Cognitive Subtests

Raw Score to Scaled Score Conversions

Age 3 years, 0 Months–3 years, 1 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0			0-9	**0**
1	1	1	0	0	10	**1**
2	2			1	11-12	**2**
3	3	2	1	2	13	**3**
4	4			3	14	**4**
5	5	3	2	4	15	**5**
6	6	4-5	3	5	16	**6**
7		6-7	4	6	17-18	**7**
8	7	8-9	5	7	19	**8**
9	8	10-11	6-7	8	20	**9**
10	9	12-13	8	9	21	**10**
11	10	14-15	9	10	22	**11**
12	11	16-17	10	11	23-24	**12**
13	12	18	11	12	25	**13**
14	13	19-20	12	13	26	**14**
15	14	21-22	13	14-15		**15**
16	15	23-24	14	16	27	**16**
17	16	25-26	15-16	17		**17**
18	17	27-28	17	18	28	**18**
19	18	29-30	18	19-25		**19**
20	19-33	31-36	19-32	26-51	29	**20**

Age 3 years, 2 Months–3 years, 3 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-9	**0**
1	1	1	0		10	**1**
2	2			1	11-12	**2**
3	3	2	1	2	13	**3**
4	4	3		3	14	**4**
5	5	4	2	4	15	**5**
6	6	5-6	3	5	16-17	**6**
7	7	7-8	4-5	6	18	**7**
8	8	9-10	6	7	19	**8**
9	9	11-12	7	8	20	**9**
10	10	13-14	8	9	21-22	**10**
11	11	15	9	10	23	**11**
12	12	16-17	10-11	11-12	24	**12**
13	13	18-19	12	13	25	**13**
14	14	20-21	13	14	26	**14**
15	15	22-23	14	15		**15**
16	16	24-25	15	16	27	**16**
17	17	26-27	16-17	17		**17**
18	18	28-29	18	18	28	**18**
19	19	30-31	19	19-26		**19**
20	20-33	32-36	20-32	27-51	29	**20**

Age 3 years, 4 Months–3 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-9	**0**
1	1	1	0	1	10	**1**
2	2			2	11-12	**2**
3	3	2	1	3	13	**3**
4	4	3	2	4	14	**4**
5	5	4-5	3	5	15	**5**
6	6	6-7	4	6	16-17	**6**
7	7	8-9	5	7	18	**7**
8	8	10-11	6	8	19	**8**
9	9	12-13	7	9	20-21	**9**
10	10	14	8-9	10	22	**10**
11	11	15-16	10	11-12	23	**11**
12	12	17-18	11	13	24	**12**
13	13	19-20	12	14	25	**13**
14	14-15	21-22	13-14	15	26	**14**
15	16	23-24	15	16		**15**
16	17	25-26	16	17	27	**16**
17	18	27-28	17	18		**17**
18	19	29-30	18-19	19-20	28	**18**
19	20	31-32	20	21-27		**19**
20	21-33	33-36	21-32	28-51	29	**20**

Age 3 years, 6 Months–3 years, 7 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-9	**0**
1	1	1	0	1	10-11	**1**
2	2			2	12	**2**
3	3	2	1	3	13	**3**
4	4	3-4	2	4	14	**4**
5	5	5-6	3	5	15	**5**
6	6	7-8	4	6	16-17	**6**
7	7	9-10	5	7	18	**7**
8	8	11	6-7	8	19-20	**8**
9	9-10	12-13	8	9	21	**9**
10	11	14-15	9	10	22	**10**
11	12	16-17	10	11-12	23	**11**
12	13	18-19	11-12	13	24	**12**
13	14	20-21	13	14	25	**13**
14	15	22-23	14	15	26	**14**
15	16	24-25	15-16	16		**15**
16	17	26-27	17	17	27	**16**
17	18	28-29	18	18		**17**
18	19	30-31	19	19	28	**18**
19	20	32-33	20-21	20-27		**19**
20	21-33	34-36	22-32	28-51	29	**20**

Age 3 years, 8 Months–3 years, 9 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-9	**0**
1	1	1	0	1	10-11	**1**
2	2			2	12	**2**
3	3	2	1	3	13	**3**
4	4	3-4	2	4	14	**4**
5	5	5-6	3	5	15-16	**5**
6	6	7-8	4-5	6	17	**6**
7	7-8	9-10	6	7	18-19	**7**
8	9	11-12	7	8	20	**8**
9	10	13-14	8	9	21	**9**
10	11	15-16	9-10	10	22-23	**10**
11	12	17-18	11	11-12	24	**11**
12	13	19-20	12	13	25	**12**
13	14	21	13	14	26	**13**
14	15	22-23	14-15	15		**14**
15	16-17	24-25	16	16	27	**15**
16	18	26-27	17	17		**16**
17	19	28-29	18-19	18	28	**17**
18	20	30-31	20	19		**18**
19	21	32-33	21	20-27	29	**19**
20	22-33	34-36	22-32	28-51		**20**

Age 3 years, 10 Months–3 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-9	**0**
1	1	1	0	1	10-11	**1**
2	2	2	1	2	12	**2**
3	3	3	2	3	13	**3**
4	4	4-5	3	4	14-15	**4**
5	5-6	6-7	4	5	16	**5**
6	7	8	5	6	17-18	**6**
7	8	9-10	6	7	19	**7**
8	9	11-12	7	8	20	**8**
9	10	13-14	8-9	9	21-22	**9**
10	11	15-16	10	10	23	**10**
11	12	17-18	11	11-12	24	**11**
12	13-14	19-20	12-13	13	25	**12**
13	15	21-22	14	14	26	**13**
14	16	23-24	15	15		**14**
15	17	25-26	16	16	27	**15**
16	18	27-28	17-18	17-18		**16**
17	19	29-30	19	19	28	**17**
18	20	31	20	20		**18**
19	21	32-33	21-22	21-28	29	**19**
20	22-33	34-36	23-32	29-51		**20**

Cognitive Subtests

Raw Score to Scaled Score Conversions

Age 4 years, 0 Months–4 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-10	**0**
1	1	1	0	1	11	**1**
2	2	2	1	2	12	**2**
3	3	3	2	3	13-14	**3**
4	4-5	4-5	3	4	15	**4**
5	6	6-7	4	5	16-17	**5**
6	7	8-9	5	6	18	**6**
7	8	10-11	6-7	7	19	**7**
8	9	12-13	8	8	20-21	**8**
9	10	14-15	9	9	22	**9**
10	11-12	16-17	10	10-11	23-24	**10**
11	13	18	11-12	12	25	**11**
12	14	19-20	13	13	26	**12**
13	15	21-22	14	14-15		**13**
14	16	23-24	15-16	16	27	**14**
15	17	25-26	17	17		**15**
16	18-19	27-28	18	18	28	**16**
17	20	29-30	19	19-20		**17**
18	21	31-32	20-21	21		**18**
19	22	33-34	22	22-28	29	**19**
20	23-33	35-36	23-32	29-51		**20**

Age 4 years, 3 Months–4 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-10	**0**
1	1	1	0	1	11	**1**
2	2	2	1	2	12-13	**2**
3	3-4	3-4	2	3	14	**3**
4	5	5-6	3	4	15-16	**4**
5	6	7	4	5	17	**5**
6	7	8-9	5-6	6	18	**6**
7	8	10-11	7	7	19-20	**7**
8	9-10	12-13	8	8	21	**8**
9	11	14-15	9-10	9-10	22-23	**9**
10	12	16-17	11	11	24	**10**
11	13	18-19	12	12	25	**11**
12	14	20-21	13	13-14	26	**12**
13	15	22-23	14-15	15		**13**
14	16-17	24-25	16	16	27	**14**
15	18	26	17	17-18		**15**
16	19	27-28	18-19	19	28	**16**
17	20	29-30	20	20		**17**
18	21	31-32	21	21		**18**
19	22-23	33-34	22	22-28	29	**19**
20	24-33	35-36	23-32	29-51		**20**

Age 4 years, 6 Months–4 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0	0		0	0-10	**0**
1	1	1	0	1	11-12	**1**
2	2-3	2	1	2	13	**2**
3	4	3-4	2	3	14-15	**3**
4	5	5-6	3	4	16	**4**
5	6	7-8	4-5	5	17	**5**
6	7	9-10	6	6	18-19	**6**
7	8-9	11-12	7	7	20	**7**
8	10	13-14	8-9	8-9	21-22	**8**
9	11	15	10	10	23	**9**
10	12	16-17	11	11	24	**10**
11	13	18-19	12	12-13	25	**11**
12	14-15	20-21	13-14	14	26	**12**
13	16	22-23	15	15		**13**
14	17	24-25	16	16-17	27	**14**
15	18	26-27	17-18	18		**15**
16	19-20	28-29	19	19	28	**16**
17	21	30-31	20	20-21		**17**
18	22	32	21	22		**18**
19	23	33-34	22-23	23-28	29	**19**
20	24-33	35-36	24-32	29-51		**20**

Age 4 years, 9 Months–4 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-1	0		0	0-11	**0**
1	2	1	0	1	12-13	**1**
2	3	2-3	1	2	14	**2**
3	4	4	2-3	3	15	**3**
4	5	5-6	4	4	16-17	**4**
5	6-7	7-8	5	5	18	**5**
6	8	9-10	6	6	19	**6**
7	9	11-12	7-8	7-8	20-21	**7**
8	10	13-14	9	9	22	**8**
9	11-12	15-16	10	10-11	23	**9**
10	13	17-18	11-12	12	24	**10**
11	14	19-20	13	13	25	**11**
12	15	21	14	14-15	26	**12**
13	16-17	22-23	15	16		**13**
14	18	24-25	16-17	17-18	27	**14**
15	19	26-27	18	19		**15**
16	20	28-29	19	20-21	28	**16**
17	21	30-31	20-21	22		**17**
18	22-23	32-33	22	23		**18**
19	24	34	23	24-29	29	**19**
20	25-33	35-36	24-32	30-51		**20**

Age 5 years, 0 Months–5 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-1	0		0	0-13	**0**
1	2	1	0	1	14	**1**
2	3	2-3	1-2	2	15	**2**
3	4-5	4-5	3	3	16	**3**
4	6	6-7	4	4	17	**4**
5	7	8-9	5-6	5	18-19	**5**
6	8	10	7	6-7	20	**6**
7	9-10	11-12	8	8	21	**7**
8	11	13-14	9	9-10	22	**8**
9	12	15-16	10-11	11	23	**9**
10	13	17-18	12	12-13	24-25	**10**
11	14-15	19-20	13	14	26	**11**
12	16	21-22	14-15	15-16		**12**
13	17	23-24	16	17	27	**13**
14	18	25	17	18-19		**14**
15	19-20	26-27	18	20	28	**15**
16	21	28-29	19-20	21-22		**16**
17	22	30-31	21	23		**17**
18	23	32-33	22	24-25	29	**18**
19	24-25	34	23	26-30		**19**
20	26-33	35-36	24-32	31-51		**20**

