through third grade. In general, the use of grade-based norms provides standard scores that are lower when considering relatively young students and higher when considering relatively old students than do the corresponding age-based norms. Further, the difference between standard scores derived using grade-based norms versus age-based norms is greater using the KTEA-2 than using the WIAT-II.

It is of note that when interpreting the results of Hypothesis 5, the mean scores are misleading; particularly with regard to age appropriate students due to there being positive and negative differences that comprise the mean. The mean of scores for age appropriate students ranges from -0.2 to 1.5 which may, at first glance suggest that there is little difference between the norm types on the WIAT-II compared to the KTEA-2. This is untrue when one considers the actual range of difference is 7.4 points in second grade and -0.5 point in first grade.

Also when considering the differences in standard scores obtained using grade-based norms versus age-based norms may result in inaccurate data for certain subtests. For example, the Written Expression and Reading Comprehension subtests of the WIAT-II do not follow basic basal and ceiling rules that achievement tests often use. Instead, examinees are administered a specific item set based on their grade level. Standard scores obtained from age-based norms may or may not be based on a different item set than standard scores obtained from grade-based norms. This study did not examine or consider the difference that may occur in such situations.

#### *Implications for School Psychologists*

Although this study does not answer the question about which norms provide the most educationally relevant information, it does provide information that would allow an individual to consider the implications of each and make a better informed decision regarding a student's

educational placement and curriculum needs. When grade-based norms are used in conjunction with age-based norms, they can provide a more comprehensive view of the student's achievement. For example, while age-based norms may be the preferred diagnostic method, grade-based norms may provide information that would be more consistent with the achievement levels he or she is actually displaying in the classroom. For this reason, grade-based norms may aid in preparing a student's Individualized Education Program, determining the least restrictive environment, or similar decisions.

#### *Future Research*

It may be necessary for future research studies to examine whether the differences in standard scores are educationally significant for students who are relatively young for their grade placement, such as having a summer birthday or relatively old for their grade placement, such as having a September birthday. These students' ages will differ from the ages of their peers who have a birthday that falls in the middle of the school year, but the difference in age will be less than in the students used in this study who were one full year older or younger than their peers because of grade retention or acceleration.

Another future study should examine the differences between standard scores derived using age-based and grade-based norms between different achievement levels. This present study collected data from below average, average, and above average achievement levels; however, this study did not determine if a greater educationally significant difference exists for certain achievement levels.



Table 2

First Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	27	70	68	2	7	70	48	22	45	70	86	16
	63	100	104	4	43	100	84	16	81	100	122	2
	97	130	138	8	77	130	118	12	112	130	153	23
Reading Comprehension	39	70	73	3	22	70	65	5	55	71	85	14
	82	100	105	5	66	100	93	7	95	100	112	12
	140	127	125	2	137	130	126	4	151	140	130	10
Numerical Operations	6	73	71	2	3	74	55	19	9	73	90	17
	12	103	109	6	8	100	83	13	15	100	129	1
	18	134	150	16	14	131	123	8	23	132	160	28
Math Reasoning	11	70	74	4	5	70	60	10	17	71	87	16
	23	100	104	4	16	100	85	15	30	102	122	20
	36	131	135	4	29	131	120	11	43	131	150	19
Written Expression	0	71	69	2	0	76	69	7	2	72	79	7
	7	102	104	2	5	100	96	4	11	102	122	20
	15	130	138	8	14	135	134	1	22	131	160	29

Table 3

Second Grade WIAT-II												
	Age Appropriate				Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	45	70	69	1	27	70	53	17	60	70	83	13
	81	100	103	3	63	100	86	14	93	100	114	14
	112	130	133	3	97	130	118	12	119	130	140	10
Reading Comprehension	55	71	72	1	39	70	61	9	71	70	80	10
	95	100	101	1	82	100	90	10	115	100	107	7
	151	130	128	2	143	130	125	5	168	130	137	7
Numerical Operations	9	73	74	1	6	73	59	14	11	70	84	14
	15	100	106	6	12	103	90	13	19	100	129	29
	23	132	148	16	18	134	123	11	28	130	159	29
Math Reasoning	17	71	71	0	11	70	57	13	21	70	80	10
	30	102	104	2	23	100	85	15	35	100	118	18
	43	131	138	7	36	131	121	10	49	131	149	18
Written Expression	2	72	75	3	0	71	65	6	5	71	90	19
	11	102	112	10	7	102	97	5	16	100	130	30
	22	131	150	19	15	130	127	7	28	130	160	30



