

Gregg and Hoy University Normal and Learning Disabled Sample. Noel Gregg and Cheri Hoy (University of Georgia) conducted this study with 200 college students at the University of Georgia. Half of the students had been diagnosed with a specific learning disability at the UGA's Regent Center for Learning Disorders and half were recruited as volunteers. All students were pursuing a bachelor's degree ($M = 15.9$ grade levels, $SD = 1.2$ grade levels). Ages ranged from 18 years, 5 months to 53 years, 0 months ($M = 22$ years, 10 months; $SD = 4$ years, 9 months). The two samples did not differ in terms of age ($t_{[202]} = 0.62$, $p = 0.54$).

Inspection of the means and standard deviations of the composite scores for the measures reported in Table 4-14 indicates that the total sample functioned within the average to above average range of general intellectual ability. The range of standard deviations for the full scale composite scores was approximately 11 to 12, indicating that the sample was moderately restricted in terms of range of talent when compared to the general population. Subjects in this sample completed select tests from the WJ III COG and WJ III ACH that produced GIA and cognitive factor clusters as well as select achievement clusters.

Subjects participating in this study were also administered a variety of measures of cognitive and achievement abilities commonly used with college-age students. Those reported here included the WAIS-III, the KAIT, the *Oral and Written Language Scales* (OW) (Carrow-Woolfolk, 1995), the Wide Range Achievement Test-Third Edition (WRAT-III) (Wilkinson, 1993), and the Nelson-Denny Reading Test (NDRT) (Brown, Fishco, & Hanna, 1993). Not all subjects were administered all measures. The WAIS-III is an individually administered battery that assesses a variety of cognitive abilities and yields intelligence quotients from the Verbal, Performance, and Full Scales, as well as. Subjects participating in this study were also administered a variety of measures of cognitive and index scores from the Verbal Comprehension, Perceptual Organization, Processing Speed, and Working Memory factors. All scores were analyzed in this study. The WAIS-III is generally considered to be a reliable and valid measure of general cognitive intelligence for individuals 16 to 89 years of age. The KAIT is an individually administered battery of cognitive abilities that yields an overall Composite IQ as well as lower-order scores for Fluid and Crystallized scales. The KAIT is considered a reliable and valid measure of cognitive abilities for individuals 11 to 85 years of age. The OWLS is a battery of tests designed to assess written language, as well as receptive and expressive language, for individuals 3 to 21 years of age. It provides standard scores for Listening Comprehension, Oral Expression, and Written Expression scales, as well as Oral and Language composites, each of which were analyzed in this study. The OW was administered individually for this investigation. Reliability is strong and adequate concurrent validity with other language scales has been established. The WRAT-III is an individually administered brief measure of basic academic skills for individuals 5 years of age through adult. In this study, the Reading (basic decoding) and Spelling (written from dictation) subtest scores were analyzed. The NDRT is a reading survey for high school and college students and adults. For this study, Part 11 of the test was administered individually, providing a reading comprehension score. (pp.77-79, WJ III Technical Manual)

Table 4-14.
Summary Statistics and Correlations for WJ III COG Clusters, WAIS-III, and KAIT Scales—College Students (Gregg & Hoy Study)