Age 5 years, 3 Months–5 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-1	0	0	0	0-14	**0**
1	2-3	1	1		15	**1**
2	4	2-3	2	1	16	**2**
3	5	4-5	3	2	17	**3**
4	6	6-7	4-5	3-4	18	**4**
5	7-8	8-9	6	5	19	**5**
6	9	10-11	7	6-7	20	**6**
7	10	12-13	8-9	8-9	21	**7**
8	11	14	10	10	22	**8**
9	12-13	15-16	11	11-12	23	**9**
10	14	17-18	12	13-14	24-25	**10**
11	15	19-20	13-14	15	26	**11**
12	16-17	21-22	15	16-17		**12**
13	18	23-24	16	18-19	27	**13**
14	19	25-26	17-18	20		**14**
15	20	27-28	19	21-22	28	**15**
16	21-22	29	20	23-24		**16**
17	23	30-31	21	25		**17**
18	24	32-33	22-23	26-27	29	**18**
19	25-26	34	24	28-31		**19**
20	27-33	35-36	25-32	32-51		**20**

Age 5 years, 6 Months–5 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-2	0	0	0	0-15	**0**
1	3	1-2	1-2		16	**1**
2	4	3-4	3	1	17	**2**
3	5	5-6	4	2	18	**3**
4	6-7	7	5	3	19	**4**
5	8	8-9	6-7	4-5	20	**5**
6	9	10-11	8	6-7	21	**6**
7	10-11	12-13	9	8-9	22	**7**
8	12	14-15	10-11	10-11	23	**8**
9	13	16-17	12	12	24	**9**
10	14-15	18-19	13	13-14	25	**10**
11	16	20	14	15-16	26	**11**
12	17	21-22	15-16	17-18		**12**
13	18	23-24	17	19-20	27	**13**
14	19-20	25-26	18	21-22		**14**
15	21	27-28	19-20	23	28	**15**
16	22	29-30	21	24-25		**16**
17	23-24	31-32	22	26-27		**17**
18	25	33	23	28-29	29	**18**
19	26	34	24-25	30-32		**19**
20	27-33	35-36	26-32	33-51		**20**

Age 5 years, 9 Months–5 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-2	0-1	0	0	0-16	**0**
1	3	2-3	1-2		17	**1**
2	4-5	4	3-4	1		**2**
3	6	5-6	5	2	18	**3**
4	7	7-8	6	3-4	19	**4**
5	8-9	9-10	7-8	5-6	20	**5**
6	10	11-12	9	7-8	21	**6**
7	11	13-14	10	9-10	22	**7**
8	12-13	15-16	11	11-12	23	**8**
9	14	17	12-13	13-14	24	**9**
10	15	18-19	14	15-16	25	**10**
11	16	20-21	15	17-18	26	**11**
12	17-18	22-23	16-17	19-20		**12**
13	19	24-25	18	21-22	27	**13**
14	20	26-27	19	23-24		**14**
15	21-22	28	20	25-26	28	**15**
16	23	29-30	21-22	27-28		**16**
17	24	31-32	23	29-30		**17**
18	25-26	33	24	31-32	29	**18**
19	27	34	25-26	33-35		**19**
20	28-33	35-36	27-32	36-51		**20**

Age 6 years, 0 Months–6 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-2	0-1	0-1	0	0	**0**
1	3-4	2-3	2-4			**1**
2	5	4-5	5	1	1	**2**
3	6	6-7	6	2		**3**
4	7-8	8-9	7	3-5	2	**4**
5	9	10-11	8-9	6-7		**5**
6	10	12	10	8-9	3	**6**
7	11-12	13-14	11	10-11		**7**
8	13	15-16	12-13	12-13	4	**8**
9	14	17-18	14	14-16	5	**9**
10	15-16	19-20	15	17-18	6	**10**
11	17	21-22	16	19-20	7	**11**
12	18	23-24	17-18	21-22		**12**
13	19-20	25	19	23-24	8	**13**
14	21	26-27	20	25-26	9	**14**
15	22-23	28-29	21-22	27-28	10	**15**
16	24	30-31	23	29-32	11	**16**
17	25	32	24	33-34		**17**
18	26-27	33	25	35-36	12	**18**
19	28	34	26-27	37-40		**19**
20	29-33	35-36	28-32	41-51	13	**20**

Age 6 years, 3 Months–6 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-2	0-1	0	0	**0**
1	4	3-4	2-5			**1**
2	5	5-6	6	1	1	**2**
3	6-7	7-8	7	2-3		**3**
4	8	9-10	8	4-5	2	**4**
5	9-10	11	9-10	6-8		**5**
6	11	12-13	11	9-10	3	**6**
7	12	14-15	12	11-12	4	**7**
8	13-14	16-17	13-14	13-15		**8**
9	15	18-19	15	16-17	5	**9**
10	16	20-21	16	18-20	6	**10**
11	17-18	22	17	21-22	7	**11**
12	19	23-24	18-19	23-24	8	**12**
13	20-21	25-26	20	25-27		**13**
14	22	27-28	21	28-29	9	**14**
15	23	29-30	22-23	30-32	10	**15**
16	24-25	31	24	33-34	11	**16**
17	26	32	25	35-36		**17**
18	27	33	26	37-39	12	**18**
19	28-29	34	27-28	40-42		**19**
20	30-33	35-36	29-32	43-51	13	**20**

Age 6 years, 6 Months–6 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-3	0-1	0	0	**0**
1	4	4-5	2-5	1		**1**
2	5-6	6-7	6-7	2	1	**2**
3	7	8	8	3		**3**
4	8-9	9-10	9	4-6	2	**4**
5	10	11-12	10-11	7-8		**5**
6	11	13-14	12	9-11	3	**6**
7	12-13	15-16	13	12-14	4	**7**
8	14	17	14	15-16	5	**8**
9	15-16	18-19	15-16	17-19	6	**9**
10	17	20-21	17	20-22		**10**
11	18	22-23	18	23-24	7	**11**
12	19-20	24-25	19-20	25-27	8	**12**
13	21	26-27	21	28-29	9	**13**
14	22-23	28	22	30-32		**14**
15	24	29-30	23	33-35	10	**15**
16	25-26	31	24-25	36-37	11	**16**
17	27	32	26	38-40		**17**
18	28	33	27	41-42	12	**18**
19	29-30	34	28-29	43-44		**19**
20	31-33	35-36	30-32	45-51	13	**20**

Age 6 years, 9 Months–6 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-3	0-2	0	0	**0**
1	4	4-5	3-6	1		**1**
2	5-6	6-7	7-8	2	1	**2**
3	7	8-9	9	3-4		**3**
4	8-9	10-11	10	5-6	2	**4**
5	10	12-13	11	7-9	3	**5**
6	11-12	14	12-13	10-12		**6**
7	13	15-16	14	13-14	4	**7**
8	14	17-18	15	15-17	5	**8**
9	15-16	19-20	16-17	18-20	6	**9**
10	17	21-22	18	21-22		**10**
11	18-19	23	19	23-25	7	**11**
12	20	24-25	20	26-27	8	**12**
13	21-22	26-27	21-22	28-30	9	**13**
14	23	28-29	23	31-33		**14**
15	24-25	30	24	34-35	10	**15**
16	26	31	25-26	36-38	11	**16**
17	27	32	27	39-40		**17**
18	28-29	33	28	41-43	12	**18**
19	30	34	29	44-45		**19**
20	31-33	35-36	30-32	46-51	13	**20**

Age 7 years, 0 Months–7 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-4	0-2	0	0	**0**
1	4	5-6	3-7	1		**1**
2	5-6	7-8	8	2	1	**2**
3	7	9	9-10	3-4	2	**3**
4	8-9	10-11	11	5-7		**4**
5	10	12-13	12	8-10	3	**5**
6	11-12	14-15	13-14	11-12	4	**6**
7	13	16-17	15	13-15		**7**
8	14-15	18-19	16	16-17	5	**8**
9	16	20	17	18-20	6	**9**
10	17-18	21-22	18-19	21-23	7	**10**
11	19	23-24	20	24-25		**11**
12	20-21	25-26	21	26-28	8	**12**
13	22	27-28	22	29-31	9	**13**
14	23	29	23-24	32-33		**14**
15	24-25	30	25	34-36	10	**15**
16	26	31	26	37-39	11	**16**
17	27-28	32	27	40-41		**17**
18	29	33	28	42-44	12	**18**
19	30-31	34	29	45-46		**19**
20	32-33	35-36	30-32	47-51	13	**20**

Age 7 years, 3 Months–7 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-5	0-2	0	0	**0**
1	4-5	6	3-7	1		**1**
2	6	7-8	8-9	2	1	**2**
3	7-8	9-10	10	3-5	2	**3**
4	9	11-12	11	6-7	3	**4**
5	10-11	13-14	12-13	8-10		**5**
6	12	15	14	11-13	4	**6**
7	13-14	16-17	15	14-15	5	**7**
8	15	18-19	16	16-18		**8**
9	16-17	20-21	17-18	19-21	6	**9**
10	18	22-23	19	22-23	7	**10**
11	19-20	24	20	24-26		**11**
12	21	25-26	21-22	27-29	8	**12**
13	22	27-28	23	30-31	9	**13**
14	23-24	29	24-25	32-34		**14**
15	25	30	26	35-37	10	**15**
16	26-27	31	27	38-39	11	**16**
17	28	32	28	40-42		**17**
18	29-30	33	29	43-44	12	**18**
19	31	34	30	45-46		**19**
20	32-33	35-36	31-32	47-51	13	**20**