Table 4

Third Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	60	70	72	2	45	70	52	18	71	70	80	10
	93	100	100	0	81	100	90	10	100	100	110	10
	119	130	130	0	112	130	123	7	123	130	134	4
Reading Comprehension	71	70	75	4	55	71	67	4	81	70	84	17
	115	100	101	1	95	100	97	7	122	100	105	5
	168	130	130	0	151	130	125	5	185	128	132	4
Numerical Operations	11	70	73	3	9	73	66	7	14	73	84	11
	19	100	101	1	15	100	88	12	23	23	117	17
	28	130	137	7	23	132	117	15	33	132	155	23
Math Reasoning	21	70	71	1	17	71	63	8	25	70	79	9
	35	100	103	3	30	102	90	12	40	101	115	14
	49	131	133	2	43	131	121	10	54	130	143	13
Written Expression	5	71	73	2	2	72	66	6	7	70	78	8
	16	100	100	0	11	102	87	15	19	101	107	6
	28	130	139	9	22	131	117	14	31	131	148	17

Table 5

Fourth Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	71	70	71	1	60	70	57	13	77	70	76	6
	100	100	102	2	93	100	95	5	106	100	110	10
	123	130	130	0	119	130	125	5	126	130	134	4
Reading Comprehension	81	70	72	2	71	70	65	5	92	70	83	13
	122	100	101	1	115	100	97	3	125	100	103	3
	190	129	128	1	168	130	124	6	190	128	128	0
Numerical Operations	14	73	73	0	11	70	63	7	17	72	82	10
	23	100	102	2	19	100	89	11	27	100	117	17
	33	132	140	8	28	130	121	9	38	132	155	23
Math Reasoning	25	70	70	0	21	70	62	8	30	70	80	10
	40	101	103	2	35	100	92	8	45	102	115	13
	54	130	137	7	49	131	124	7	59	132	148	16
Written Expression	7	70	73	3	5	71	68	3	9	71	77	6
	19	101	101	0	16	100	94	6	21	101	107	6
	31	131	137	6	28	130	128	2	33	131	143	12

Table 6

Fifth Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	77	70	70	0	71	70	65	6	83	70	63	7
	106	100	103	3	100	100	97	3	111	101	110	9
	126	130	129	1	123	130	125	5	129	131	133	2
Reading Comprehension	92	70	72	2	81	70	65	5	103	70	82	12
	125	100	100	0	122	100	98	2	130	100	106	6
	195	130	130	0	192	130	128	2	199	126	131	5
Numerical Operations	17	72	73	1	14	73	64	9	19	71	79	8
	27	100	102	2	23	100	90	10	30	100	112	12
	38	132	137	5	33	132	122	10	43	132	152	20
Math Reasoning	30	70	73	3	25	70	63	7	34	70	82	11
	45	102	103	1	40	101	94	7	48	100	109	9
	59	132	132	0	54	130	122	8	62	130	138	8
Written Expression	9	71	74	3	7	70	70	0	11	72	79	7
	21	101	102	1	19	101	98	2	23	101	107	6
	33	131	132	1	31	131	127	4	36	130	139	9

Table 7

Sixth Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	83	70	71	1	77	70	62	8	88	70	75	5
	111	101	105	4	106	100	98	2	113	100	108	8
	129	131	126	5	126	130	122	8	130	131	127	4
Reading Comprehension	103	70	76	6	92	70	68	2	111	70	81	11
	130	100	102	2	125	100	96	4	137	100	109	9
	204	130	132	2	195	130	125	5	208	127	131	4
Numerical Operations	19	71	72	1	17	72	66	6	21	71	78	7
	30	100	103	3	27	100	95	5	34	101	115	14
	43	132	137	5	38	132	125	7	48	131	152	21
Math Reasoning	34	71	74	3	30	70	66	4	36	70	78	8
	48	100	102	2	45	102	96	6	51	100	108	8
	62	130	131	1	59	132	125	7	66	130	140	10
Written Expression	11	72	76	6	9	71	72	1	12	70	78	8
	23	101	102	1	21	101	97	4	26	101	111	10
	36	130	135	5	33	131	128	3	40	131	147	16

