

WIAT-III Content and Scoring Modifications

April 22, 2010



We would like to bring to your attention several content and scoring modifications that are being implemented on the WIAT-III. Based on careful analysis of standardization data and a poststandardization study, we have concluded that these modifications do not affect norms, reliability, or validity, and that the original materials can be used and interpreted with confidence. These modifications are intended to ensure that the WIAT-III materials meet the high standards of quality that you expect from Pearson.

Revisions of Numerical Operations Items 49 and 56

Each of these items depicts a triangle with sides of indicated lengths. However, in the original version of the Response Booklet, the lengths do not represent logically possible conditions. In Item 49, the length of one side is greater than the sum of the lengths of the other two sides; and in Item 56, the lengths are not consistent with a right triangle.

Based on results from standardization and a special study conducted after publication, it is our conclusion that examinees either were not aware of these features of the figures, or were capable of ignoring them and solving the problems appropriately. Statistically, the items function as well as other items that do not have this problem. In standardization, both items had above-average validity (that is, they were highly accurate in measuring math computation skill).

For Item 49, although it is logically impossible for a triangle to have one side whose length is greater than the sum of the lengths of the other two sides, students evidently were able to identify the intent of the item and compute the lengths of the sides given the perimeter and the relationship among the respective lengths. In fact, no examiner, examinee, or reviewer commented on this item during standardization, and the issue was

not brought to our attention until data collection for the adult norms, when it was noticed by a math teacher. In addition, the vast majority of even the gifted sample who missed this item also missed all harder items, showing that this item was not unfairly difficult.

Item 56 measures understanding of the basic trigonometric terms “tangent,” “sine” and “cosine.” It presents a right triangle with the lengths of the sides indicated, and asks the examinee to provide the ratio of side lengths corresponding to each of the trigonometric terms. The fact that the side lengths are not consistent with a right triangle evidently did not interfere with students’ ability to calculate the trigonometric functions. Like Item 49, Item 56 correlated highly with the subtest total score, and no comments were made about the item during standardization.

Two potential replacement versions of Item 49, and one replacement version of Item 56, were evaluated in a special study in which 572 students in grades 8 through 12 were administered the Numerical Operations subtest in an untimed, group-administered format that included either the original version or a revised version of each of these items. Versions were assigned randomly within each participating classroom.

The study showed the first replacement version of Item 49 to be slightly but significantly easier than the original item (difference in Rasch difficulties of 0.6 logit; p value of .45 for the replacement, vs. .35 for the original) and to have equally strong validity (item-total correlation and Rasch infit) as the original version. The other replacement for Item 49 was not considered because it was 1.2 logits easier than the original and

had slightly worse validity. Through a Rasch-based simulation analysis, the effect on norms of using the first replacement version was found to be negligible (at most one percentile point), as shown in the following table.

WIAT-III Numerical Operations, Item 49 Effect of modifying Item 49 Pilot data (Items 38-57, Grades 8-12)			
Percentile			
raw score	original	revised	difference
1	1	1	0
2	2	2	0
3	4	4	0
4	8	8	0
5	13	13	0
6	20	20	0
7	27	26	1
8	33	32	1
9	39	38	1
10	46	45	1
11	56	55	1
12	65	64	1
13	69	69	0
14	74	73	1
15	80	79	1
16	86	85	1
17	90	90	0
18	95	95	0
19	99	99	0

The replacement version of Item 56 did not differ significantly in difficulty from the original; the difference in logits was 0.4, and the p values were .28 for the revision and .26 for the original. The replacement item had slightly better validity (item-total correlation and Rasch infit) than the original.

Scoring Modification for Math Problem Solving Item 71

For the next-to-last item on Math Problem Solving, Item 71, the range of correct responses has been increased to include the responses 16.77 and 16.82 minutes, which are defensible as correct answers. The revised scoring criterion for this item is:

16.65 to 16.82 minutes;

16 minutes, 39 to 49 seconds

The original correct response (16.65 minutes) is obtained by subtracting the duration of ascent and descent (1 minute) from 19.5 minutes, and multiplying the result by .9. The answer of 16.82 minutes is obtained by applying the formula $v = rt$, where v is the volume of the air tank, r is the rate of usage of air, and t is time. Because v is a constant, the problem is solved by the equation $18.5r = t(1.1r)$, where t and $1.1r$ are the time and rate of consumption at a depth of 60 feet. Finally, the answer of 16.77 minutes is obtained in the same way but with the assumption that the average rate of consumption during the minute of ascent and descent is midway between the rates at the surface and at 60 feet (i.e., $1.05r$).