Age 7 years, 6 Months–7 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-5	0-2	0	0	**0**
1	4-5	6-7	3-8	1		**1**
2	6	8-9	9	2-3	1	**2**
3	7-8	10-11	10	4-5	2	**3**
4	9	12	11-12	6-8	3	**4**
5	10-11	13-14	13	9-11		**5**
6	12	15-16	14	12-13	4	**6**
7	13-14	17-18	15	14-16	5	**7**
8	15	19-20	16-17	17-19		**8**
9	16-17	21	18	20-21	6	**9**
10	18	22-23	19	22-24	7	**10**
11	19-20	24-25	20-21	25-27		**11**
12	21	26-27	22	28-29	8	**12**
13	22-23	28	23	30-32	9	**13**
14	24	29	24-25	33-35		**14**
15	25-26	30	26	36-37	10	**15**
16	27-28	31	27	38-40	11	**16**
17	29	32	28	41-42		**17**
18	30	33	29	43-45	12	**18**
19	31	34	30	46-47		**19**
20	32-33	35-36	31-32	48-51	13	**20**

Age 7 years, 9 Months–7 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-6	0-2	0	0	**0**
1	4-5	7	3-8	1		**1**
2	6	8-9	9	2-3	1	**2**
3	7-8	10-11	10	4-6	2	**3**
4	9	12-13	11-12	7-8	3	**4**
5	10-11	14-15	13	9-11		**5**
6	12	16	14	12-14	4	**6**
7	13-14	17-18	15-16	15-16	5	**7**
8	15	19-20	17	17-19		**8**
9	16-17	21-22	18	20-22	6	**9**
10	18-19	23	19	23-24	7	**10**
11	20	24-25	20-21	25-27		**11**
12	21-22	26-27	22	28-30	8	**12**
13	23	28	23	31-32	9	**13**
14	24-25	29	24-25	33-35		**14**
15	26	30	26	36-38	10	**15**
16	27-28	31	27	39-40	11	**16**
17	29	32	28	41-43		**17**
18	30	33	29	44-45	12	**18**
19	31	34	30	46-47		**19**
20	32-33	35-36	31-32	48-51	13	**20**

Age 8 years, 0 Months–8 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-6	0-2	0	0	**0**
1	4-5	7-8	3-8	1		**1**
2	6	9-10	9	2-4	1	**2**
3	7-8	11	10-11	5-6	2	**3**
4	9	12-13	12	7-9	3	**4**
5	10-11	14-15	13	10-12		**5**
6	12-13	16-17	14	13-14	4	**6**
7	14	18	15-16	15-17	5	**7**
8	15-16	19-20	17	18-20		**8**
9	17	21-22	18	21-22	6	**9**
10	18-19	23-24	19-20	23-25	7	**10**
11	20	25-26	21	26-28	8	**11**
12	21-22	27	22	29-30		**12**
13	23	28	23	31-33	9	**13**
14	24-25	29	24-25	34-36	10	**14**
15	26	30	26	37-38		**15**
16	27-28	31	27	39-41	11	**16**
17	29	32	28	42-44		**17**
18	30	33	29	45-46	12	**18**
19	31	34	30	47-49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 8 years, 3 Months–8 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-3	0-6	0-2	0	0	**0**
1	4-5	7-8	3-8	1		**1**
2	6	9-10	9	2-4	1	**2**
3	7-8	11-12	10-11	5-7	2	**3**
4	9-10	13	12	8-9	3	**4**
5	11	14-15	13	10-12		**5**
6	12-13	16-17	14	13-15	4	**6**
7	14	18-19	15-16	16-17	5	**7**
8	15-16	20-21	17	18-20		**8**
9	17	22	18	21-23	6	**9**
10	18-19	23-24	19-20	24-26	7	**10**
11	20	25-26	21	27-28	8	**11**
12	21-22	27	22	29-31		**12**
13	23	28	23	32-34	9	**13**
14	24-25	29	24-25	35-36	10	**14**
15	26	30	26	37-39	11	**15**
16	27-28	31	27	40-42		**16**
17	29	32	28	43-44		**17**
18	30	33	29	45-47	12	**18**
19	31	34	30	48-49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 8 years, 6 Months–8 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-7	-0-3	0	0	**0**
1	5	8-9	4-8	1-2		**1**
2	6-7	10	9	3-4	1	**2**
3	8	11-12	10-11	5-7	2	**3**
4	9-10	13-14	12	8-10	3	**4**
5	11	15-16	13	11-13		**5**
6	12-13	17	14-15	14-15	4	**6**
7	14	18-19	16	16-18	5	**7**
8	15-16	20-21	17	19-21		**8**
9	17-18	22-23	18	22-23	6	**9**
10	19	24	19-20	24-26	7	**10**
11	20-21	25-26	21	27-29	8	**11**
12	22	27	22	30-31	9	**12**
13	23-24	28	23	32-34		**13**
14	25	29	24-25	35-37	10	**14**
15	26-27	30	26	38-39	11	**15**
16	28	31	27	40-42		**16**
17	29	32	28	43-45	12	**17**
18	30	33	29	46-48		**18**
19	31	34	30	49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 8 years, 9 Months–8 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-7	0-3	0-1	0	**0**
1	5	8-9	4-8	2-3		**1**
2	6-7	10-11	9-10	4-5	1	**2**
3	8	12	11	6-8	2	**3**
4	9-10	1314	12	9-10	3	**4**
5	11-12	15-16	13	11-13		**5**
6	13	17-18	14-15	14-16	4	**6**
7	14-15	19	16	17-18	5	**7**
8	16	20-21	17	19-21	6	**8**
9	17-18	22-23	18-19	22-24		**9**
10	19	24-25	20	25-27	7	**10**
11	20-21	26	21	28-29	8	**11**
12	22	27	22	30-32	9	**12**
13	23-24	28	23-24	33-35		**13**
14	25	29	25	36-37	10	**14**
15	26-27	30	26	38-40	11	**15**
16	28	31	27	41-43		**16**
17	29	32	28	44-45	12	**17**
18	30	33	29	46-48		**18**
19	31	34	30	49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 9 years, 0 Months–9 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-7	0-3	0-1	0	**0**
1	5	8-9	4-8	2-3		**1**
2	6-7	10-11	9-10	4-5	1	**2**
3	8-9	12-13	11	6-8	2	**3**
4	10	14	12	9-11	3	**4**
5	11-12	15-16	13	12-13		**5**
6	13	17-18	14-15	14-16	4	**6**
7	14-15	19-20	16	17-19	5	**7**
8	16	21	17	20-22	6	**8**
9	17-18	22-23	18-19	23-24		**9**
10	19	24-25	20	25-27	7	**10**
11	20-21	26	21	28-30	8	**11**
12	22	27	22	31-32	9	**12**
13	23-24	28	23-24	33-35	10	**13**
14	25	29	25	36-38		**14**
15	26-27	30	26	39-41	11	**15**
16	28	31	27	42-43		**16**
17	29	32	28	44-45	12	**17**
18	30	33	29	46-47		**18**
19	31	34	30	48-49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 9 years, 3 Months–9 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-8	0-3	0-1	0	**0**
1	5-6	9	4-8	2-3		**1**
2	7	10-11	9-10	4-6	1	**2**
3	8-9	12-13	11	7-8	2	**3**
4	10	14-15	12	9-11	3	**4**
5	11-12	16	13	12-14		**5**
6	13	17-18	14-15	15-17	4	**6**
7	14-15	19-20	16	18-19	5	**7**
8	16	21-22	17	20-22	6	**8**
9	17-18	23	18-19	23-25	7	**9**
10	19	24-25	20	26-27		**10**
11	20-21	26	21	28-30	8	**11**
12	22	27	22	31-33	9	**12**
13	23-24	28	23-24	34-36	10	**13**
14	25-26	29	25	37-38	11	**14**
15	27	30	26	39-41		**15**
16	28	31	27	42-43		**16**
17	29	32	28	44-45	12	**17**
18	30	33	29	46-47		**18**
19	31	34	30	48-49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 9 years, 6 Months–9 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-8	0-3	0-1	0	**0**
1	5-6	9-10	4-8	2-3		**1**
2	7	11	9-10	4-6	1	**2**
3	8-9	12-13	11	7-9	2	**3**
4	10	14-15	12	10-12	3	**4**
5	11-12	16-17	13-14	13-14	4	**5**
6	13	18	15	15-17		**6**
7	14-15	19-20	16	18-20	5	**7**
8	16	21-22	17	21-22	6	**8**
9	17-18	23-24	18-19	23-25	7	**9**
10	19	25	20	26-28		**10**
11	20-21	26	21	29-31	8	**11**
12	22-23	27	22	32-33	9	**12**
13	24	28	23-24	34-36	10	**13**
14	25-26	29	25	37-39	11	**14**
15	27	30	26	40-42		**15**
16	28	31	27	43-44		**16**
17	29	32	28	45-46	12	**17**
18	30	33	29	47-48		**18**
19	31	34	30	49		**19**
20	32-33	35-36	31-32	50-51	13	**20**

Age 9 years, 9 Months–9 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-8	0-3	0-1	0	**0**
1	5-6	9-10	4-8	2-4		**1**
2	7	11-12	9-10	5-6	1	**2**
3	8-9	13-14	11	7-9	2	**3**
4	10	15	12-13	10-12	3	**4**
5	11-12	16-17	14	13-15	4	**5**
6	13	18-19	15	16-17		**6**
7	14-15	20	16	18-20	5	**7**
8	16-17	21-22	17-18	21-23	6	**8**
9	18	23-24	19	24-26	7	**9**
10	19-20	25-26	20	27-28	8	**10**
11	21	27	21-22	29-31		**11**
12	22-23	28	23	32-34	9	**12**
13	24	29	24	35-37	10	**13**
14	25-26	30	25	38-39	11	**14**
15	27	31	26	40-42		**15**
16	28	32	27	43-45	12	**16**
17	29	33	28	46-47		**17**
18	30	34	29	48		**18**
19	31	35	30	49		**19**
20	32-33	36	31-32	50-51	13	**20**

Age 10 years, 0 Months–10 years, 2 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-4	0-9	0-4	0-1	0	**0**
1	5-6	10	5-9	2-4	1	**1**
2	7	11-12	10	5-7		**2**
3	8-9	13-14	11-12	8-10	2	**3**
4	10-11	15-16	13	11-12	3	**4**
5	12	17	14	13-15	4	**5**
6	13-14	18-19	15	16-18	5	**6**
7	15	20-21	16-17	19-21		**7**
8	16-17	22	18	22-23	6	**8**
9	18	23-24	19	24-26	7	**9**
10	19-20	25-26	20	27-29	8	**10**
11	21	27	21-22	30-32		**11**
12	22-23	28	23	33-34	9	**12**
13	24	29	24	35-37	10	**13**
14	25-26	30	25	38-40	11	**14**
15	27	31	26	41-43		**15**
16	28	32	27	44-45	12	**16**
17	29	33	28	46-47		**17**
18	30	34	29	48		**18**
19	31	35	30	49		**19**
20	32-33	36	31-32	50-51	13	**20**