Measure	N	M	SD	WAIS-III*							KAIT**		
				FSIQ	VIQ	PIQ	VCI	POI	PSI	WMI	CIS	Gc	Gf
WJ III General Intellectual Ability Standard Scale	137	104.0	10.4	.67	.66	.51	.52	.50	.46	.70	.75	.64	.69
Brief Intellectual Ability	177	101.1	10.0	.62	.57	.51	.48	.43	.49	.53	.68	.58	.62
WJ III Cognitive Clusters													
Thinking Ability—Ext	148	105.3	9.1	.59	.52	.49	.45	.51	.39	.49	.64	.46	.67
Thinking Ability—Std	157	104.8	10.8	.57	.53	.47	.45	.49	.39	.50	.67	.51	.68
Cognitive Efficiency—Ext	205	98.9	11.5	.45	.43	.35	.24	.28	.53	.65	.52	.40	.51
Cognitive Efficiency—Std	205	98.4	12.3	.39	.37	.30	.18	.21	.47	.63	.48	.34	.49
Verbal Comprehension (Gc)	179	102.9	10.8	.72	.71	.54	.65	.55	.25	.37	.68	.66	.53
Long-Term Retrieval (Glr)	202	106.5	11.6	.38	.31	.36	.20	.37	.23	.36	.58	.39	.64
Visual-Spatial Thinking (Gv)	151	104.2	10.7	.43	.30	.45	.33	.50	.29	.24	.42	.32	.42
Auditory Processing (Ga)	205	100.0	13.0	.39	.38	.29	.31	.26	.39	.44	.44	.33	.44
Phonemic Awareness (Ga)	205	102.9	12.5	.40	.38	.29	.34	.25	.34	.41	.48	.40	.43
Fluid Reasoning (Gf)	205	103.3	9.3	.60	.56	.48	.46	.53	.22	.39	.54	.40	.55
Processing Speed (Gs)	205	97.3	11.1	.37	.27	.39	.19	.26	.60	.42	.43	.32	.44
Cognitive Fluency (Gs)	205	93.4	10.9	.36	.28	.36	.15	.22	.51	.30	.24	.16	.27
Short-Term Memory (Gsm)	206	101.1	13.1	.33	.40	.16	.18	.18	.25	.60	.41	.32	.39
Working Memory (Gsm)	206	100.3	13.9	.45	.48	.29	.25	.27	.30	.67	.52	.38	.52
N	—	—	—	153	153	153	152	151	149	150	151	151	151
Mean	—	—	—	112.5	112.8	110.2	112.9	111.2	103.7	104.6	107.6	106.2	107.5
Standard Deviation	—	—	—	12.0	11.9	13.4	14.5	14.3	12.9	11.5	10.5	10.8	11.3

Note: The WJ III standard scores reported in this table are special research standard scores derived from a simple z-score transformation of *W*-scores at each of 26 age groups. The purpose of these research standard scores was to remove the age variance from the *W*-scores to allow for the calculation of correlations across broad age ranges. The research standard scores will differ from the final WJ III publication standard scores which were not available at the time this study was completed. The research standard scores make use of the mean and average standard deviation at each age level while the WJ III publication standard scores utilize median scores and two unique estimates of the standard deviation (above and below the median) via a continuous norming procedure (see Chapter 2).

* WAIS-III Abbreviations: FSIQ = Full Scale IQ; VIQ = Verbal IQ; PIQ = Performance IQ; VCI = Verbal Comprehension Index; POI = Perceptual Organization Index; PSI = Processing Speed Index; WMI = Working Memory Index

** KAIT Abbreviations: CIS = Composite Intelligence Scale; Gc = Crystallized Scale; Gf = Fluid Scale

Table 4-21.
*Correlations for WJ III COG
 Clusters, WAIS-III
 Composites, and KAIT
 Composites With WJ III ACH
 Clusters, OWLS Scales,
 WRAT-III Composites, and
 NDRT Clusters (Gregg &
 Hoy Study)*

Measure	WJ III ACHIEVEMENT CLUSTERS					
	Broad Reading	Basic Reading Skills	Basic Writing Skills	Oral Expression	Phoneme/Grapheme Knowledge	Academic Fluency
Predicted Achievement	.66	.62	.63	.42	—	—
Brief Intellectual Ability	.55	.54	.60	.51	.54	.51
WJ III General Intellectual Ability Standard Scale	.56	.56	.62	.47	.63	.48
WJ III Cognitive Factors						
Thinking Ability—Ext	.35	.40	.43	.35	.45	.26
Thinking Ability—Std	.38	.45	.45	.38	.52	.29
Cognitive Efficiency—Ext	.62	.52	.54	.23	.52	.55
Cognitive Efficiency—Std	.60	.53	.56	.16	.55	.55
Verbal Comprehension (<i>Gc</i>)	.32	.34	.40	.82	.33	.27
Long-Term Retrieval (<i>Glr</i>)	.27	.23	.31	.33	.27	.23
Visual-Spatial Thinking (<i>Gv</i>)	.19	.18	.25	.29	.29	.16
Auditory Processing (<i>Ga</i>)	.42	.49	.41	.23	.51	.35
Phonemic Awareness (<i>Ga</i>)	.44	.52	.45	.26	.56	.35
Fluid Reasoning (<i>Gf</i>)	.22	.30	.31	.32	.32	.18
Processing Speed (<i>Gs</i>)	.55	.37	.49	.21	.36	.52
Cognitive Fluency (<i>Gs</i>)	.39	.15	.27	.26	.12	.33
Short-Term Memory (<i>Gsm</i>)	.45	.44	.39	.16	.46	.37
Working Memory (<i>Gsm</i>)	.50	.46	.49	.23	.49	.45
Wechsler Adult Intelligence Scale—Third Edition						
Full Scale IQ	.35	.39	.38	.61	.40	.27
Verbal IQ	.42	.43	.40	.60	.41	.37
Performance IQ	.17	.23	.25	.45	.27	.09
Verbal Comprehension Index	.25	.31	.31	.60	.29	.19
Perceptual Organization Index	.07	.18	.15	.48	.23	.00
Processing Speed Index	.47	.29	.37	.19	.31	.49
Working Memory Index	.52	.51	.54	.25	.51	.51
Kaufman Adolescent & Adult Intelligence Test						
Composite Intelligence Scale	.57	.53	.51	.55	.53	.49
Crystallized Scale	.56	.51	.50	.52	.51	.50
Fluid Scale	.42	.40	.39	.44	.40	.35
N	206	185	200	182	185	205
Mean	94.7	92.2	95.9	101.7	98.5	103.6
Standard Deviation	12.4	12.9	14.0	11.0	12.8	13.3

