# Wrightslaw

## White Paper

# Making Sense of Your Child's Test Scores

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## Executive Summary

To be an effective advocate, you need to understand your child's scores on tests and assessments. Test scores provide information about your child's abilities, academic achievement, and functional performance.

If your child has an Individualized Education Program (IEP), his school team will use scores from tests and assessments to determine his present levels of academic achievement and functional performance. The scores will be used to develop goals in his IEP.

You need to learn about standardized norm-referenced tests and criterion-referenced tests. You also need to learn about academic and diagnostic assessments, the bell curve, standard scores, T scores, stanines, subtest scores, standard deviations, and percentile ranks.

You should never rely on one test or one test score when making decisions about your child's educational programming and remediation of specific skill deficits. When you understand what test scores mean, you will be able to use test results to monitor your child's progress.

Although test scores are important, they should not be your only source of information.

- First, tests may not measure what they appear to measure.

- Second, all tests do not measure a child's skills comprehensively.

- Third, even the best tests are not perfectly reliable.

When you can make sense of your child's test scores, you will be able to answer these questions:

- What are my child's strengths and weaknesses?

- What does my child need in his educational program?

- How can I monitor my child's progress or lack of progress?

**As your child's advocate, you need to learn how to use test scores to monitor your child's progress and ensure that it is adequate.**

## Understanding Your Child's Test Scores

Assume you attend an IEP meeting for your child with a learning disability. Your child's teachers say, "We are so excited. Your son earned a score of 85 on the reading test!"

If your child earns a standard score of 85 (SS = 85) on a test, his percentile rank is 16 (PR = 16). Eighty-four percent of his peers earned higher scores on the test. Should you be excited to learn that your child earned a percentile rank of 16 in reading?

What skills did the reading test measure? Did his scores improve, stay the same, or drop?

## Standardized Norm-Referenced Tests and Criterion-Referenced Tests

Standardized, norm-referenced tests are used to assess many areas, including intelligence and academic skills. These tests are also used to measure specific skills required for reading, written language, and math.

A standardized test is given the same way to all children. Evaluators follow rules for test administration. Evaluators are not permitted to alter materials or reword questions.

Standardized, norm-referenced tests provide valuable information about your child's levels of functioning in the areas tested. Norm-referenced tests also provide a way to evaluate changes in performance, including the impact of educational remediation.

### *What are norm-referenced tests?*

Norm-referenced tests are standardized tests that compare one child's performance with the performance of other children in the same age or grade. Norm-referenced tests use scoring systems that are designed to capture a child's skills with respect to the peer group.

### *What are criterion-referenced tests?*

Criterion-referenced tests are used to measure knowledge or skills. The child's score is based on mastery of the material and is usually expressed as a percentage.

Teachers use criterion-referenced tests to determine if students have mastered material. Classroom spelling and math tests are criterion-referenced tests. A child who spells 8 of 10 words correctly on a spelling test will earn a score of 80%.

*What are the differences between norm-referenced and criterion-referenced tests?*

Norm-referenced tests allow you to compare one child's performance to a representative sample of his peers. You can compare your child's score to scores of other children who are the same age or in the same grade.

Criterion-referenced tests are used to assess academic knowledge and skills in greater depth. For example, a criterion-referenced test can show if your child has mastered specific math facts or phonics skills.

Before you can fully understand your child's test scores, you need to understand a few basic concepts: the bell curve, mean, and standard deviation. When you understand your child's test scores, you will have the knowledge to change your child's life.

## The Bell Curve

You need to know how your child is performing on tests when compared to other children who are at his age or grade level. The bell curve will provide this information and allow you to create graphs to show progress or lack of progress.

The bell curve is a graph showing the percentage of children who earn scores from low to high. When all scores are plotted on the graph, it forms a bell shape. Most children are in the "average" range so the curve is the highest in the middle. There are fewer high and low scores.

Before you can use the bell curve, you need to know the Mean and Standard Deviation of a test. The Mean and the Standard Deviation are the keys to interpreting test scoring systems.