Age 10 years, 3 Months–10 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-5	0-9	0-4	0-1	0	**0**
1	6	10-11	5-9	2-4	1	**1**
2	7-8	12	10	5-7		**2**
3	9	13-14	11-12	8-10	2	**3**
4	10-11	15-16	13	11-13	3	**4**
5	12	17-18	14	14-15	4	**5**
6	13-14	19	15-16	16-18	5	**6**
7	15	20-21	17	19-21		**7**
8	16-17	22-23	18	22-24	6	**8**
9	18	24	19	25-26	7	**9**
10	19-20	25-26	20-21	27-29	8	**10**
11	21-22	27	22	30-32	9	**11**
12	23	28	23	33-35		**12**
13	24-25	29	24	36-37	10	**13**
14	26	30	25	38-40	11	**14**
15	27	31	26	41-43		**15**
16	28	32	27	44-45	12	**16**
17	29	33	28	46-47		**17**
18	30	34	29	48		**18**
19	31	35	30	49		**19**
20	32-33	36	31-32	50-51	13	**20**

Age 10 years, 6 Months–10 years, 8 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-5	0-9	0-5	0-2	0	**0**
1	6	10-11	6-10	3-5	1	**1**
2	7-8	12-13	11	6-7	2	**2**
3	9	14	12	8-10		**3**
4	10-11	15-16	13	11-13	3	**4**
5	12-13	17-18	14-15	14-16	4	**5**
6	14	19-20	16	17-19	5	**6**
7	15-16	21	17	20-21	6	**7**
8	17	22-23	18	22-24		**8**
9	18-19	24-25	19-20	25-27	7	**9**
10	20	26	21	28-30	8	**10**
11	21-22	27	22	31-32	9	**11**
12	23	28	23	33-35	10	**12**
13	24-25	29	24	36-38		**13**
14	26	30	25	39-41	11	**14**
15	27	31	26	42-43		**15**
16	28	32	27	44-46	12	**16**
17	29	33	28	47-48		**17**
18	30	34	29	49		**18**
19	31	35	30	50		**19**
20	32-33	36	31-32	51	13	**20**

Age 10 years, 9 Months–10 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-5	0-10	0-5	0-2	0	**0**
1	6-7	11	6-10	3-5	1	**1**
2	8	12-13	11	6-8	2	**2**
3	9-10	14-15	12-13	9-11		**3**
4	11-12	16	14	12-13	3	**4**
5	13	17-18	15	14-16	4	**5**
6	14-15	19-20	16	17-19	5	**6**
7	16	21-22	17-18	20-22	6	**7**
8	17-18	23	19	23-24		**8**
9	19	24-25	20	25-27	7	**9**
10	20-21	26-27	21	28-30	8	**10**
11	22	28	22	31-33	9	**11**
12	23-24	29	23	34-36	10	**12**
13	25	30	24	37-38		**13**
14	26	31	25	39-41	11	**14**
15	27	32	26	42-44		**15**
16	28	33	27	45-46	12	**16**
17	29	34	28	47-48		**17**
18	30	35	29	49		**18**
19	31		30	50		**19**
20	32-33	36	31-32	51	13	**20**

Age 11 years, 0 Months–11 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-6	0-10	0-5	0-2	0	**0**
1	7-8	11-12	6-10	3-5	1	**1**
2	9	13-14	11-12	6-8	2	**2**
3	10-11	15	13	9-11		**3**
4	12	16-17	14	12-14	3	**4**
5	13-14	18-19	15-16	15-17	4	**5**
6	15-16	20	17	18-19	5	**6**
7	17	21-22	18	20-22	6	**7**
8	18-19	23-24	19	23-25		**8**
9	20	25	20	26-28	7	**9**
10	21-22	26-27	21-22	29-31	8	**10**
11	23	28	23	32-33	9	**11**
12	24	29	24	34-36	10	**12**
13	25	30	25	37-39		**13**
14	26	31	26	40-42	11	**14**
15	27	32	27	43-45		**15**
16	28	33	28	46-47	12	**16**
17	29	34	29	48		**17**
18	30	35	30	49		**18**
19	31		31	50		**19**
20	32-33	36	32	51	13	**20**

Age 11 years, 6 Months–11 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-7	0-11	0-5	0-2	0	**0**
1	8-9	12	6-11	3-6	1	**1**
2	10	13-14	12	7-9	2	**2**
3	11-12	15-16	13-14	10-12		**3**
4	13	17	15	13-14	3	**4**
5	14-15	18-19	16	15-17	4	**5**
6	16-17	20-21	17	18-20	5	**6**
7	18	22	18	21-23	6	**7**
8	19-20	23-24	19-20	24-26		**8**
9	21	25-26	21	27-29	7	**9**
10	22	27	22	30-31	8	**10**
11	23	28	23	32-34	9	**11**
12	24	29	24	35-37	10	**12**
13	25	30	25	38-40		**13**
14	26	31	26	41-43	11	**14**
15	27	32	27	44-45		**15**
16	28	33	28	46-47	12	**16**
17	29	34	29	48		**17**
18	30	35	30	49		**18**
19	31		31	50		**19**
20	32-33	36	32	51	13	**20**

Age 12 years, 0 Months–12 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-7	0-12	0-6	0-3	0	**0**
1	8-9	13	7-12	4-7	1	**1**
2	10-11	14-15	13	8-9	2	**2**
3	12	16-17	14	10-12	3	**3**
4	13-14	18	15	13-15		**4**
5	15	19-20	16	16-18	4	**5**
6	16-17	21	17	19-21	5	**6**
7	18	22-23	18-19	22-24	6	**7**
8	19-20	24-25	20	25-26	7	**8**
9	21	26	21	27-29		**9**
10	22	27-28	22	30-32	8	**10**
11	23	29	23	33-35	9	**11**
12	24	30	24	36-38	10	**12**
13	25	31	25	39-41		**13**
14	26	32	26	42-43	11	**14**
15	27	33	27	44-46		**15**
16	28	34	28	47	12	**16**
17	29		29	48		**17**
18	30	35	30	49		**18**
19	31		31	50		**19**
20	32-33	36	32	51	13	**20**

Age 12 years, 6 Months–12 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-7	0-13	0-6	0-3	0	**0**
1	8-9	14	7-12	4-7	1	**1**
2	10-11	15-16	13	8-10	2	**2**
3	12	17-18	14	11-13	3	**3**
4	13-14	19	15	14-16		**4**
5	15	20-21	16	17-18	4	**5**
6	16-17	22	17-18	19-21	5	**6**
7	18	23-24	19	22-24	6	**7**
8	19-20	25	20	25-27	7	**8**
9	21	26-27	21	28-30		**9**
10	22	28	22	31-33	8	**10**
11	23	29	23	34-36	9	**11**
12	24	30	24	37-38	10	**12**
13	25	31	25	39-41	11	**13**
14	26	32	26	42-44		**14**
15	27	33	27	45-46		**15**
16	28	34	28	47	12	**16**
17	29		29	48		**17**
18	30	35	30	49		**18**
19	31		31	50		**19**
20	32-33	36	32	51	13	**20**

Age 13 years, 0 Months–13 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-8	0-14	0-6	0-3	0	**0**
1	9-10	15	7-12	4-8	1	**1**
2	11	16-17	13	9-10	2	**2**
3	12-13	18	14-15	11-13	3	**3**
4	14	19-20	16	14-16	4	**4**
5	15-16	21	17	17-19		**5**
6	17-18	22-23	18	20-22	5	**6**
7	19	24	19	23-25	6	**7**
8	20-21	25-26	20	26-28	7	**8**
9	22	27	21	29-31		**9**
10	23	28-29	22-23	32-33	8	**10**
11	24	30	24	34-36	9	**11**
12	25	31	25	37-39	10	**12**
13	26	32	26	40-42	11	**13**
14	27	33	27	43-44		**14**
15	28	34	28	45-46		**15**
16	29		29	47	12	**16**
17	30	35	30	48		**17**
18	31		31	49		**18**
19	32	36		50		**19**
20	33		32	51	13	**20**

Age 13 years, 6 Months–13 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-9	0-15	0-6	0-3	0	**0**
1	10-11	16	7-13	4-8	1	**1**
2	12	17-18	14	9-11	2	**2**
3	13-14	19	15	12-14	3	**3**
4	15	20-21	16	15-17	4	**4**
5	16-17	22	17	18-20		**5**
6	18	23	18-19	21-22	5	**6**
7	19-20	24-25	20	23-25	6	**7**
8	21	26	21	26-28	7	**8**
9	22-23	27-28	22	29-31	8	**9**
10	24	29	23	32-34		**10**
11	25	30	24	35-37	9	**11**
12	26	31	25	38-40	10	**12**
13	27	32	26	41-43	11	**13**
14	28	33	27	44-45		**14**
15	29	34	28	46		**15**
16	30		29	47	12	**16**
17	31	35	30	48		**17**
18	32		31	49		**18**
19		36		50	13	**19**
20	33		32	51		**20**

Age 14 years, 0 Months–14 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-9	0-16	0-7	0-4	0-1	**0**
1	10-11	17	8-13	5-9	2	**1**
2	12	18-19	14	10-11		**2**
3	13-14	20	15	12-14	3	**3**
4	15	21	16	15-17	4	**4**
5	16-17	22-23	17-18	18-20	5	**5**
6	18-19	24	19	21-23	6	**6**
7	20	25	20	24-26		**7**
8	21-22	26-27	21	27-29	7	**8**
9	23	28	22	30-32	8	**9**
10	24	29	23	33-35	9	**10**
11	25	30	24	36-38		**11**
12	26	31	25	39-40	10	**12**
13	27	32	26	41-43	11	**13**
14	28	33	27	44-45		**14**
15	29	34	28	46	12	**15**
16	30		29	47		**16**
17	31	35	30	48		**17**
18	32		31	49	13	**18**
19		36		50		**19**
20	33		32	51		**20**

