



Edmentum Exact Path and the Lexile Framework Linking Study

An Abstract

Evidence Base of Exact Path Lexile Measures

Linking studies are a psychometric method to relate scores from one scale to scores on another scale. This linking study was completed by MetaMetrics®, the parent organization of The Lexile® Framework for Reading, to research the link between the Edmentum Exact Path reading scale scores and Lexile® measures.



By establishing a link, **information can be used to predict the books and texts that a student would be successful in reading** and to compare academic growth across years, using student performance on the Edmentum Exact Path reading assessment.

The Lexile Framework for Reading Purpose and Design

The Lexile Framework is a tool that helps teachers, parents, and students locate appropriate reading materials. Text complexity (difficulty) and reader ability are measured in the same unit—the Lexile measure, which is represented by a number followed by an “L.” Text complexity is determined by examining text characteristics such as word frequency and sentence length. Items and text are calibrated using the Rasch model. The typical range of the Lexile scale is from 200L to 1600L, although actual Lexile measures can range from below zero (BR) to above 1600L.

The Lexile Framework for Reading is designed to:

- Measure reading ability by focusing on skills that readers use when studying written materials sampled from various content areas, including both literary and informational text
- Measure skills such as referring to details in the passage, drawing conclusions, and making comparisons and generalizations
- Not require prior knowledge related to the passage, vocabulary taken out of context, or formal logic



Exact Path Scale Score Calculations

Exact Path’s computer adaptive diagnostic assessment uses the Rasch model to place student results on a vertical-growth scale. A student’s initial ability estimate is based on grade level and adjusts according to performance on each test item. The adaptive algorithm also ensures sufficient domain and item-type coverage as well as measurement precision for each assessment. Scores on the Exact Path reading scale range from a minimum of 500 to a maximum of 1500. The scale scores provide a way to monitor student growth.



Linking Study Design

A single-group/common-person design was chosen for this study (Kolen & Brennan, 2014). This design is most useful “when (1) administering two sets of items to examinees is operationally possible, and (2) differential order effects are not expected to occur” (Kolen & Brennan, 2014, pp. 16–17). The Lexile linking items were administered as part of the Edmentum Exact Path reading administration during two phases. Phase 1 included students in grades K-6 and took place during the established testing window between late August and October 31, 2016. Phase 2, for students in grades 7-12, took place between late August and October 31, 2017.

Linking the Edmentum Exact Path Reading Scale to the Lexile Scale

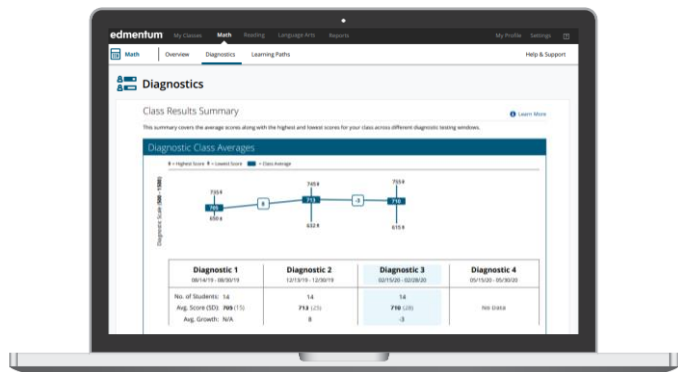
These three steps were performed concurrently for the items in all grades:

1. All Edmentum Exact Path reading items and Lexile linking items were concurrently calibrated.
2. The psychometric properties of linking items were evaluated, and a second concurrent calibration was conducted with Exact Path reading items and Lexile linking items deemed appropriate for analyses to anchor the theoretical Lexile values to Edmentum’s Exact Path reading items on to the Lexile scale.
3. A scoring run using only the Edmentum Exact Path reading items on the Lexile scale obtained from step 2 was conducted.

Evaluation of Lexile Linking Item Pool Items

MetaMetrics provided Edmentum with 32 linking items per grade to build eight-item, fixed-form blocks of items that were added to Edmentum’s online test administration. Each eight-item block contained a range of items varying in complexity. However, all eight-item blocks represented the typical range of complexity for a fall administration based on grade-level norms. Edmentum then provided MetaMetrics with difficulty values for the range of reading items typically encountered by students during their test administration.