Table 8

Seventh Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	88	70	67	3	83	70	59	11	96	70	77	7
	113	100	102	2	111	101	100	1	117	101	108	7
	130	130	122	9	129	131	121	10	131	128	122	6
Reading Comprehension	111	70	68	2	103	70	56	14	117	71	79	8
	137	100	101	1	130	100	94	6	158	100	110	10
	209	128	126	2	204	130	124	6	209	118	126	8
Numerical Operations	21	71	74	3	19	71	68	3	22	70	76	6
	34	101	104	3	30	100	95	5	36	100	109	9
	48	131	135	4	43	132	123	9	53	130	147	17
Math Reasoning	36	70	72	2	34	71	68	3	40	71	80	9
	51	100	102	2	48	100	96	4	55	101	110	9
	66	130	136	6	62	130	126	4	67	128	139	11
Written Expression	12	70	75	5	11	72	73	1	14	70	78	8
	26	101	102	1	23	101	97	4	28	100	107	7
	40	131	132	1	36	130	124	6	42	130	136	6

Table 9

Eighth Grade WIAT-II												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Word Reading	96	70	72	2	88	70	63	7	101	71	80	9
	117	101	103	2	113	100	98	2	118	101	106	5
	131	128	123	5	130	131	122	9	131	126	123	3
Reading Comprehension	117	71	72	1	111	70	65	5	117	70	72	2
	158	100	104	4	137	100	96	4	162	100	105	5
	216	125	130	5	211	130	125	5	216	124	130	6
Numerical Operations	22	70	73	3	21	71	70	1	24	71	78	7
	36	100	102	2	34	101	98	3	39	100	107	7
	53	130	138	8	48	131	125	6	54	130	141	11
Math Reasoning	40	71	75	4	36	70	67	3	43	71	80	9
	55	101	104	3	51	100	95	5	55	101	104	3
	67	128	135	7	66	130	133	3	67	128	135	7
Written Expression	14	70	75	5	12	70	72	2	15	71	77	6
	28	100	103	3	26	101	98	3	29	100	104	4
	42	130	132	2	40	131	128	3	43	131	135	4

Table 10

Kindergarten KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	2	70	66	4	0	76	59	27	11	70	82	12
	21	100	106	6	11	101	82	19	36	100	124	24
	49	131	133	2	25	130	114	16	59	130	155	25
Reading Comprehension	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-
Math Concepts and Application	9	70	65	5	3	70	52	18	17	70	88	12
	23	100	103	3	16	102	85	17	32	101	123	22
	40	130	132	2	27	131	113	18	50	132	160	28
Math Computation	1	75	73	2	0	81	66	15	3	71	87	16
	6	103	104	1	3	106	87	19	11	104	125	21
	13	131	131	0	7	132	109	23	19	131	144	13
Written Expression	82	70	68	2	43	70	42	28	121	70	89	19
	138	100	99	1	94	100	76	24	171	100	122	22
	184	131	136	5	156	130	112	18	195	130	155	25

Table 11

First Grade KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	11	70	51	19	2	70	44	26	20	72	76	4
	36	100	99	1	21	100	78	22	49	100	113	13
	59	130	136	6	49	131	113	18	66	130	154	24
Reading Comprehension	3	71	74	3	1	73	67	6	5	72	80	8
	15	100	100	0	6	102	83	19	26	100	115	15
	45	130	132	2	33	130	120	10	55	130	160	30
Math Concepts and Application	17	70	67	3	9	70	53	17	22	71	78	7
	32	101	103	2	23	100	81	19	41	100	120	20
	50	132	149	17	40	130	119	11	60	131	160	29
Math Computation	3	71	65	6	1	75	56	21	5	72	75	3
	11	104	103	1	6	103	80	23	16	102	126	22
	19	131	137	6	13	131	113	18	24	131	158	27
Written Expression	121	70	64	6	82	70	46	24	138	70	73	3
	171	100	100	0	138	100	73	28	179	101	109	8
	195	130	137	7	184	130	117	14	197	10	141	11