Age 14 years, 6 Months–14 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-10	0-17	0-7	0-4	0-1	**0**
1	11	18	8-14	5-9	2	**1**
2	12-13	19-20	15	10-12	3	**2**
3	14	21	16	13-15	4	**3**
4	15-16	22	17	16-18		**4**
5	17	23	18	19-21	5	**5**
6	18-19	24-25	19	22-24	6	**6**
7	20	26	20	25-26	7	**7**
8	21-22	27	21	27-29		**8**
9	23-24	28	22	30-32	8	**9**
10	25	29-30	23	33-35	9	**10**
11	26	31	24	36-38	10	**11**
12	27	32	25	39-41		**12**
13	28	33	26	42-44	11	**13**
14	29	34	27	45-46		**14**
15	30		28	47	12	**15**
16	31	35	29	48		**16**
17			30	49		**17**
18	32		31	50	13	**18**
19		36				**19**
20	33		32	51		**20**

Age 15 years, 0 Months–15 years, 5 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-10	0-18	0-7	0-4	0-1	**0**
1	11-12	19	8-14	5-9	2	**1**
2	13	20	15	10-12	3	**2**
3	14-15	21	16	13-15	4	**3**
4	16	22-23	17	16-18		**4**
5	17-18	24	18	19-21	5	**5**
6	19	25	19	22-24	6	**6**
7	20-21	26	20	25-27	7	**7**
8	22-23	27	21	28-30		**8**
9	24	28-29	22-23	31-33	8	**9**
10	25	30	24	34-36	9	**10**
11	26	31	25	37-39	10	**11**
12	27	32	26	40-42		**12**
13	28	33	27	43-44	11	**13**
14	29	34	28	45-46		**14**
15	30		29	47	12	**15**
16	31	35	30	48		**16**
17			31	49		**17**
18	32			50	13	**18**
19		36	32			**19**
20	33			51		**20**

Age 15 years, 6 Months–15 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-11	0-19	0-7	0-5	0-1	**0**
1	12	20	8-14	6-10	2	**1**
2	13-14	21	15	11-13	3	**2**
3	15	22	16	14-16	4	**3**
4	16-17	23	17	17-19		**4**
5	18	24	18	20-22	5	**5**
6	19-20	25-26	19	23-25	6	**6**
7	21-22	27	20-21	26-27	7	**7**
8	23	28	22	28-30		**8**
9	24-25	29	23	31-33	8	**9**
10	26	30	24	34-36	9	**10**
11	27	31	25	37-39	10	**11**
12	28	32	26	40-42	11	**12**
13	29	33	27	43-44		**13**
14	30	34	28	45-46		**14**
15	31		29	47	12	**15**
16		35	30	48		**16**
17	32		31	49		**17**
18				50	13	**18**
19	33	36	32			**19**
20				51		**20**

Age 16 years, 0 Months–16 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-11	0-20	0-7	0-5	0-1	**0**
1	12	21	8-14	6-10	2	**1**
2	13-14	22	15	11-13	3	**2**
3	15-16	23	16	14-16	4	**3**
4	17	24	17	17-19	5	**4**
5	18-19	25	18-19	20-22		**5**
6	20	26	20	23-25	6	**6**
7	21-22	27	21	26-28	7	**7**
8	23	28	22	29-31	8	**8**
9	24-25	29	23	32-34		**9**
10	26	30	24	35-37	9	**10**
11	27	31	25	38-40	10	**11**
12	28	32	26	41-43	11	**12**
13	29	33	27	44-45		**13**
14	30	34	28	46		**14**
15	31		29	47	12	**15**
16		35	30	48		**16**
17	32		31	49		**17**
18				50	13	**18**
19	33	36	32			**19**
20				51		**20**

Age 17 years, 0 Months–17 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-11	0-21	0-8	0-5	0-2	**0**
1	12-13	22	9-15	6-10		**1**
2	14	23	16	11-13	3	**2**
3	15-16	24	17	14-16	4	**3**
4	17	25	18	17-19	5	**4**
5	18-19	26	19	20-22		**5**
6	20	27	20	23-25	6	**6**
7	21-22	28	21	26-28	7	**7**
8	23	29	22	29-31	8	**8**
9	24-25	30	23	32-34		**9**
10	26	31	24	35-37	9	**10**
11	27	32	25	38-40	10	**11**
12	28	33	26	41-43	11	**12**
13	29	34	27	44-45		**13**
14	30		28	46		**14**
15	31		29	47	12	**15**
16		35	30	48		**16**
17	32		31	49		**17**
18				50	13	**18**
19	33	36	32			**19**
20				51		**20**

Age 18 years, 0 Months–18 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-12	0-21	0-8	0-5	0-2	**0**
1	13	22	9-15	6-11		**1**
2	14	23	16	12-14	3	**2**
3	15-16	24	17	15-17	4	**3**
4	17	25	18	18-20	5	**4**
5	18-19	26	19	21-23		**5**
6	20	27	20	24-26	6	**6**
7	21-22	28	21	27-29	7	**7**
8	23	29	22	30-32	8	**8**
9	24-25	30	23	33-35		**9**
10	26	31	24	36-38	9	**10**
11	27	32	25	39-41	10	**11**
12	28	33	26	42-44	11	**12**
13	29	34	27	45		**13**
14	30		28	46		**14**
15	31		29	47	12	**15**
16		35	30	48		**16**
17	32		31	49		**17**
18				50	13	**18**
19	33	36	32			**19**
20				51		**20**

Age 19 years, 0 Months–19 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-12	0-22	0-8	0-6	0-2	**0**
1	13-14	23	9-15	7-11	3	**1**
2	15	24	16	12-14		**2**
3	16-17	25	17	15-17	4	**3**
4	18	26	18	18-20	5	**4**
5	19-20	27	19	21-23	6	**5**
6	21	28	20-21	24-26		**6**
7	22-23	29	22	27-29	7	**7**
8	24		23	30-32	8	**8**
9	25-26	30	24	33-35		**9**
10	27	31	25	36-38	9	**10**
11	28	32	26	39-41	10	**11**
12	29	33	27	42-44	11	**12**
13	30	34	28	45		**13**
14	31		29	46		**14**
15			30	47	12	**15**
16	32	35		48		**16**
17			31	49		**17**
18				50	13	**18**
19	33	36	32			**19**
20				51		**20**

Age 20 years, 0 Months–24 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-13	0-23	0-8	0-6	0-2	**0**
1	14	24	9-16	7-11	3	**1**
2	15-16	25	17	12-14		**2**
3	17	26	18	15-17	4	**3**
4	18-19		19	18-20	5	**4**
5	20	27	20	21-23	6	**5**
6	21-22	28	21	24-26		**6**
7	23	29	22	27-30	7	**7**
8	24-25	30	23	31-33	8	**8**
9	26		24	34-36	9	**9**
10	27	31	25	37-39		**10**
11	28	32	26	40-42	10	**11**
12	29	33	27	43-44	11	**12**
13	30	34	28	45		**13**
14	31		29	46	12	**14**
15			30	47		**15**
16	32	35		48		**16**
17			31	49	13	**17**
18				50		**18**
19	33	36	32			**19**
20				51		**20**

Age 25 years, 0 Months–29 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-13	0-22	0-8	0-6	0-2	**0**
1	14-15	23	9-15	7-10	3	**1**
2	16	24	16	11-14		**2**
3	17-18	25	17	15-17	4	**3**
4	19	26	18	18-20	5	**4**
5	20	27	19	21-24	6	**5**
6	21-22	28	20	25-27		**6**
7	23	29	21	28-30	7	**7**
8	24-25	30	22	31-34	8	**8**
9	26	31	23	35-36	9	**9**
10	27	32	24	37-39		**10**
11	28	33	25	40-42	10	**11**
12	29		26	43-44	11	**12**
13	30	34	27	45		**13**
14	31		28	46	12	**14**
15			29	47		**15**
16	32	35	30	48		**16**
17				49	13	**17**
18			31	50		**18**
19	33	36				**19**
20			32	51		**20**

Age 30 years, 0 Months–39 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-13	0-22	0-8	0-4	0-2	**0**
1	14	23	9-15	5-7	3	**1**
2	15-16		16	8-11		**2**
3	17	24	17	12-14	4	**3**
4	18-19	25	18	15-18	5	**4**
5	20	26	19	19-21	6	**5**
6	21-22	27	20	22-24		**6**
7	23	28	21	25-28	7	**7**
8	24-25	29	22	29-31	8	**8**
9	26	30	23	32-35	9	**9**
10	27	31	24	36-38		**10**
11	28	32	25	39-41	10	**11**
12	29	33	26	42-43	11	**12**
13	30		27	44		**13**
14	31	34	28	45	12	**14**
15			29	46		**15**
16	32	35	30	47		**16**
17				48	13	**17**
18			31	49		**18**
19	33	36		50		**19**
20			32	51		**20**

Age 40 years, 0 Months–49 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-13	0-20	0-8	0-3	0-2	**0**
1	14	21	9-15	4-5		**1**
2	15-16	22	16	6-8	3	**2**
3	17	23	17	9-11	4	**3**
4	18-19	24	18	12-15	5	**4**
5	20	25	19	16-19		**5**
6	21-22	26	20	20-22	6	**6**
7	23	27	21	23-26	7	**7**
8	24-25	28	22	27-29	8	**8**
9	26	29-30	23	30-33		**9**
10	27	31	24	34-36	9	**10**
11	28	32	25	37-40	10	**11**
12	29	33	26	41-42	11	**12**
13	30		27	43-44		**13**
14	31	34	28	45	12	**14**
15			29	46		**15**
16	32	35	30	47		**16**
17				48	13	**17**
18			31	49		**18**
19	33	36		50		**19**
20			32	51		**20**

Age 50 years, 0 Months–59 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-13	0-19	0-7	0-1	0-2	**0**
1	14	20	8-15	2-3		**1**
2	15-16	21	16	4-6	3	**2**
3	17	22	17	7-9	4	**3**
4	18-19	23	18	10-13	5	**4**
5	20	24-25	19	14-16		**5**
6	21-22	26	20	17-20	6	**6**
7	23	27	21	21-24	7	**7**
8	24	28	22	25-27	8	**8**
9	25-26	29	23	28-31		**9**
10	27	30	24	32-34	9	**10**
11	28	31	25	35-38	10	**11**
12	29	32	26	39-41	11	**12**
13	30	33	27	42-44		**13**
14	31		28	45	12	**14**
15		34	29	46		**15**
16	32		30	47		**16**
17		35		48	13	**17**
18			31	49		**18**
19	33	36		50		**19**
20			32	51		**20**