*What is the Mean?*

On the bell curve, the Mean is in the middle, at the 50th percentile. The average or Mean score on most tests is 100 (Mean = 100). Tests are made up of subtests. The Mean is usually 10 on subtests (Mean = 10).
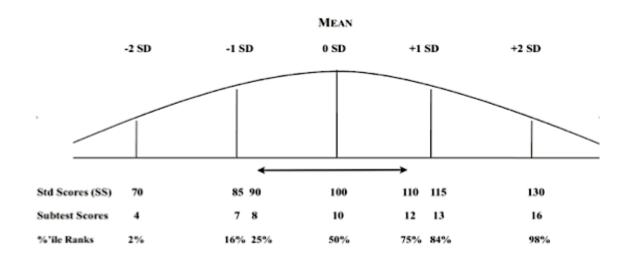
*What are Standard Deviations?*

The bell curve is measured in units called Standard Deviations (SD). Standard Deviations describe how far test scores spread out or deviate from the Mean. The center of the bell curve (the Mean) is at 0 (zero) Standard Deviations. A score that is zero Standard Deviations from the Mean is always at the 50th percentile (PR = 50).

On the bell curve, the area between one Standard Deviation to the right (+1 SD) and 1 Standard Deviation to the left (-1 SD) of the Mean represents 68% (about two-thirds) of the population. If we increase the range to two Standard Deviations above (+2 SD) to two

Standard Deviations below (-2 SD) the Mean, about 96% of the population is represented.

**Figure 1. Bell Curve with Mean, Standard Deviations, Subtest Scores, Percentile Ranks**



A score that is one Standard Deviation above the Mean is at or close to the 84th percentile rank (PR = 84). A score that is one Standard Deviation below the Mean is at or close to the 16th percentile (PR = 16). On some tests, the percentile ranks are close to, but not exactly at the expected value.

A score that is two Standard Deviations above the Mean is at or close to the 98th percentile (PR = 98). A score that is two Standard Deviations below the Mean is at or close to the 2nd percentile (PR =2).

Assume for a moment your child earned a score that is one Standard Deviation below the Mean (-1 SD). Do you know how your child performed when compared to his peers? Now assume your child earned a score that is one Standard Deviation above the Mean (+ 1 SD). How did your child perform when compared to his peers?

For answers to these questions, see the Conversion Table in Figure 2, page 8.

On most psychological and educational tests, the mean is 100 and the Standard Deviation is 15 points. Evaluators usually provide the Mean and Standard Deviation in their evaluation report. When you know the Mean and Standard Deviation of a test, you can determine how your child is performing when compared to other children who are at his age or grade level.

### Test Scores

*What are raw scores?*

A raw score describes the number of points awarded for correct answers on a test or subtest, or number of tasks performed correctly. A raw score can also measure the frequency of a behavior. Raw scores are converted into standard scores, percentile ranks, grade-equivalent, and age-equivalent scores.

*What are standard scores?*

Standard scores are raw scores that have been converted so they have a Mean and Standard Deviation.

Most test scoring systems have a Mean of 100 and a Standard Deviation of ±15. Scores between 85 and 115 capture the middle two-thirds of the children tested.

If your child earns a standard score (SS) of 100, this score is zero deviations from the Mean because it is at the Mean. If your child scores one Standard Deviation above the Mean (+1 SD), the standard score is 115 (100 + 15). If your child scores one Standard Deviation below the Mean (-1 SD), her standard score is 85 (100 – 15 = 85).

*What are scaled scores?*

Scaled scores are standard scores that have a Mean of 10 and a Standard Deviation of ± 3. Scores between 7 and 13 include the middle two-thirds of children tested. Most subtest scores are reported as scaled scores.

If your child scores one Standard Deviation above the Mean (+1 SD), his standard score is 13 (10 + 3). If your child scores one Standard Deviation below the Mean (-1 SD), his standard score is 7 (10 – 3).

*What are T Scores?*

T scores are a type of standard score that has a Mean of 50 and a Standard Deviation of ± 10. If your child scores one Standard Deviation above the Mean (+ 1 SD), her T score is 60. If your child scores one Standard Deviation below the Mean (-1 SD), her T score is 40.

