



Reliability Coefficients and Standard Errors of Measurement for Subtest Component Scores

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Overview

This technical report provides the fall, spring, and age-based reliability coefficients and standard errors of measurement (*SEM*) for the subtest component scores within the following subtests: Listening Comprehension, Oral Expression, Sentence Composition, and Essay Composition. Subtest component standard scores allow practitioners to evaluate differences in performance between components and to identify relative strengths and weaknesses.

Reliability Coefficients

Tables 1–3 include the reliability coefficients of the subtest component scores for the fall, spring, and age samples, respectively. These reliability coefficients may be used to evaluate the precision of the subtest component scores. Reliability coefficients for most of the subtest component scores were obtained utilizing the split-half method. A subtest's split-half reliability coefficient is the correlation between the total scores of items from each half of the subtest, corrected by the Spearman-Brown formula for the length of the full subtest. Because Essay Composition (Theme Development and Text Organization; Word Count) does not have item-level data, and the Oral Word Fluency component of the Oral Expression subtest is a speeded measure, the split-half reliability method is not appropriate for these subtest component scores. Instead, test-retest stability coefficients were used as the reliability estimates for these subtest components. These stability coefficients were based on the scores of students who participated in the test-retest study described in chapter 3 of the WIAT–III Technical Manual.

Table 1 Grade-Based Reliability Coefficients of the Subtest Components: Fall

Subtest Component	Grade														Average r_{xx}^a
	PK	K	1	2	3	4	5	6	7	8	9	10	11	12	
Listening Comprehension															
Receptive Vocabulary	0.78	0.73	0.71	0.67	0.73	0.70	0.67	0.76	0.72	0.75	0.58	0.71	0.66	0.65	0.70
Oral Discourse Comprehension	0.80	0.78	0.84	0.84	0.85	0.85	0.85	0.87	0.80	0.80	0.83	0.87	0.84	0.83	0.83
Oral Expression															
Expressive Vocabulary	0.67	0.60	0.71	0.66	0.70	0.69	0.84	0.68	0.73	0.76	0.61	0.82	0.68	0.72	0.71
Oral Word Fluency ^b	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.73
Sentence Repetition	0.84	0.87	0.86	0.86	0.86	0.90	0.82	0.85	0.83	0.84	0.87	0.80	0.85	0.83	0.85
Sentence Composition															
Sentence Building	.	.	0.90	0.90	0.87	0.93	0.87	0.86	0.86	0.82	0.91	0.80	0.81	0.84	0.87
Sentence Combining	.	.	0.85	0.81	0.81	0.80	0.79	0.80	0.81	0.84	0.78	0.80	0.79	0.79	0.81
Essay Composition															
Theme Development and Text Organization ^b	.	.	.	.	0.82	0.82	0.82	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.79
Word Count ^b	.	.	.	.	0.75	0.75	0.75	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.80

^a Average reliability coefficients were calculated with Fisher's *z* transformation.

^b Reliability based on test-retest correlation.

Table 2 Grade-Based Reliability Coefficients of the Subtest Components: Spring

Subtest Component	Grade														Average r_{xx}^a
	PK	K	1	2	3	4	5	6	7	8	9	10	11	12	
Listening Comprehension															
Receptive Vocabulary	0.70	0.72	0.73	0.73	0.78	0.58	0.67	0.64	0.76	0.59	0.77	0.68	0.59	0.68	0.69
Oral Discourse Comprehension	0.86	0.84	0.79	0.78	0.88	0.78	0.85	0.80	0.86	0.76	0.80	0.83	0.83	0.84	0.82
Oral Expression															
Expressive Vocabulary	0.67	0.60	0.51	0.75	0.71	0.67	0.75	0.77	0.64	0.77	0.77	0.79	0.79	0.79	0.72
Oral Word Fluency ^b	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.73
Sentence Repetition	0.89	0.77	0.84	0.84	0.82	0.81	0.88	0.84	0.83	0.77	0.85	0.73	0.83	0.88	0.83
Sentence Composition															
Sentence Building	.	.	0.88	0.89	0.84	0.81	0.80	0.85	0.78	0.76	0.77	0.81	0.70	0.83	0.82
Sentence Combining	.	.	0.81	0.76	0.73	0.80	0.73	0.86	0.84	0.74	0.82	0.82	0.82	0.81	0.80
Essay Composition															
Theme Development and Text Organization ^b	.	.	.	.	0.82	0.82	0.82	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.79
Word Count ^b	.	.	.	.	0.75	0.75	0.75	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.80

^a Average reliability coefficients were calculated with Fisher's *z* transformation.