Table 12

Second Grade KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	20	72	67	3	11	70	48	22	24	70	71	1
	49	100	101	1	36	100	86	14	55	100	110	10
	66	130	136	6	59	130	120	10	69	132	146	14
Reading Comprehension	5	72	70	2	3	71	65	6	7	70	75	5
	26	100	99	1	15	100	84	16	36	100	110	10
	55	130	143	13	45	130	119	11	62	130	156	26
Math Concepts and Application	22	71	65	6	17	100	57	13	25	70	73	3
	41	100	104	4	32	101	85	16	47	100	115	15
	60	131	144	13	50	132	124	8	64	130	150	20
Math Computation	5	72	62	10	3	71	54	17	8	71	73	2
	16	102	104	2	11	104	85	19	21	100	123	23
	24	131	140	9	19	131	114	17	37	130	159	29
Written Expression	138	70	55	15	121	70	47	23	164	70	77	7
	179	101	100	1	171	100	87	13	181	100	103	3
	197	130	130	0	195	130	127	3	198	130	133	3

Table 13

	Third Grade KTEA-2											
	Age Appropriate				Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	24	70	63	7	20	72	60	12	29	70	70	0
	55	100	98	2	49	100	89	11	59	100	107	7
	69	132	130	2	66	130	123	7	73	130	142	12
Reading Comprehension	7	70	68	2	5	72	64	8	11	70	72	2
	36	100	99	1	26	100	88	12	44	100	106	6
	62	130	135	5	55	130	119	11	71	130	150	20
Math Concepts and Application	25	70	60	10	22	71	56	15	30	70	72	2
	47	100	101	1	41	100	90	10	53	100	111	11
	64	130	132	2	60	131	123	8	67	130	148	18
Math Computation	8	71	56	15	5	72	49	23	14	72	76	4
	21	100	99	1	16	102	84	18	27	100	124	24
	37	130	145	15	24	131	112	19	43	130	155	25
Written Expression	164	70	67	3	138	70	46	24	166	70	71	1
	181	100	97	3	179	101	94	7	184	102	103	1
	198	130	130	0	197	130	128	2	200	130	137	7

Table 14

Fourth Grade KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	29	70	66	4	24	70	58	12	34	70	69	1
	59	100	100	0	55	100	92	8	62	101	107	6
	73	130	128	2	69	132	122	10	78	130	144	14
Reading Comprehension	11	70	69	1	7	70	64	6	18	70	73	3
	44	100	99	1	36	100	92	8	50	100	106	6
	71	130	132	2	62	130	119	11	75	131	143	12
Math Concepts and Application	30	70	55	15	25	70	47	23	35	70	69	1
	53	100	101	1	47	100	91	9	57	101	107	6
	67	130	127	3	64	130	119	11	73	130	137	7
Math Computation	14	72	69	3	8	71	47	23	15	71	72	1
	27	100	96	4	21	100	88	12	34	100	115	15
	43	130	136	6	37	130	118	12	54	130	151	21
Written Expression	166	70	65	5	164	70	61	9	167	70	67	3
	184	102	97	5	181	100	91	9	186	100	102	2
	200	130	133	3	198	130	126	4	202	130	142	12

Table 15

Fifth Grade KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	34	70	68	2	29	70	63	7	38	70	70	0
	62	101	102	1	59	100	96	4	64	101	106	5
	78	130	131	1	73	130	120	10	83	130	144	14
Reading Comprehension	18	70	71	1	11	70	66	4	22	70	76	6
	50	100	99	1	44	100	93	7	58	100	108	8
	75	131	130	0	71	130	124	6	82	130	149	19
Math Concepts and Application	35	70	64	6	30	70	50	20	38	70	72	2
	57	101	101	0	53	100	97	3	59	100	105	5
	73	130	127	3	67	130	119	11	76	130	137	7
Math Computation	15	71	69	2	14	72	66	6	17	70	73	3
	34	100	102	2	27	100	89	11	38	100	109	9
	54	130	134	4	43	130	116	14	59	132	150	18
Written Expression	167	70	65	5	166	70	63	7	170	70	70	0
	186	100	99	1	184	102	95	7	188	100	102	2
	202	130	132	2	200	130	127	3	204	130	136	6