This extension of the range of correct answers has no measurable effect on the difficulty of this item or on the norms. Item 71 was already very difficult, with only about 5% of the standardization examinees who attempted it giving the original correct answer (16.65). Fewer than 1% gave a response between 16.66 and 16.82 minutes.

Scoring Modifications for Pseudoword Decoding Items 51 and 52

An alternate pronunciation option has been added to Items 51 and 52. According to the rules of English pronunciation, the placement of emphasis at the end of a word is on the syllable that has a long vowel sound. Thus, for Item 51, if the y is pronounced as a long vowel, the emphasis would be placed on that syllable. For Item 52, if the final a is pronounced as a long vowel, the emphasis would be placed on that syllable.

51.	preembutyric \prē-em-'byū-tŭ-rik\ or \prē-em-byū-'tī-rik\ 	DK	10
52.	diphthalbarbadinyl \dif-thŭl-bār-bŭ-'dī-nŭl\ or \dif-thŭl-bār-'bā-din-ŭl\ 	DK	10

Scoring Modification for Written Expression, Comma Usage (Examiner's Manual, p. 128)

The scoring rule at the top of page 128 addresses a common punctuation error, which is to insert a comma after a coordinating conjunction, as in the following example:

He found the book challenging, but, he enjoyed it.

However, if the coordinating conjunction is followed immediately by a word or phrase that is set off by commas, a comma may follow the coordinating conjunction, as in this example:

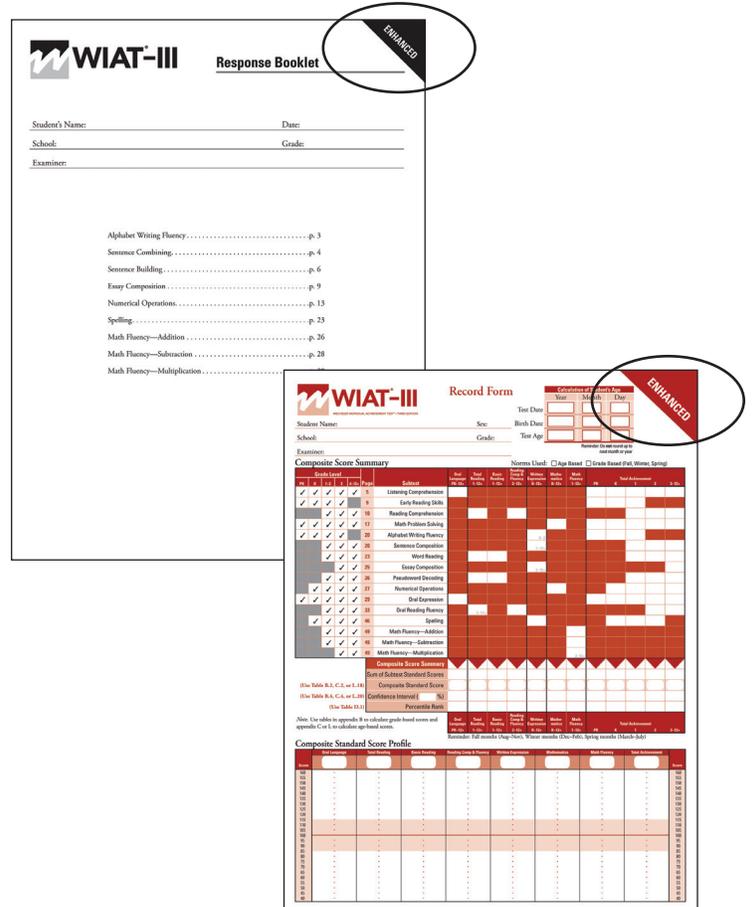
He found the book challenging, but, to his surprise, he enjoyed it.

Thus, the scoring rule has been amended to permit a comma after a coordinating conjunction in this type of circumstance. This change will not affect the norms because standardization cases were not penalized for this usage of commas.

Procedures for Using Enhanced Record Forms and Response Booklets

Because the modifications to the Numerical Operations subtest affect both the Record Form and the Response Booklet, it is essential that users who are administering this subtest use the matching versions of these two components—either the original printings of both, or the enhanced versions of both.

• **Designation of the enhanced editions:** As shown below, the covers of the revised editions of both the Record Form and the Response Booklet are marked by the word **Enhanced**.



- **Using existing supplies of Record Forms and Response Booklets:** You may continue to use the original versions of the Record Form and Response Booklet, as long as they are used in combination with each other. If you have a greater supply of one of these components than the other, please call 800.627.7271 to order.
- **Ordering Record Forms and Response Booklets:** Because of the importance of using the appropriate Record Form and Response Booklet together, we will now sell the Record Forms and Response Booklets as a set. The new item number for the combined set is 0158984846.