^b Reliability based on test-retest correlation.

Table 3 Age-Based Reliability Coefficients of the Subtest Components

Subtest Component	Age in Years														Average r_{xx}^a
	4	5	6	7	8	9	10	11	12	13	14	15	16	17–19	
Listening Comprehension															
Receptive Vocabulary	0.75	0.73	0.71	0.72	0.67	0.74	0.73	0.62	0.70	0.63	0.65	0.74	0.62	0.61	0.69
Oral Discourse Comprehension	0.82	0.81	0.85	0.83	0.82	0.82	0.85	0.82	0.81	0.82	0.82	0.83	0.80	0.82	0.82
Oral Expression															
Expressive Vocabulary	0.74	0.65	0.68	0.74	0.73	0.78	0.73	0.71	0.77	0.58	0.79	0.79	0.69	0.77	0.73
Oral Word Fluency ^b	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.75
Sentence Repetition	0.81	0.88	0.87	0.84	0.85	0.87	0.83	0.84	0.82	0.73	0.83	0.79	0.83	0.81	0.83
Sentence Composition															
Sentence Building	.	.	0.84	0.88	0.82	0.81	0.76	0.85	0.76	0.80	0.83	0.74	0.79	0.78	0.81
Sentence Combining	.	.	0.82	0.81	0.75	0.84	0.75	0.79	0.82	0.85	0.76	0.80	0.79	0.83	0.80
Essay Composition															
Theme Development and Text Organization ^b	.	.	.	.	0.79	0.79	0.79	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.78
Word Count ^b	.	.	.	.	0.85	0.85	0.85	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.84

^a Average reliability coefficients were calculated with Fisher's z transformation.

^b Reliability based on test-retest correlation.

Standard Errors of Measurement

Tables 4–6 provide the standard errors of measurement (SEM) of the subtest component scores for the fall, spring, and age samples, respectively. The SEM provides an estimate of the amount of error in an individual's observed test score. The SEM is inversely related to the reliability; thus, as reliability increases, the SEM decreases, and confidence in the observed test score increases. As described in chapter 3 of the WIAT–III Technical Manual, the SEM may be used to calculate the confidence interval, or the band of scores around the observed score in which the individual's true score is likely to fall.

Table 4 Grade-Based Standard Errors of Measurement of the Subtest Components: Fall

Subtest Component	Grade													Average SEM^a	
	PK	K	1	2	3	4	5	6	7	8	9	10	11		12
Listening Comprehension															
Receptive Vocabulary	7.04	7.79	8.08	8.62	7.79	8.22	8.62	7.35	7.94	7.50	9.72	8.08	8.75	8.87	8.20
Oral Discourse Comprehension	6.71	7.04	6.00	6.00	5.81	5.81	5.81	5.41	6.71	6.71	6.18	5.41	6.00	6.18	6.15
Oral Expression															
Expressive Vocabulary	8.62	9.49	8.08	8.75	8.22	8.35	6.00	8.49	7.79	7.35	9.37	6.36	8.49	7.94	8.15
Oral Word Fluency	8.35	8.35	8.35	8.35	8.35	8.35	8.35	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.79
Sentence Repetition	6.00	5.41	5.61	5.61	5.61	4.74	6.36	5.81	6.18	6.00	5.41	6.71	5.81	6.18	5.84
Sentence Composition															
Sentence Building	.	.	4.74	4.74	5.41	3.97	5.41	5.61	5.61	6.36	4.50	6.71	6.54	6.00	5.53
Sentence Combining	.	.	5.81	6.54	6.54	6.71	6.87	6.71	6.54	6.00	7.04	6.71	6.87	6.87	6.61
Essay Composition															
Theme Development and Text Organization	.	.	.	.	6.36	6.36	6.36	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.18
Word Count	.	.	.	.	7.50	7.50	7.50	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.49

^a The average $SEMs$ were calculated by averaging the sum of the squared $SEMs$ for each grade and obtaining the square root of the result.