Table 16

	Sixth Grade KTEA-2											
	Age Appropriate				Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	38	70	69	1	34	70	67	3	40	70	71	1
	64	101	100	1	62	101	96	5	66	100	104	4
	83	130	128	2	78	130	120	10	90	130	146	16
Reading Comprehension	22	70	70	0	18	70	67	3	24	70	71	1
	58	100	99	1	50	100	90	10	63	100	104	4
	82	131	133	2	75	131	120	9	84	130	139	9
Math Concepts and Application	38	70	69	1	35	70	64	6	39	70	71	1
	59	100	99	1	57	101	95	6	62	100	103	3
	76	130	130	0	73	130	120	10	79	132	144	12
Math Computation	17	70	69	1	15	71	67	4	17	70	69	1
	38	100	99	1	34	100	93	7	44	100	105	5
	59	132	137	5	54	130	121	9	63	131	148	17
Written Expression	170	70	69	1	167	70	64	6	173	71	73	2
	188	100	100	0	186	100	97	3	190	101	103	2
	204	130	131	1	202	130	128	2	207	131	139	8

Table 17

Seventh Grade KTEA-2												
	Age Appropriate				Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	40	70	70	0	38	70	67	3	45	70	73	3
	66	100	98	2	64	101	95	6	69	100	104	4
	90	130	129	1	83	130	118	12	95	132	141	9
Reading Comprehension	24	70	69	1	22	70	68	2	29	70	73	3
	63	100	99	1	58	100	94	6	68	100	105	5
	84	130	134	4	82	131	127	4	86	133	146	13
Math Concepts and Application	39	70	67	3	38	70	67	3	40	70	68	2
	62	100	99	1	59	100	95	5	65	100	104	4
	79	132	131	1	76	130	122	8	80	130	134	4
Math Computation	17	70	67	3	17	70	67	3	18	70	68	2
	44	100	99	1	38	100	93	7	48	100	105	5
	63	131	132	1	59	132	123	9	66	131	143	12
Written Expression	173	71	72	1	170	70	68	2	173	71	72	1
	190	101	100	1	188	100	97	3	193	101	104	3
	207	131	131	0	204	130	126	4	209	130	135	5

Table 18

Eighth Grade KTEA-2												
Age Appropriate					Young				Old			
	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference	Raw Score	Age Based Standard Score	Grade Based Standard Score	Difference
Letter & Word Recognition	45	70	71	1	40	70	68	2	47	70	70	0
	69	100	98	2	66	100	94	6	74	100	102	2
	95	132	131	1	90	130	123	7	96	131	134	3
Reading Comprehension	29	70	69	1	24	70	66	4	38	70	75	5
	68	100	101	1	63	100	94	6	72	100	107	7
	86	133	141	8	84	130	131	1	87	133	146	13
Math Concepts and Application	40	70	67	3	39	70	66	4	43	70	71	1
	65	100	100	0	62	100	96	4	68	100	103	3
	80	130	128	2	79	132	124	8	82	134	139	5
Math Computation	18	70	68	2	17	70	66	4	18	70	68	2
	48	100	99	1	44	100	95	5	51	100	104	4
	66	131	135	4	63	131	125	6	66	130	135	5
Written Expression	173	71	71	0	173	71	71	0	173	70	71	1
	193	101	101	0	190	101	97	4	195	101	105	4
	209	130	129	1	207	131	126	5	213	130	139	9