Table 4-21. (cont.)
 Correlations for WJ III COG Clusters, WAIS-III Composites, and KAIT Composites With WJ III ACH Clusters, OWLS Scales, WRAT-III Composites, and NDRT Clusters (Gregg & Hoy Study)

Measure	OWLS					WRAT-III		NDRT
	Listening Comprehension	Oral Expression	Oral Comprehension	Written Expression	Language Comprehension	Reading	Spelling	Reading Comprehension
Predicted Achievement	.56	.58	.66	.52	.54	.60	.49	.68
Brief Intellectual Ability	.54	.60	.65	.39	.52	.51	.44	.63
WJ III General Intellectual Ability Standard Scale	.56	.62	.69	.49	.64	.61	.47	.61
WJ III Cognitive Factors								
Thinking Ability-Ext	.48	.48	.57	.30	.48	.44	.29	.37
Thinking Ability-Std	.54	.53	.62	.28	.54	.51	.36	.42
Cognitive Efficiency-Ext	.36	.38	.43	.44	.30	.45	.44	.50
Cognitive Efficiency-Std	.33	.38	.41	.48	.33	.50	.43	.48
Verbal Comprehension (<i>Gc</i>)	.55	.53	.61	.23	.43	.38	.29	.52
Long-Term Retrieval (<i>Glr</i>)	.40	.38	.45	.43	.47	.31	.22	.26
Visual-Spatial Thinking (<i>Gv</i>)	.31	.31	.38	.26	.33	.24	.20	.16
Auditory Processing (<i>Ga</i>)	.40	.43	.46	.31	.38	.44	.32	.42
Phonemic Awareness (<i>Ga</i>)	.39	.45	.48	.35	.38	.48	.38	.41
Fluid Reasoning (<i>Gf</i>)	.48	.47	.53	.25	.50	.30	.18	.30
Processing Speed (<i>Gs</i>)	.28	.36	.37	.32	.24	.37	.40	.49
Cognitive Fluency (<i>Gs</i>)	.21	.21	.25	.17	.17	.15	.18	.26
Short-Term Memory (<i>Gsm</i>)	.30	.26	.32	.36	.22	.36	.31	.33
Working Memory (<i>Gsm</i>)	.37	.38	.44	.46	.37	.37	.34	.40
Wechsler Adult Intelligence Scale-Third Edition								
Full Scale IQ	.56	.52	.60	.36	.56	.43	.27	.47
Verbal IQ	.54	.56	.62	.31	.53	.47	.26	.57
Performance IQ	.42	.34	.42	.30	.41	.28	.20	.23
Verbal Comprehension Index	.42	.47	.50	.15	.35	.35	.22	.45
Perceptual Organization Index	.40	.31	.39	.28	.41	.19	.13	.10
Processing Speed Index	.27	.32	.35	.19	.13	.33	.34	.49
Working Memory Index	.40	.43	.47	.48	.40	.49	.41	.47
Kaufman Adolescent & Adult Intelligence Test								
Composite Intelligence Scale	.66	.68	.75	.47	.70	.58	.37	.59
Crystallized Scale	.56	.62	.66	.34	.57	.56	.38	.60
Fluid Scale	.58	.57	.64	.46	.64	.44	.27	.42
N	204	204	203	102	96	204	204	191
Mean	102.8	117.9	111.5	93.2	97.6	107.6	104.5	219.1
Standard Deviation	13.8	19.3	16.6	13.4	13.0	9.6	13.7	23.9

Note: The WJ III standard scores reported in this table are special research standard scores derived from a simple z-score transformation of *W*-scores at each of 26 age groups. The purpose of these research standard scores was to remove the age variance from the *W*-scores to allow for the calculation of correlations across broad age ranges. The research standard scores will differ from the final WJ III publication standard scores which were not available at the time this study was completed. The research standard scores make use of the mean and average standard deviation at each age level while the WJ III publication standard scores utilize median scores and two unique estimates of the standard deviation (above and below the median) via a continuous norming procedure (see Chapter 2).