Age 60 years, 0 Months–69 years, 11 Months

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-12	0-18	0-7	0	0-1	**0**
1	13	19	8-15	1	2	**1**
2	14	20	16	2-4		**2**
3	15-16	21-22	17	5-8	3	**3**
4	17	23	18	9-11	4	**4**
5	18-19	24	19	12-15	5	**5**
6	20	25	20	16-18		**6**
7	21-22	26	21	19-22	6	**7**
8	23	27	22	23-25	7	**8**
9	24-25	28	23	26-29	8	**9**
10	26	29-30	24	30-32		**10**
11	27	31	25	33-36	9	**11**
12	28	32	26	37-39	10	**12**
13	29	33	27	40-42	11	**13**
14	30		28	43-44		**14**
15	31	34	29	45	12	**15**
16			30	46		**16**
17	32	35		47		**17**
18			31	48	13	**18**
19		36		49		**19**
20	33		32	50-51		**20**

Age 70 years, 0 Months+

Scaled Score	Figure Ground	Form Completion	Classification/ Analogies	Sequential Order	Visual Patterns	Scaled Score
0	0-9	0-16	0-6	0	0	**0**
1	10-11	17-18	7-14	1	1	**1**
2	12	19	15	2-4	2	**2**
3	13-14	20	16	5-8		**3**
4	15	21	17	9-11	3	**4**
5	16-17	22-23	18	12-14	4	**5**
6	18	24	19	15-18	5	**6**
7	19-20	25	20	19-21		**7**
8	21	26-27	21	22-24	6	**8**
9	22-23	28	22	25-28	7	**9**
10	24	29	23	29-31	8	**10**
11	25	30	24	32-34		**11**
12	26	31	25	35-38	9	**12**
13	27	32	26	39-40	10	**13**
14	28	33	27	41-42	11	**14**
15	29	34	28	43-44		**15**
16	30		29	45-46	12	**16**
17	31	35	30	47		**17**
18	32		31	48		**18**
19		36		49	13	**19**
20	33		32	50-51		**20**

A
Appendix

Appendix B
Attention/Memory Subtests

3 years, 0 Months–3 years, 1 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0						< -3	**0**
1	0					-3	**1**
2		0					**2**
3	1					-2	**3**
4					0		**4**
5	2	1	0	0		-1	**5**
6	3-4						**6**
7	5-6	2			1		**7**
8	7-8	3	1	1		0	**8**
9	9-10	4			2		**9**
10	11-12	5	2	2	3	1	**10**
11	13-14	6-7	3	3	4		**11**
12	15-16	8	4		5	2	**12**
13	17-18	9	5	4	6		**13**
14	19-20	10	6	5	7	3	**14**
15	2122	11-12	7	6	8		**15**
16	23-24	13	8			4	**16**
17	25-26	14		7	9		**17**
18	27-28	15	9	8	10	5	**18**
19	29	16-17	10	9	11	6	**19**
20	30	18-28	11-23	>9	>11	>6	**20**

3 years, 2 Months–3 years, 3 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0					< -3	**0**
1							**1**
2	1	0				-3	**2**
3			0				**3**
4	2				0	-2	**4**
5	3	1		0			**5**
6	4-5		1			-1	**6**
7	6-7	2			1		**7**
8	8-9	3	2	1	2	0	**8**
9	10-11	4					**9**
10	12-13	5-6	3	2	3	1	**10**
11	14	7		3	4		**11**
12	15-16	8	4	4	5	2	**12**
13	17-18	9-10	5		6		**13**
14	19-20	11	6	5	7	3	**14**
15	21-22	12	7	6	8		**15**
16	23-24	13	8	7	9	4	**16**
17	25-26	14-15	9		10		**17**
18	27-28	16	10	8	11	5	**18**
19	29	17	11	9		6	**19**
20	30	18-28	12-23	>9	>11	>6	**20**

3 years, 4 Months–3 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0					< -3	**0**
1		0					**1**
2	1					-3	**2**
3			0				**3**
4	2	1		0	0	-2	**4**
5	3-4						**5**
6	5-6	2	1			-1	**6**
7	7-8	3		1	1		**7**
8	9-10	4	2		2	0	**8**
9	11-12	5		2	3		**9**
10	13-14	6	3			1	**10**
11	15-16	7	4	3	4	2	**11**
12	17-18	8-9	5	4	5		**12**
13	19	10	6	5	6	3	**13**
14	20-21	11			7		**14**
15	22-23	12-13	7	6	8	4	**15**
16	24-25	14	8	7	9		**16**
17	26-27	15	9	8	10	5	**17**
18	28	16	10		11		**18**
19	29	17-18	11	9	12	6	**19**
20	30	19-28	12-23	>9	>12	>6	**20**

3 years, 6 Months–3 years, 7 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0					< -4	**0**
1		0				-4	**1**
2	1						**2**
3	2		0			-3	**3**
4	3	1		0	0	-2	**4**
5	4-5						**5**
6	6-7	2	1			-1	**6**
7	8-9	3		1	1		**7**
8	10-11	4	2		2	0	**8**
9	12-13	5		2	3		**9**
10	14	6-7	3		4	1	**10**
11	15-16	8	4	3	5	2	**11**
12	17-18	9	5	4	6		**12**
13	19-20	10-11	6	5	7	3	**13**
14	21-22	12	7	6	8		**14**
15	23-24	13	8		9	4	**15**
16	25-26	14	9	7	10		**16**
17	27-28	15-16	10	8		5	**17**
18	28	17	11	9	11	6	**18**
19	29	18	12	10	12		**19**
20	30	19-28	13-23	>10	>12	>6	**20**

Attention/Memory Subtests

3 years, 8 Months–3 years, 9 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0					< -4	**0**
1	1	0				-4	**1**
2	2						**2**
3	3		0			-3	**3**
4	4	1		0	0		**4**
5	5-6					-2	**5**
6	7-8	2	1			-1	**6**
7	9	3-4		1	1		**7**
8	10-11	5	2		2	0	**8**
9	12-13	6		2	3		**9**
10	14-15	7	3		4	1	**10**
11	16-17	8	4	3	5	2	**11**
12	18-19	9-10	5	4	6		**12**
13	20-21	11	6	5	7	3	**13**
14	22-23	12	7	6	8		**14**
15	24-25	13	8		9	4	**15**
16	26	14-15	9	7	10	5	**16**
17	27	16	10	8	11		**17**
18	28	17	11	9	12	6	**18**
19	29	18	12	10	13		**19**
20	30	19-28	13-23	>10	>13	>6	**20**

3 years, 10 Months–3 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0	0				< -4	**0**
1	1						**1**
2	2					-4	**2**
3	3	1	0			-3	**3**
4	4-5			0	0		**4**
5	6-7	2				-2	**5**
6	8	3	1			-1	**6**
7	9-10	4		1	1		**7**
8	11-12	5	2		2	0	**8**
9	13-14	6		2	3	1	**9**
10	15-16	7-8	3	3	4		**10**
11	17-18	9	4	4	5	2	**11**
12	19-20	10	5		6		**12**
13	21-22	11	6	5	7	3	**13**
14	23-24	12-13	7	6	8	4	**14**
15	25	14	8	7	9		**15**
16	26	15	9	8	10	5	**16**
17	27	16	10	9	11	6	**17**
18	28	17-18	11		12		**18**
19	29	19	12	10	13	7	**19**
20	30	20-28	13-23	>10	>13	>7	**20**

4 years, 0 Months–4 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0	0				< -4	**0**
1	1						**1**
2	2		0			-4	**2**
3	3-4	1				-3	**3**
4	5			0	0		**4**
5	6-7	2	1			-2	**5**
6	8-9	3				-1	**6**
7	10-11	4	2	1	1		**7**
8	12-13	5-6			2	0	**8**
9	14-15	7	3	2	3	1	**9**
10	16-17	8	4	3	4		**10**
11	18-19	9	5	4	5	2	**11**
12	20-21	10-11	6	5	6	3	**12**
13	22-23	12	7		7		**13**
14	25-24	13	8	6	8	4	**14**
15	26	14	9	7	9	5	**15**
16	27	15-16	10	8	10		**16**
17	28	17	11	9	11	6	**17**
18	29	18	12	10	12-13	7	**18**
19		19	13		14		**19**
20	30	20-28	14-23	>10	>14	>7	**20**

4 years, 3 Months–4 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0	0				< -5	**0**
1	1					-5	**1**
2	2-3	1	0			-4	**2**
3	4					-3	**3**
4	5-6	2		0	0		**4**
5	7-8	3	1			-2	**5**
6	9-10	4				-1	**6**
7	11-12	5	2	1	1		**7**
8	13-14	6			2	0	**8**
9	15-16	7	3	2	3	1	**9**
10	17-18	8-9	4	3	4		**10**
11	19-20	10	5	4	5	2	**11**
12	21-22	11	6	5	6	3	**12**
13	23-24	12	7	6	7	4	**13**
14	25	13-14	8	7	8		**14**
15	26	15	9		9-10	5	**15**
16	27	16	10	8	11	6	**16**
17	28	17	11	9	12		**17**
18	29	18	12	10	13	7	**18**
19		19-20	13	11	14	8	**19**
20	30	21-28	14-23	>11	>14	>8	**20**

Attention/Memory Subtests

4 years, 6 Months–4 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-1	0				< -5	**0**
1	2-4					-5	**1**
2	5-6	1	0			-4	**2**
3	7-8					-3	**3**
4	9-10	2		0	0		**4**
5	11-12	3	1			-2	**5**
6	13-14	4				-1	**6**
7	15-16	5	2	1	1		**7**
8	17	6-7		2	2	0	**8**
9	18	8	3	3	3	1	**9**
10	19-20	9	4		4	2	**10**
11	21-22	10	5	4	5		**11**
12	23-24	11-12	6	5	6	3	**12**
13	25	13	7	6	7 8	4	**13**
14	26	14	8	7	9	5	**14**
15	27	15	9	8	10		**15**
16	28	16-17	10	9	11	6	**16**
17		18	11	10	12	7	**17**
18	29	19	12		13	8	**18**
19		20	13	11	14		**19**
20	30	21-28	14-23	>11	>14	>8	**20**

4 years, 9 Months–4 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-5	0				< -5	**0**
1	6-7					-5	**1**
2	8-9-	1	0			-4	**2**
3	10-11	2					**3**
4	12-13	3		0	0	-3	**4**
5	14-15	4	1			-2	**5**
6	16	5-6				-1	**6**
7	17	7	2	1	1		**7**
8	18	8		2	2	0	**8**
9	19-20	9	3	3	3 4	1	**9**
10	21	10-11	4	4	5	2	**10**
11	22-23	12	5	5	6	3	**11**
12	24	13	6	6	7		**12**
13	25	14	7	7	8	4	**13**
14	26	15-16	8		9	5	**14**
15	27	17	9	8	10 11	6	**15**
16	28	18	10	9	12		**16**
17		19	11	10	13	7	**17**
18	29	20	12	11	14	8	**18**
19		21-22	13	12	15	9	**19**
20	30	23-28	14-23	>12	>15	>9	**20**