Table 19

Kindergarten Age- Versus Grade-Based Norm Difference										
	Age Appropriate				Young			Old		
	Standard Score	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference
Word Reading	70	2	4	-2	12	27	-15	22	12	10
	100	8	6	2	16	19	-3	29	24	5
	130	13	2	11	12	16	-4	30	25	5
Reading Comprehension	70	-	-		-	-		-	-	
	100	-	-		-	-		-	-	
	130	-	-		-	-		-	-	
Calculation	70	2	2	0	13	15	-2	22	12	0
	100	8	1	7	9	19	-10	30	22	8
	130	15	0	15	4	23	-19	26	28	-2
Word Problems	70	5	5	0	6	18	-12	22	16	6
	100	7	3	4	12	17	-5	29	21	8
	130	15	2	13	4	18	-14	27	13	14
Written Expression	70	-	2	-	-	28	-	-	19	-
	100	-	1	-	-	24	-	-	22	-
	130	-	5	-	-	18	-	-	25	-



Table 20

First Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate				Young			Old		
	Standard Score	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference
Word Reading	70	2	19	-17	22	26	-4	16	4	12
	100	4	1	3	16	22	-6	2	13	-11
	130	8	6	2	12	18	-6	23	24	-1
Reading Comprehension	70	3	3	0	5	6	-1	14	8	6
	100	5	0	5	7	19	-12	12	15	-3
	130	2	2	0	4	10	-6	10	30	-20
Calculation	70	2	6	-4	19	21	-2	17	3	14
	100	6	1	5	13	23	-10	1	22	-21
	130	16	6	10	8	18	-10	28	27	1
Word Problems	70	4	3	1	10	17	-7	16	7	9
	100	4	2	2	15	19	-4	20	20	0
	130	4	17	-13	11	11	0	19	29	-10
Written Expression	70	2	6	-4	7	24	-17	7	3	4
	100	2	0	2	4	28	-24	20	8	12
	130	8	7	1	1	14	-13	29	11	18

Table 21

Second Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate				Young			Old		
	Standard Score	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference
Word Reading	70	1	3	-2	17	22	-5	13	1	12
	100	3	1	2	14	14	0	14	10	4
	130	3	6	-3	12	10	2	10	14	-4
Reading Comprehension	70	1	2	-1	9	6	3	10	5	5
	100	1	1	0	10	16	6	7	10	-3
	130	2	13	-11	5	11	-6	7	26	-19
Calculation	70	1	10	-9	14	17	-3	14	2	12
	100	6	2	4	13	19	-6	29	23	6
	130	16	9	7	11	17	-6	29	29	0
Word Problems	70	0	6	-6	13	13	0	10	3	7
	100	2	4	-2	15	16	-1	18	15	3
	130	7	13	-5	10	8	2	18	20	-2
Written Expression	70	3	15	-12	6	23	-17	19	7	12
	100	10	1	9	5	13	-8	30	3	27
	130	19	0	19	7	3	4	30	3	27



Table 23

Fourth Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate			Young			Old			
	Standard Score	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference
Word Reading	70	1	4	-3	13	12	-1	6	1	5
	100	2	0	2	5	8	-3	10	6	4
	130	0	2	-2	5	10	-5	4	14	-10
Reading Comprehension	70	2	1	1	5	6	-1	13	3	10
	100	1	1	0	3	8	-5	3	6	-3
	130	1	2	-1	6	11	-5	0	12	-12
Calculation	70	0	3	-3	7	23	-16	10	1	9
	100	2	4	-2	11	12	-1	17	15	2
	130	8	6	2	9	12	-3	23	21	2
Word Problems	70	0	15	-15	8	23	-15	10	1	9
	100	2	1	1	8	9	-1	13	6	7
	130	7	3	4	7	11	-4	16	7	9
Written Expression	70	3	5	-2	3	9	-6	6	3	3
	100	0	5	-5	6	9	-3	6	2	4
	130	6	3	3	2	4	-2	12	12	0

Table 24

Fifth Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate				Young			Old		
	Standard Score	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference
Word Reading	70	0	2	-2	6	7	-1	7	0	7
	100	3	1	2	3	4	-1	9	5	4
	130	1	1	0	5	10	-5	2	14	-12
Reading Comprehension	70	2	1	1	5	4	1	12	6	6
	100	0	1	-1	2	7	-5	6	8	-2
	130	0	0	0	2	6	-4	5	19	-14
Calculation	70	1	2	-1	9	6	3	8	3	5
	100	2	2	0	10	11	-1	12	9	3
	130	5	4	1	10	14	-4	20	18	2
Word Problems	70	3	6	-3	7	20	-13	11	2	9
	100	1	0	1	7	3	4	9	5	4
	130	0	3	-3	8	11	-3	8	7	1
Written Expression	70	3	5	-2	0	7	-7	7	0	7
	100	1	1	0	2	7	-5	6	2	4
	130	1	2	-1	4	3	1	9	6	3

