

History and Purpose

Traditionally, learning disabilities have been defined by unexpected low academic achievement in basic reading skills, listening comprehension, mathematics calculation, mathematics problem solving, oral expression, reading comprehension, or written expression. Under this model, learning disabled students are those whose measured achievement is below what would be predicted from their intelligence. Such students are considered to have a severe discrepancy between intelligence and achievement. The original federal special education regulations required that students exhibit a severe discrepancy in order to be qualified for special education as learning disabled. Regulations accompanying the latest reauthorization of federal special education laws moved severe discrepancy from being a requirement to an option when qualifying students as learning disabled. How to measure severe discrepancy has been a subject of much debate in the special education literature for many years.

In 1988, the Utah State Office of Education (USOE) adopted a formula recommended in the report of the United States Department of Education, Special Education Programs Work Group on Measurement Issues in Assessment of Learning Disabilities (Reynolds, 1984-85) for evaluating the discrepancy between a student's expected and obtained educational achievement.

$$z_{yc} = (z_x r_{xy}) - \left(1.96 \sqrt{1 - r_{xy}^2} - \left(1.65 \left(\sqrt{1 - r_{xy}^2} \right) \left(\sqrt{1 - \frac{r_{yy} + (r_{xx} r_{xy}^2) - (2r_{xy}^2)}{1 - r_{xy}^2}} \right) \right) \right)$$

The formula requires somewhat lengthy calculations as well as knowing the correlation between the intelligence and achievement tests administered a student and the internal consistency reliability of each test. The ESTIMATOR program was designed to make dealing with these issues easy. It contains a database with internal consistency reliability coefficients for all tests approved for learning disabilities assessment in Utah as well as the test-to-test correlations for the intelligence and achievement tests. Users of the program enter demographic and testing information on a student. The program looks up the necessary coefficients, makes the calculations, and generates a report describing the degree of confidence that can be had that the difference between the two scores represents a severe discrepancy.

The first ESTIMATOR program was published in 1989. Because new tests are published all the time and existing tests become dated, ESTIMATOR has been revised about every two years. Recommendation to USOE for tests to be added and deleted are made by the SLD Eligibility Assessment Committee

Version 1.0 - 6.0

ESTIMATOR: Versions 1.0 - 6.0 employed the Special Education Programs Work Group on Measurement Issues in Assessment of Learning Disabilities formula pictured above in calculating severe discrepancy. The program determined the achievement score where one could be 95 percent confident that a student exhibited a severe discrepancy (cutoff score). It then considered the obtained achievement score and generated a percent likelihood that the obtained score was equal to or greater than the cutoff score. If the obtained score was equal to the cutoff score, there was a 50 percent likelihood that the student exhibited a severe discrepancy. Students whose obtained scores represented a 50 percent likelihood of a severe discrepancy or greater were considered to have met severe discrepancy criterion for LD eligibility; those whose obtained scores represented less than a 50 percent likelihood were considered not to have met criterion.

Versions 7.0 - 11.0

Beginning with the publication of ESTIMATOR: Version 7.0, the original formula was modified. The modified formula was developed by Dr. Richard Keene, past chairman of Utah's LD Test Selection Committee. It retains the basic regression characteristics of its predecessor, but incorporates a one-tailed test (the original formula employed a two-tailed test) and a mathematically more elegant way of correcting for test unreliability.

$$z_{cut} = (z_x r_{xy}) - \left(1.476 \sqrt{1 - \left(\frac{r_{xy}}{\sqrt{r_{xx}} \sqrt{r_{yy}}} \right)^2} \right)$$

* Reynolds, C.R., (1984-85). Critical measurement issues in learning disabilities. *The Journal of Special Education* 18(4), 451-476.

In addition to modifying the formula, beginning with ESTIMATOR: Version 7.0, changes were made in the way the program output is reported. Versions 7.0 - 11.0 as well as the web based ESTIMATOR:

- Do not generate a percent likelihood.
- Do generate the percent confidence one can have that a student exhibits a severe discrepancy.
- Do use a 93 percent cutoff. If the confidence one can have that a student exhibits a severe discrepancy is equal to or greater than 93 percent, the student meets severe discrepancy criterion for LD eligibility; if the confidence is less than 93 percent, the student does not meet severe discrepancy criterion for LD eligibility. Research on the new formula showed that the 93 percent cutoff used by the new formula is similar to the 50 percent likelihood used by the old formula.
- Report (1) the cutoff score at which one can be 93 percent confident the student meets severe discrepancy criteria, and (2) the standard error of measurement of the achievement test.

Version 10.0

Proposed federal regulations to accompany the Individuals with Disabilities Education Improvement Act, 2005 would add an eighth learning disabilities achievement area, “reading fluency,” under which students might be qualified for special education services. This provided the impetus for developing ESTIMATOR: Version 10.0. The new version included a variety of reading fluency tests.

Version 11.0

Federal regulations accompanying reauthorization of the Individuals with Disabilities Education Act, 2007 did add, “reading fluency,” as an achievement area under which students could be qualified as learning disabled. In addition, the “Mathematical Reasoning” achievement area was relabeled “Mathematics Problem Solving.” These changes are reflected in ESTIMATOR: Version 11.0.

Web Based ESTIMATOR

In 2008, a decision was made to offer ESTIMATOR online. This web based ESTIMATOR program greatly improved the authors’ ability to update the program in a timely manner. As a practical matter, prior to launching the web based program, ESTIMATOR was updated about every two years and districts were provided with new program disks. Thus, if a test was published shortly after an update, ESTIMATOR users might have to wait almost two years for an approved test to be incorporated into the program. Providing ESTIMATOR online allows for adding a new test to the program almost immediately after it is approved. An updated and expanded webpage developed in conjunction with the web based ESTIMATOR also offers users access to a variety of resources related to the program as well as general information about learning disabilities assessment.

Purpose

ESTIMATOR is a computer program designed to use the Utah formula to determine the probability that a student’s aptitude/achievement discrepancy is severe enough for LD classification. A step-by-step procedure for calculating discrepancy with the formula is found on the program webpage. As noted, using the formula requires knowing the reliability of the aptitude (IQ) and achievement tests administered to a student as well as the test to test correlation. Also, somewhat lengthy calculations are required. ESTIMATOR was developed to make using the discrepancy formula easy. The program contains reliabilities and test to test correlations for all aptitude (IQ) and achievement tests approved for making LD classifications in Utah. It also makes rapid and accurate calculations, saving time and eliminating the possibility of error. Finally, it generates a report summarizing discrepancy data for individual students and appropriate for documenting discrepancy data as part of eligibility determination for LD classification decisions. ESTIMATOR deals only with discrepancy calculation, one element in the LD qualification process. Additional information such as observational data, criterion referenced test data, intervention history and social history must be considered before a student is classified as LD.