*What are stanines?*

Stanines are standard scores that have a Mean of 5 and a Standard Deviation of about ±2. If your child scores one Standard Deviation above the Mean (+ 1 SD), her stanine score is 7 (5 + 2). If her score is one Standard Deviation below the Mean (-1 SD), her stanine score is 3 (5 – 2).

*What are percentile ranks?*

Percentile ranks describe your child's rank or position when compared to other children who are the same age or in the same grade. Percentile ranks are not equal units. Percentile ranks cluster around the mean, and they stretch out at the high and low ends of the bell curve.

If your child earns a standard score of 100, your child's percentile rank is 50. This means that your child performed as well as or better than 50 percent of children who are his age or in his grade. If your child earns a percentile rank of 75 on a standardized test, your child scored as well or better than 75 percent of his peers. Percentile ranks are not the same as percent of correct answers on a test.

*I need to know if my child is making progress. Can I convert standard scores into percentile ranks?*

Yes. You can use the Conversion Table to convert standard scores and scaled scores into percentile ranks, and percentile ranks into standard scores and scaled scores. (See Figure 2, page 8.)

*What are age- and grade-equivalent scores?*

Age- and grade-equivalent scores are quick, easy ways to estimate your child's skill levels. Age-equivalent scores are reported as years and months (AE: 7-6 or 7:6). Grade-equivalent scores are reported as grades and months (GE: 7.6). Note: On most tests, a "month" equals one-tenth of a school year or 18 school days.

Age- and grade-equivalent scores are not equal units. Age- and grade-equivalent scores need to be explicit. An age-equivalent (AE) score of 7-6 means 7 years, 6 months. A grade-equivalent (GE) score of 7.6 means 7th grade, 6th month.

Age- and grade-equivalent scores for middle and high school students are less accurate because their skill levels are more variable.

**Figure 2. Conversion Table: Standard Scores, Scaled or Subtest Scores, & Percentile Ranks**

| Standard Score | Scaled Score | Percentile Rank |
|---|---|---|
| **145** | **19** | **99** |
| 140 | 18 | 99 |
| 135 | 17 | 99 |
| **130** | **16** | **98** |
| 125 | 15 | 95 |
| 120 | 14 | 91 |
| **115** | **13** | **84** |
| 110 | 12 | 75 |
| 109 | – | 73 |
| 108 | – | 70 |
| 107 | – | 68 |
| 106 | – | 66 |
| 105 | 11 | 63 |
| 104 | – | 61 |
| 103 | – | 58 |
| 102 | – | 55 |
| 101 | – | 53 |
| **100** | **10** | **50** |
| 99 | – | 47 |
| 98 | – | 45 |
| 97 | – | 42 |
| 96 | – | 39 |
| 95 | 9 | 37 |
| 94 | – | 34 |
| 93 | – | 32 |
| 92 | – | 30 |
| 91 | – | 27 |
| 90 | 8 | 25 |
| 89 | – | 23 |
| 88 | – | 21 |
| 87 | – | 19 |
| 86 | – | 18 |
| **85** | **7** | **16** |
| 80 | 6 | 09 |
| 75 | 5 | 05 |
| **70** | **4** | **02** |
| 65 | 3 | 01 |
| 60 | 2 | 01 |
| **55** | **1** | **01** |

### Subtest Scores, Composite Scores, and Index Scores

The evaluation may report your child's test scores as subtest scores, composite scores, cluster scores, or index scores.

***What do I need to know about subtest scores?***

Subtests are short tests that measure different skills and abilities, such as vocabulary, math computation, or short-term memory. Most psychological and educational tests are composed of several subtests.

Scaled scores are the mostly commonly used scoring system for subtests. Scaled scores have a Mean of 10 and a Standard Deviation of 3.

***What are composite scores, cluster scores, and index scores?***

Two or more subtests are often combined into a single score called a composite score, a cluster score, or an index score. Most composite, cluster, and index scores have a mean of 100 and a standard deviation of 15.