Table 25

Sixth Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate				Young			Old		
	Standard Score	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference	WIAT-II Age- Versus Grade- Based Norm Difference	KTEA-2 Age- Versus Grade- Based Norm Difference	Difference
Word Reading	70	1	1	0	8	3	5	5	1	4
	100	4	1	3	2	5	-3	8	4	4
	130	5	2	3	8	10	-2	4	16	-12
Reading Comprehension	70	6	0	6	2	3	-1	11	1	10
	100	2	1	1	4	10	-6	9	4	5
	130	2	2	0	5	9	-4	4	9	-5
Calculation	70	1	1	0	6	4	2	7	1	6
	100	3	1	2	5	7	-2	14	5	9
	130	5	5	0	7	9	-2	21	17	4
Word Problems	70	3	1	2	4	6	-2	8	1	7
	100	2	0	2	6	6	0	8	3	5
	130	1	1	0	7	10	-3	10	12	-2
Written Expression	70	6	1	5	1	6	-5	8	2	6
	100	1	1	0	4	3	1	10	2	8
	130	5	0	5	3	2	1	16	8	8

Table 26

Seventh Grade: Age- Versus Grade-Based Norm Difference										
	Age Appropriate			Young				Old		
Standard Score	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	WIAT-II Age- Versus Grade-Based Norm Difference	KTEA-2 Age- Versus Grade-Based Norm Difference	Difference	
Word Reading	70	3	0	3	11	3	8	7	3	4
	100	2	2	0	1	6	-5	7	4	3
	130	9	1	8	10	12	-2	6	9	-3
Reading Comprehension	70	2	1	1	14	2	12	8	3	5
	100	1	1	0	6	6	0	10	5	5
	130	2	4	-2	6	4	2	8	13	-5
Calculation	70	3	3	0	3	3	0	6	2	4
	100	3	1	2	5	7	-2	9	5	4
	130	4	1	3	9	9	0	17	12	5
Word Problems	70	2	3	-1	3	3	0	9	2	7
	100	2	1	1	4	5	-1	9	4	5
	130	6	1	5	4	8	-4	11	4	7
Written Expression	70	5	1	4	1	2	-1	8	1	7
	100	1	1	0	4	3	1	7	3	4
	130	1	0	1	6	4	2	6	5	1





Table 28

WIAT-II Average Differences									
	Total Average Difference	Appropriate Age	Young	Old	Word Reading	Numerical Operations	Reading Comprehension	Math Reasoning	Written Expression
Kindergarten	14.9	8.3	9.8	26.7	16	14.7	-	14.1	-
First Grade	10.2	4.8	10.3	14	11.7	12.2	6.9	11.4	8.9
Second Grade	10.8	13.1	10.7	16.7	9.7	14.8	5	10.3	14.3
Third Grade	7.8	2.3	10	11.2	6.8	10.7	5.2	8	8.6
Fourth Grade	6.3	2.3	6.5	9.9	5.1	9.7	3.8	7.9	4.9
Fifth Grade	5.2	1.5	5.3	8.7	4	8.6	3.8	6	3.7
Sixth Grade	5.8	3.1	4.8	9.5	5	7.7	5	4	6
Seventh Grade	5.8	3.1	5.8	8.5	6.2	6.6	6.3	5.6	4.3
Eighth Grade	4.6	3.8	4.1	5.9	4.9	5.3	4.1	4.9	3.6