5 years, 0 Months–5 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-8	0				< -5	**0**
1	9-11					-5	**1**
2	12-13	1	0			-4	**2**
3	14-15	2-3		0	0		**3**
4	16-18	4				-3	**4**
5	19-20	5	1			-2	**5**
6	21-22	6		1	1	-1	**6**
7	23-25	7-8	2	2	2	0	**7**
8	26-27	9		3	3		**8**
9	28-29	10	3	4	4	1	**9**
10	30-32	11	4		5	2	**10**
11	33-34	12-13	5	5	6-7	3	**11**
12	35-36	14	6	6	8	4	**12**
13	37-39	15	7	7	9		**13**
14	40-41	16	8	8	10	5	**14**
15	42-43	17-18	9	9	11	6	**15**
16	44-46	19	10	10	12-13	7	**16**
17	47-48	20	11	11	14	8	**17**
18	49-50	21	12	12	15		**18**
19	51-53	22	13	13	16	9	**19**
20	54-70	23-28	14-23	>13	>16	>9	**20**

5 years, 3 Months–5 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-8	0				< -5	**0**
1	9-11	1	0			-5	**1**
2	12-14	2					**2**
3	15-17	3		0	0	-4	**3**
4	18-20	4-5	1			-3	**4**
5	21-23	6				-2	**5**
6	24-26	7	2	1	1	-1	**6**
7	27-29	8		2	2	0	**7**
8	30-32	9-10	3	3	3-4		**8**
9	33-35	11	4	4	5	1	**9**
10	36-38	12	5	5	6	2	**10**
11	39-41	13	6	6	7	3	**11**
12	42-44	14-15	7	7	8	4	**12**
13	45-47	16	8	8	9-10	5	**13**
14	48-50	17	9	9	11		**14**
15	51-53	18	10	10	12	6	**15**
16	54-56	19-20	11	11	13	7	**16**
17	57-59	21	12		14-15	8	**17**
18	60-62	22	13	12	16	9	**18**
19	63-65	23	14	13	17	10	**19**
20	66-70	24-28	15-23	>13	>17	>10	**20**

Attention/Memory Subtests

5 years, 6 Months–5 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-8	0				< -5	**0**
1	9-12	1-2	0				**1**
2	13-16	3			0	-5	**2**
3	17-19	4		0		-4	**3**
4	20-23	5	1			-3	**4**
5	24-27	6-7			1	-2	**5**
6	28-30	8	2	1	2	-1	**6**
7	31-34	9		2	3	0	**7**
8	35-38	10	3	3	4	1	**8**
9	39-41	11-12	4	4	5		**9**
10	42-45	13	5	5	6-7	2	**10**
11	46-49	14	6	6	8	3	**11**
12	50-52	15	7	7	9	4	**12**
13	53-56	16-17	8	8	10	5	**13**
14	57-60	18	9	9	11-12	6	**14**
15	61-63	19	10	10	13	7	**15**
16	64-66	20	11	11	14		**16**
17	67	21	12	12	15	8	**17**
18	68	22-23	13	13	16-17	9	**18**
19	69	24	14	14	18	10	**19**
20	70	25-28	15-23	>14	>18	>10	**20**

5 years, 9 Months–5 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-7	0-1				< -6	**0**
1	8-11	2	0			-6	**1**
2	12-16	3-4		0	0	-5	**2**
3	17-20	5				-4	**3**
4	21-24	6	1		1	-3	**4**
5	25-29	7		1		-2	**5**
6	30-33	8-9	2	2	2	-1	**6**
7	34-37	10		3	3	0	**7**
8	38-42	11	3	4	4-5	1	**8**
9	43-46	12	4	5	6		**9**
10	47-50	13-14	5	6	7	2	**10**
11	51-55	15	6	7	8-9	3	**11**
12	56-59	16	7	8	10	4	**12**
13	60-63	17	8	9	11	5	**13**
14	64	18	9	10	12	6	**14**
15	65	19-20	10	11	13-14	7	**15**
16	66	21	11	12	15	8	**16**
17	67	22	12	13	16	9	**17**
18	68	23	13	14	17-18	10	**18**
19	69	24-25	14	15	19		**19**
20	70	26-28	15-23	>15	>19	>10	**20**

6 years, 0 Months–6 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-9	0-2	0			< -6	**0**
1	10-14	3				-6	**1**
2	15-18	4-5		0	0	-5	**2**
3	19-23	6	1			-4	**3**
4	24-28	7			1	-3	**4**
5	29-32	8	2	1		-2	**5**
6	33-37	9		2	2-3	-1	**6**
7	38-42	10-11	3	3	4	0	**7**
8	43-46	12	4	4	5	1	**8**
9	47-51	13	5	5	6-7	2	**9**
10	52-56	14	6	6	8	3	**10**
11	57-60	15	7	7	9		**11**
12	61-65	16-17	8	8	10-11	4	**12**
13	66-70	18	9	9	12	5	**13**
14	71-74	19	10	10	13	6	**14**
15	75-79	20	11	11	14-15	7	**15**
16	80-84	21	12	12	16	8	**16**
17	85-88	22-23	13	13	17	9	**17**
18	89-93	24	14	14	18-19	10	**18**
19	94-98	25	15	15	20	11	**19**
20	99-217	26-28	16-23	>15	>20	>11	**20**

6 years, 3 Months–6 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-11	0-3	0			< -6	**0**
1	12-16	4			0	-6	**1**
2	17-21	5-6	1	0		-5	**2**
3	22-26	7			1	-4	**3**
4	27-31	8	2			-3	**4**
5	32-36	9		1	2	-2	**5**
6	37-41	10	3	2	3	-1	**6**
7	42-46	11-12	4	3	4-5	0	**7**
8	47-51	13	5	4	6	1	**8**
9	52-56	14	6	5	7	2	**9**
10	57-61	15	7	6	8-9	3	**10**
11	62-66	16	8	7	10	4	**11**
12	67-71	17-18	9	8	11	5	**12**
13	72-76	19	10	9	12-13	6	**13**
14	77-81	20	11	10	14	7	**14**
15	82-86	21	12	11	15	8	**15**
16	87-91	22	13-14	12	16-17		**16**
17	92-96	23-24	15	13	18	9	**17**
18	97-101	25	16	14	19	10	**18**
19	102-106	26	17	15	20-21	11	**19**
20	107-217	27-28	18-23	>15	>21	>11	**20**

Attention/Memory Subtests

6 years, 6 Months–6 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-13	0-4	0			< -6	**0**
1	14-18	5		0	0	-6	**1**
2	19-23	6-7	1			-5	**2**
3	24-29	8			1	-4	**3**
4	30-34	9	2	1	2	-3	**4**
5	35-39	10	3	2	3	-2	**5**
6	40-44	11	4	3	4	-1	**6**
7	45-49	12-13	5-6	4	5	0	**7**
8	50-54	14	7	5	6-7	1	**8**
9	55-60	15	8	6	8	2	**9**
10	61-65	16	9	7	9	3	**10**
11	66-70	17	10	8	10-11	4	**11**
12	71-75	18-19	11	9	12	5	**12**
13	76-80	20	12	10	13-14	6	**13**
14	81-85	21	13	11	15	7	**14**
15	86-91	22	14	12	16	8	**15**
16	92-96	23	15	13	17-18	9	**16**
17	97-101	24-25	16	14	19	10	**17**
18	102-106	26	17	15	20	11	**18**
19	107-111	27	18	16	21-22	12	**19**
20	112-217	28	19-23	>16	>22	>12	**20**

6 years, 9 Months–6 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-14	0-4	0			< -6	**0**
1	15-19	5-6		0	0	-6	**1**
2	20-24	7	1			-5	**2**
3	25-30	8	2		1	-4	**3**
4	31-35	9	3	1	2	-3	**4**
5	36-40	10	4	2	3-4	-2	**5**
6	41-46	11-12	5	3	5	-1	**6**
7	47-51	13	6	4	6	0	**7**
8	52-56	14	7	5	7-8	1	**8**
9	57-62	15	8	6	9	2	**9**
10	63-67	16	9	7	10-11	3	**10**
11	68-72	17-18	10	8	12	4	**11**
12	73-78	19	11	9	13	5	**12**
13	79-83	20	12	10	14-15	6	**13**
14	84-88	21	13	11	16	7	**14**
15	89-94	22	14	12	17-18	8	**15**
16	95-99	23-24	15	13-14	19	9	**16**
17	100-104	25	16	15	20	10	**17**
18	105-110	26	17	16	21-22	11	**18**
19	111-115	27	18	17	23	12	**19**
20	116-217	28	19-23	>17	>23	>12	**20**

7 years, 0 Months–7 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-13	0-5	0	0	0	< -7	**0**
1	14-19	6				-7 - -6	**1**
2	20-24	7	1		1	-5	**2**
3	25-30	8	2	1	2	-4	**3**
4	31-36	9	3	2	3-4	-3	**4**
5	37-41	10-11	4	3	5	-2	**5**
6	42-47	12	5	4	6	-1	**6**
7	48-52	13	6	5	7	0	**7**
8	53-58	14	7	6	8-9	1	**8**
9	59-64	15	8	7	10	2	**9**
10	65-69	16-17	9	8	11-12	3	**10**
11	70-75	18	10	9	13	4	**11**
12	76-80	19	11	10	14-15	5	**12**
13	81-86	20	12	11	16	6	**13**
14	87-92	21	13	12	17	7	**14**
15	93-97	22-23	14	13	18-19	8	**15**
16	98-103	24	15	14	20	9-10	**16**
17	104-108	25	16	15	21-22	11	**17**
18	109-114	26	17	16	23	12	**18**
19	115-120	27	18-19	17	24	13	**19**
20	121-217	28	20-23	>17	>24	>13	**20**