Table 4-22.
Means, Standard Deviations,
and *t* tests for WJ III Clusters
With Learning Disabled (LD)
and Non-Learning Disabled
(Non-LD) Groups—College
Students (Gregg & Hoy
Study)

Measure	SAMPLES						M Diff.	<i>t</i>	df	<i>p</i>
	LD			Non-LD						
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>				
Brief Intellectual Ability	84	95.5	9.3	91	106.3	7.8	-10.8	-8.3	162.5	.0001
WJ III Cognitive Clusters										
General Intellectual Ability—Std	52	96.8	9.6	84	108.6	8.1	-11.8	-7.4	95.3	.0001
Thinking Ability—Ext	52	100.3	9.0	95	108.2	7.9	-7.9	-5.3	94.5	.0001
Thinking Ability—Std	60	98.7	10.7	96	108.8	8.9	-10.2	-6.2	108.5	.0001
Cognitive Efficiency—Ext	100	93.6	10.6	103	104.0	10.0	-10.4	-7.2	199.7	.0001
Cognitive Efficiency—Std	100	92.4	11.5	103	104.3	10.1	-11.8	-7.8	195.6	.0001
Verbal Comprehension (<i>Gc</i>)	86	99.1	9.9	91	106.4	10.5	-7.3	-4.8	175.0	.0001
Long-Term Retrieval (<i>Glr</i>)	100	104.1	11.6	100	109.1	11.3	-5.0	-3.1	197.9	.0479
Visual-Spatial Thinking (<i>Gv</i>)	54	100.8	10.9	96	106.2	10.1	-5.4	-3.0	103.5	.0721
Auditory Processing (<i>Ga</i>)	100	94.2	11.9	103	105.8	11.3	-11.7	-7.2	199.5	.0001
Phonemic Awareness (<i>Ga</i>)	100	97.2	11.2	103	108.5	11.1	-11.3	-7.2	200.8	.0001
Fluid Reasoning (<i>Gf</i>)	100	100.7	10.2	103	105.7	7.8	-5.0	-3.9	186.1	.0027
Processing Speed (<i>Gs</i>)	100	92.7	11.0	103	101.9	9.2	-9.2	-6.5	192.8	.0001
Cognitive Fluency (<i>Gs</i>)	100	91.6	11.9	103	95.0	9.6	-3.4	-2.3	190.0	.5658
Short-Term Memory (<i>Gsm</i>)	101	96.8	12.8	103	105.1	12.2	-8.3	-4.8	201.2	.0001
Working Memory (<i>Gsm</i>)	101	94.7	13.5	103	105.7	12.1	-11.1	-6.2	198.6	.0001
WJ III Achievement Clusters										
Broad Reading	101	86.5	10.0	103	102.4	8.8	-15.8	-12.0	197.7	.0001
Basic Reading Skills	80	84.3	13.4	103	98.2	8.5	-14.0	-8.1	126.9	.0001
Basic Writing Skills	95	86.5	12.9	103	104.3	8.4	-17.8	-11.4	159.0	.0001
Oral Expression	86	99.3	10.8	94	103.9	10.9	-4.6	-2.8	176.8	.1144
Phoneme/Grapheme Knowledge	80	90.8	14.0	103	104.3	7.9	-13.5	-7.7	117.5	.0001
Academic Fluency	100	94.7	10.9	103	112.0	9.3	-17.3	-12.2	194.5	.0001

Note: The WJ III standard scores reported in this table are special research standard scores derived from a simple *z*-score transformation of *W*-scores at each of 26 age groups. The purpose of these research standard scores was to remove the age variance from the *W*-scores to allow for the calculation of correlations across broad age ranges. The research standard scores will differ from the final WJ III publication standard scores which were not available at the time this study was completed. The research standard scores make use of the mean and average standard deviation at each age level while the WJ III publication standard scores utilize median scores and two unique estimates of the standard deviation (above and below the median) via a continuous norming procedure (see Chapter 2).