Table 29

K-TEA-2 Average Differences									
	Total Average Difference	Appropriate Age	Young	Old	Letter/Word Recognition	Reading Comprehension	Math Concepts & Applications	Math Computation	Written Expression
Kindergarten	14.3	2.8	20.2	1.9	15	-	13.9	12.2	16
First Grade	12.9	5.3	18.4	14.9	14.8	10.3	13.9	14.1	11.2
Second Grade	10.3	5.7	13.9	11.4	9	10	10.9	14.2	7.6
Third Grade	8.8	4.6	12.5	9.3	6.7	7.4	8.6	16	5.3
Fourth Grade	7.4	3.7	11.1	7.3	6.3	5.6	8.4	10.8	5.8
Fifth Grade	5.7	2.1	8	6.9	4.9	5.8	6.3	7.7	3.7
Sixth Grade	4.4	1.2	6.2	5.7	4.8	4.3	4.4	5.6	2.8
Seventh Grade	3.8	1.4	5.1	5	4.4	4.3	3.4	4.8	2.2
Eighth Grade	3.5	1.8	4.4	4.3	2.7	5.1	3.3	3.7	2.7

Table 30

	Difference between WIAT-II and K-TEA-2 Averages								
	Age Appropriate			Young for Grade			Old for Grade		
	WIAT-II	K-TEA-2	Difference	WIAT-II	K-TEA-2	Difference	WIAT-II	K-TEA-2	Difference
Basic Reading	3.2	2.8	0.4	9.7	12	-2.3	10.2	8.4	1.8
Reading Comprehension	2.1	2.3	-0.2	5.4	7.5	-2.1	7.5	9.8	-2.3
Math Computation	4.9	4	0.9	8.9	13.5	-4.6	16.3	12.2	4.1
Math Reasoning	4.5	4	0.5	7.8	11.1	-3.3	13.2	9.3	3.9
Written Expression	4.1	2.6	1.5	4.5	10.2	-5.7	11.7	5.9	5.8

## References

- Carroll, J.B. (1993). *Human cognitive abilities: A survey of factor-analytic studies*. New York: Cambridge University Press.
- Cummings, A. (2008). Normative comparison for the Woodcock-Johnson III: Tests of Achievement in fifteen- and eighteen-year olds. (Master's thesis, Marshall University Graduate College, 2008). Retrieved from personal communication May 4, 2009.
- Giovingo, L.K., Proctor, B.E., & Prevatt, F. (2005). Use of Grade-Based Norms Versus Age-Based Norms in Psychoeducational Assessment for a College Population. *Journal of Learning Disabilities*; 38, 1., pages 79-85.
- Jimerson, S., Pletcher, S., Graydon, K., Schnurr, B., Nickerson, A., & Kundert, D. (2006). Beyond grade retention and social promotion: Promoting the social and academic competence of students. *Psychology in the Schools*, 43(1), 85-97.
- Kaufman, A.S. & Kaufman, N.L. (2004). *Kaufman Test of Educational Achievement, Second Edition*. Circle Pines, MN: AGS Publishing.
- Mather, N. & Jaffe, L.E. (2002). *Woodcock-Johnson III Reports, Recommendations, and Strategies* (p. 26). New York: John Wiley & Sons, Inc.
- Mather, N., Wendling, B.J., Woodcock, R.W. (2001). *Essentials of WJ-III of Achievement Assessment* (p. 100). New York: John Wiley & Sons, Inc.
- Reynolds, C.R. & Gutkin, T.B. (2009). *The Handbook of School Psychology*, Fifth edition (p. 236). New York: John Wiley & Sons, Inc.
- Sattler, J.M. & Hoge, R.D. (2006). *Assessment of Children, Behavioral, Social, and Clinical Foundations*, Fifth edition (p. 43). San Diego: Jerome M. Sattler, Publisher, Inc.

Viadero, D. (2004). Report Urges Acceleration for Gifted Students. *Education Week*; 24, 1, page 5-5.

Wechsler, D. (1997). *Wechsler adult intelligence scale* (3rd ed.). San Antonio, TX: Psychological Corp.

Wechsler, D. (2002). *Wechsler Individual Achievement Test – Second Edition*. San Antonio, TX: The Psychological Corporation.

Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson–III Tests of Achievement*. Itasca, IL: Riverside.

Woodcock, R. W., McGrew, K. S., & Mather, N. (2001d). *Woodcock-Johnson–III Tests of Cognitive Abilities*. Itasca, IL: Riverside.