Table 5 Grade-Based Standard Errors of Measurement of the Subtest Components: Spring

Subtest Component	Grade													Average SEM ^a	
	PK	K	1	2	3	4	5	6	7	8	9	10	11		12
Listening Comprehension															
Receptive Vocabulary	8.22	7.94	7.79	7.79	7.04	9.72	8.62	9.00	7.35	9.60	7.19	8.49	9.60	8.49	8.39
Oral Discourse Comprehension	5.61	6.00	6.87	7.04	5.20	7.04	5.81	6.71	5.61	7.35	6.71	6.18	6.18	6.00	6.34
Oral Expression															
Expressive Vocabulary	8.62	9.49	10.50	7.50	8.08	8.62	7.50	7.19	9.00	7.19	7.19	6.87	6.87	6.87	8.04
Oral Word Fluency	8.35	8.35	8.35	8.35	8.35	8.35	8.35	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.79
Sentence Repetition	4.97	7.19	6.00	6.00	6.36	6.54	5.20	6.00	6.18	7.19	5.81	7.79	6.18	5.20	6.23
Sentence Composition															
Sentence Building	.	.	5.20	4.97	6.00	6.54	6.71	5.81	7.04	7.35	7.19	6.54	8.22	6.18	6.54
Sentence Combining	.	.	6.54	7.35	7.79	6.71	7.79	5.61	6.00	7.65	6.36	6.36	6.36	6.54	6.79
Essay Composition															
Theme Development and Text Organization	.	.	.	.	6.36	6.36	6.36	7.50	7.50	7.50	7.50	7.50	7.50	7.50	7.18
Word Count	.	.	.	.	7.50	7.50	7.50	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.49

^a The average SEMs were calculated by averaging the sum of the squared SEMs for each grade and obtaining the square root of the result.

Table 6 Age-Based Standard Errors of Measurement of the Subtest Components

Subtest Component	Age in Years														Average SEM ^a
	4	5	6	7	8	9	10	11	12	13	14	15	16	17-19	
Listening Comprehension															
Receptive Vocabulary	7.50	7.79	8.08	7.94	8.62	7.65	7.79	9.25	8.22	9.12	8.87	7.65	9.25	9.37	8.39
Oral Discourse Comprehension	6.36	6.54	5.81	6.18	6.36	6.36	5.81	6.36	6.54	6.36	6.36	6.18	6.71	6.36	6.31
Oral Expression															
Expressive Vocabulary	7.65	8.87	8.49	7.65	7.79	7.04	7.79	8.08	7.19	9.72	6.87	6.87	8.35	7.19	7.86
Oral Word Fluency	8.08	8.08	8.08	8.08	8.08	8.08	8.08	7.04	7.04	7.04	7.04	7.04	7.04	7.04	7.58
Sentence Repetition	6.54	5.20	5.41	6.00	5.81	5.41	6.18	6.00	6.36	7.79	6.18	6.87	6.18	6.54	6.21
Sentence Composition															
Sentence Building	.	.	6.00	5.20	6.36	6.54	7.35	5.81	7.35	6.71	6.18	7.65	6.87	7.04	6.62
Sentence Combining	.	.	6.36	6.54	7.50	6.00	7.50	6.87	6.36	5.81	7.35	6.71	6.87	6.18	6.69
Essay Composition															
Theme Development and Text Organization	.	.	.	.	6.87	6.87	6.87	7.19	7.19	7.19	7.19	7.19	7.19	7.19	7.10
Word Count	.	.	.	.	5.81	5.81	5.81	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.20

^a The average SEMs were calculated by averaging the sum of the squared SEMs for each age and obtaining the square root of the result.