Do not rely solely on composite scores to measure your child's skills. Composite scores can mask significant weaknesses. If a child's subtest scores within a composite are very different from each other, the composite score will not accurately measure her skills.

For example, assume your child took a reading test and earned a high score on decoding and a low score on reading comprehension. The composite score on these two subtests is likely to fall in the average range. An average score is misleading because her reading skills are not average.

## Measuring Educational Progress

***Can I use my child's test scores to track progress?***

Maybe. When tracking progress, you need to compare your child's scores from the same edition of the same test. When tracking progress, it is best to use scoring systems that are equal units, such as standard scores. All changes in test scores are not significant. Some differences are accidental.

***Can I use age- and grade-equivalent scores to measure my child's progress?***

Age- and grade-equivalent scores are one way to estimate progress. If you use age- and grade-equivalent scores, you must compare scores from the same test. Different tests will not measure the same knowledge and skills. You cannot measure your child's progress by comparing age- and grade-equivalent scores on different tests.

Age- and grade-equivalent scores need to be used with caution. These scores are more useful when the tests are given at longer intervals (longer than a year). These scores can tell you if your child made progress, but they cannot tell you how much progress he made.

**Never rely on one test or one test score** when making decisions about your child's educational programming.

*When I looked for scores in my child's evaluation, the results were given as ranges - "average" and "below average." Shouldn't an evaluation report include standard scores and percentile ranks?*

Yes! An evaluator should always include standard scores and percentile ranks in evaluation reports. Some evaluators also include raw scores, and age- and grade-equivalent scores. If an evaluation does not include standard scores and percentile ranks, write a letter to the evaluator or the school to request these scores.

*My daughter's evaluation report referred to her skills as "average" although she struggles in school.*

Evaluators often describe a child's performance as "average," "above average," or "below average." These labels are arbitrary and are defined by test publishers. Different publishers use different labels for the same scores. For example, a standard score of 85 (16th percentile rank) on a test may be "average," "low average," or even "below average," depending on the test publisher.

A child who earns scores in the "average range" may have a disability and require specialized instruction. If you see large or unexpected changes in your child's test scores, ask the evaluator to check for scoring errors.
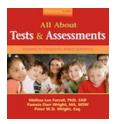
*What does it mean when a child regresses?*

Regression refers to the loss of skills. When a child regresses, scores on the same test drop significantly. If a child's standard scores drop, but his age- or grade-equivalent scores increase, this suggests that his progress has slowed, but he did not lose ground.

Regression may indicate that your child did not master targeted skills. His educational program may not be meeting his needs.

Many children regress over the summer months and during long breaks from school. If you have good baseline data on your child, you can use this data to document regression. Good data is helpful when you need to request Extended School Year (ESY) services for your child. You can obtain baseline data from criterion-referenced tests, work samples, and from your district's progress monitoring tests (e.g., STAR, AIMSweb). (See www.intensiveintervention.org/chart/progress-monitoring)

**Find more comprehensive information about test scores and how to use test data in the resources below.**

*Wrightslaw All About Tests and Assessments* by Melissa Lee Farrall, Ph.D., SAIF, Pamela Darr Wright, MA MSW, and Peter W. D. Wright, Esq.
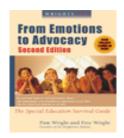
Understanding Your Child's Test Scores by Peter W. D. Wright, Esq.

Multimedia Training 1.5 hrs Immediate Download

*Wrightslaw: From Emotions to Advocacy, 2ⁿᵈ Edition*

Chapters 10 &11: Tests and Measurements 101 and 102.

## About Wrightslaw

Wrightslaw provides parents, educators, advocates, and attorneys with accurate, reliable information about special education law, education law, and advocacy for children with disabilities.  On Wrightslaw.com, founded by Peter W.D. Wright and Pamela Darr Wright, you will find thousands of articles, cases, and resources. Also available are best-selling books about special education law and advocacy co-authored by the Wrights and an award-winning DVD.

Wrightslaw, co-founder of the William and Mary Law School Institute of Special Education Advocacy (ISEA), provides legal and advocacy training at its best in training conferences across the country and as multimedia training downloads.