After administering the items, the Lexile linking items were reviewed by MetaMetrics. The number of students taking the sets of linking items varied by grade, from 363 (kindergarten) to 10,039 (grade 8), for a total sample of 26,896 students taking a block of Lexile linking items across grades K through 12. All items were submitted to a Winsteps analysis (Linacre, 2017) and were reviewed and evaluated for use in the linking study based on item difficulty or potential alternate answer choices being more attractive than the correct answer choice. Four items were flagged for removal based on these criteria.



Each Lexile item administered was taken by a minimum of 54 students and maximum of 9,993 per grade. The retained items performed adequately (the average ability measure for the correct answer was highest compared to the average ability measures of the three distractors from the Winsteps analyses) and were retained in the subsequent analyses.

Using this information, along with national normative data and information from previously administered Lexile linking tests, the difficulty for each grade-level

linking item pool was determined. To provide connectivity within grades, each within-grade, eight-item set contained two common items, which resulted in a total of 26 unique items per grade-level pool. Common items were also included across adjacent grades to provide connectivity across grades.

Linking Analyses

Two score scales (e.g., the Edmentum Exact Path reading scale and the Lexile scale) can be linked using linear equating. The linear-equating method is appropriate to use when (1) test forms have similar difficulties and (2) simplicity is desired in conversion tables or equations, in conducting analyses, and in describing procedures (Kolen & Brennan, 2014).

In linear equating, a transformation is chosen such that scores on two sets of items are equated if they correspond to the same number of standard deviations above (or below) the mean in that group of examinees (Kolen & Brennan, 2014). Linear equating by definition has the same mean and standard deviation for the linking equation because the means and standard deviations are the same for the tests being linked. The final linking equation between the Edmentum Exact Path reading scale scores and Lexile measures can be written as:

Lexile Measure = Slope (Edmentum Reading Scale Score) + Intercept

Here, the slope is the ratio of the standard deviations of the Edmentum Exact Path reading scale scores and calibrated Lexile measures. Conversion tables were developed for all grade levels to express the Edmentum Exact Path reading scale scores in the Lexile metric.

Lexile measures that are reported for an individual student should reflect the purpose for which they will be used. If the purpose is research (e.g., to measure growth at the student, grade, school, district, or state level), then actual measures should be used at all score points, rounded to the nearest integer. A computed Lexile measure of 772.5L would be reported as 773L. If the purpose is instructional, then the Lexile measures should be capped at the upper bound of measurement error (e.g., at the 95th percentile

of the national Lexile norms) to ensure developmental appropriateness of the material. MetaMetrics expresses these scores as “Reported Lexile Measures” and recommends that these measures be reported on individual score reports.

Conclusions, Caveats, and Recommendations

The study results showed a strong positive correlation between Exact Path reading diagnostic scale scores and Lexile measures. Now, as students complete Exact Path’s adaptive diagnostic assessment, they will receive an accurate Lexile measure. Following multiple administrations, Lexile growth is also tracked in reporting. Additionally, within the rigorous online content, appropriately Lexile-leveled texts are embedded to support reading growth.

The Lexile measure is one factor related to comprehension and is a good starting point in the selection process of a book for a specific reader. Other factors—such as student developmental level, motivation, and interest; amount of background knowledge possessed by the reader; and characteristics of the text, like illustrations and formatting—also need to be considered when matching a book with a reader.

The real power of the Lexile Framework is in examining the growth of readers—wherever the reader may be in the development of his or her reading skills. Readers can be matched with texts that they are forecasted to read with 75-percent comprehension. As a reader grows, he or she can be matched with more demanding texts. And, as the texts become more demanding, the reader’s skills grow.



The link that has been established between the Edmentum Exact Path reading scale scores and the Lexile measures **permits readers to be matched with books and texts that provide an appropriate level of challenge.**

References

Kolen, M.J. & Brennan, R.L. (2014). *Test equating, scaling, and linking: Methods and practices* (3rd ed.). New York, NY: Springer-Verlag New York.

Linacre, J.M. (2017). Winsteps® Rasch measurement computer program. Beaverton, OH: Winsteps.com.

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