7 years, 3 Months–7 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-13	0-5	0	0	0	< -7	**0**
1	14-19	6				-7	**1**
2	20-25	7	1	1	1	-6	**2**
3	26-31	8	2		2-3	-5	**3**
4	32-36	9-10	3	2	4	-3 - -4	**4**
5	37-42	11	4	3	5-6	-2	**5**
6	43-48	12	5	4	7	-1	**6**
7	49-54	13	6	5	8	0	**7**
8	55-60	14	7	6	9-10	1	**8**
9	61-66	15-16	8	7	11	2	**9**
10	67-71	17	9	8	12-13	3	**10**
11	72-77	18	10	9	14	4	**11**
12	78-83	19	11-12	10	15-16	5	**12**
13	84-89	20	13	11	17	6	**13**
14	90-95	21-22	14	12	18-19	8-7	**14**
15	96-101	23	15	13	20	9	**15**
16	102-106	24	16	14-15	21	10	**16**
17	107-112	25	17	16	22-23	11	**17**
18	113-118	26	18	17	24	12	**18**
19	119-124	27	19	18	25-26	13	**19**
20	125-217	28	20-23	>18	>26	>13	**20**

Attention/Memory Subtests

7 years, 6 Months–7 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-12	0-5	0	0	0	< -7	**0**
1	13-18	6			1	-7	**1**
2	19-24	7	1	1	2	-6 - -5	**2**
3	25-30	8	2		3	-4	**3**
4	31-37	9-10	3	2	4-5	-3	**4**
5	38-43	11	4	3	6	-2	**5**
6	44-49	12	5	4	7-8	-1	**6**
7	50-55	13	6	5	9-10	0	**7**
8	56-61	14	7	6	11	1	**8**
9	62-67	15-16	8-9	7	12	2	**9**
10	68-74	17	10	8-9	13-14	3	**10**
11	75-80	18	11	10	15	4	**11**
12	81-86	19	12	11	16-17	5-6	**12**
13	87-92	20	13	12	18	7	**13**
14	93-98	21-22	14	13	19-20	8	**14**
15	99-104	23	15	14	21	9	**15**
16	105-111	24	16	15	22-23	10	**16**
17	112-117	25	17	16	24	11	**17**
18	118-123	26	18	17	25-26	12	**18**
19	124-129	27	19	18	27	13	**19**
20	130-217	28	20-23	>18	>27	>13	**20**

7 years, 9 Months–7 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-14	0-5	0	0	0	< -7	**0**
1	15-20	6-7			1	-7 - -6	**1**
2	21-26	8	1	1	2	-5	**2**
3	27-33	9	2		3	-4	**3**
4	34-39	10	3-4	2	4-5	-3	**4**
5	40-45	11	5	3	6	-2	**5**
6	46-51	12	6	4-5	7-8	-1	**6**
7	52-58	13-14	7	6	9-10	0	**7**
8	59-64	15	8	7	11	1	**8**
9	65-70	16	9	8	12-13	2	**9**
10	71-77	17	10	9	14	3-4	**10**
11	78-83	18	11	10	15-16	5	**11**
12	84-89	19	12	11	17	6	**12**
13	90-96	20-21	13	12	18-19	7	**13**
14	97-102	22	14	13	20	8	**14**
15	103-108	23	15	14	21-22	9	**15**
16	109-114	24	16	15-16	23	10	**16**
17	115-121	25	17	17	24-25	11	**17**
18	122-127	26	18	18	26	12	**18**
19	128-133	27	19-20	19	27-28	13	**19**
20	134-217	28	21-23	>19	>28	>13	**20**

8 years, 0 Months–8 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-14	0-6	0	0	0	< -7	**0**
1	15-21	7	1		1	-7	**1**
2	22-27	8	2	1	2	-6 - -5	**2**
3	28-34	9	3		3	-4	**3**
4	35-40	10	4	2-3	4-5	-3	**4**
5	41-47	11	5	4	6	-2	**5**
6	48-53	12-13	6	5	7-8	-1	**6**
7	54-59	14	7	6	9	0	**7**
8	60-66	15	8	7	10-11	1	**8**
9	67-72	16	9	8	12-13	2-3	**9**
10	73-79	17	10	9	14	4	**10**
11	80-85	18	11	10	15-16	5	**11**
12	86-92	19-20	12	11-12	17	6	**12**
13	93-98	21	13	13	18-19	7	**13**
14	99-104	22	14	14	20-21	8	**14**
15	105-111	23	15	15	22	9	**15**
16	112-117	24	16-17	16	23-24	10	**16**
17	118-124	25	18	17	25	11 -12	**17**
18	125-130	26	19	18	26-27	13	**18**
19	131-137	27	20	19-20	28-29	14	**19**
20	138-217	28	21-23	>20	>29	>14	**20**

8 years, 3 Months–8 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-15	0-6	0	0	0	< -7	**0**
1	16-22	7	1		1	-7- -6	**1**
2	23-28	8	2	1	2	-5	**2**
3	29-35	9	3	2	3	-4	**3**
4	36-41	10	4	3	4-5	-3	**4**
5	42-48	11-12	5	4	6	-2	**5**
6	49-54	13	6	5	7-8	-1	**6**
7	55-61	14	7	6	9-10	0	**7**
8	62-68	15	8	7	11	1	**8**
9	69-74	16	9	8-9	12-13	2-3	**9**
10	75-81	17	10	10	14-15	4	**10**
11	82-87	18-19	11	11	16	5	**11**
12	88-94	20	12	12	17-18	6	**12**
13	95-100	21	13-14	13	19-20	7	**13**
14	101-107	22	15	14	21	8	**14**
15	108-114	23	16	15-16	22-23	9	**15**
16	115-120	24	17	17	24-25	10-11	**16**
17	121-127	25	18	18	26	12	**17**
18	128-133	26	19	19	27-28	13	**18**
19	134-140	27	20	20	29-30	14	**19**
20	141-217	28	21-23	>20	>30	>14	**20**

Attention/Memory Subtests

8 years, 6 Months–8 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-16	0-6	0	0	0	< -6	**0**
1	17-23	7	1		1	-6	**1**
2	24-29	8	2	1	2	-5	**2**
3	30-36	9	3	2	3	-4	**3**
4	37-43	10-11	4	3	4-5	-3	**4**
5	44-49	12	5	4	6	-2	**5**
6	50-56	13	6	5-6	7-8	-1	**6**
7	57-63	14	7	7	9-10	0	**7**
8	64-69	15	8	8	11	1-2	**8**
9	70-76	16	9	9	12-13	3	**9**
10	77-83	17-18	10-11	10	14-15	4	**10**
11	84-90	19	12	11-12	16-17	5	**11**
12	91-96	20	13	13	18	6	**12**
13	97-103	21	14	14	19-20	7	**13**
14	104-110	22	15	15	21-22	8	**14**
15	111-116	23	16	16	23-24	9-10	**15**
16	117-123	24	17	17-18	25	11	**16**
17	124-130	25	18	19	26-27	12	**17**
18	131-136	26	19	20	28-29	13	**18**
19	137-143	27	20	21	30-31	14	**19**
20	144-217	28	21-23	>21	>31	>14	**20**

8 years, 9 Months–8 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-17	0-6	0	0	0	< -6	**0**
1	18-24	7	1		1	-6	**1**
2	25-31	8-9	2	1	2	-5	**2**
3	32-38	10	3	2	3	-4	**3**
4	39-44	11	4	3-4	4-5	-3	**4**
5	45-51	12	5	5	6-7	-2	**5**
6	52-58	13	6-7	6	8-9	-1	**6**
7	59-65	14	8	7	10	0-1	**7**
8	66-71	15	9	8	11-12	2	**8**
9	72-78	16-17	10	9-10	13-14	3	**9**
10	79-85	18	11	11	15-16	4	**10**
11	86-92	19	12	12	17	5	**11**
12	93-98	20	13	13	18-19	6	**12**
13	99-105	21	14	14-15	20-21	7	**13**
14	106-112	22	15	16	22-23	8-9	**14**
15	113-118	23	16	17	24	10	**15**
16	119-125	24	17	18	25-26	11	**16**
17	126-132	25	18	19-20	27-28	12	**17**
18	133-139	26	19	21	29-30	13	**18**
19	140-145	27	20	22	31	14	**19**
20	146-217	28	21-23	>22	>31	>14	**20**

9 years, 0 Months–9 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-19	0-7	0	0	0	< -6	**0**
1	20-26	8	1		1	-6	**1**
2	27-33	9	2	1	2	-5	**2**
3	34-40	10	3-4	2-3	3-4	-4	**3**
4	41-46	11	5	4	5	-3	**4**
5	47-53	12	6	5	6-7	-2	**5**
6	54-60	13	7	6	8-9	-1-0	**6**
7	61-67	14	8	7-8	10-11	1	**7**
8	68-73	15-16	9	9	12-13	2	**8**
9	74-80	17	10	10	14	3	**9**
10	81-87	18	11	11-12	15-16	4	**10**
11	88-94	19	12	13	17-18	5	**11**
12	95-100	20	13	14	19-20	6	**12**
13	101-107	21	14	15	21-22	7-8	**13**
14	108-114	22	15	16-17	23	9	**14**
15	115-120	23	16	18	24-25	10	**15**
16	121-127	24	17	19	26-27	11	**16**
17	128-134	25	18	20	28-29	12	**17**
18	135-141	26	19-20	21-22	30-31	13	**18**
19	142-147	27	21	23	32	14	**19**
20	148-217	28	22-23	>23	>32	>14	**20**

9 years, 3 Months–9 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-22	0-7	0-1	0	0	< -6	**0**
1	23-28	8	2	1	1	-6	**1**
2	29-35	9	3	2	2-3	-5	**2**
3	36-42	10	4	3	4	-4	**3**
4	43-49	11	5	4	5-6	-3	**4**
5	50-55	12	6	5-6	7-8	-2	**5**
6	56-62	13-14	7	7	9-10	-1-0	**6**
7	63-69	15	8	8	11-12	1	**7**
8	70-76	16	9	9-10	13	2	**8**
9	77-82	17	10	11	14-15	3	**9**
10	83-89	18	11	12	16-17	4	**10**
11	90-96	19	12	13	18-19	5	**11**
12	97-102	20	13	14-15	20-21	6-7	**12**
13	103-109	21	14	16	22	8	**13**
14	110-116	22	15-16	17	23-24	9	**14**
15	117-123	23	17	18-19	25-26	10	**15**
16	124-129	24	18	20	27-28	11	**16**
17	130-136	25	19	21	29-30	12	**17**
18	137-143	26	20	22-23	31	13-14	**18**
19	144-150	27	21	24	32-33	15	**19**
20	151-217	28	22-23	>25	>33	>15	**20**

Attention/Memory Subtests

9 years, 6 Months–9 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-23	0-7	0-1	0	0	< -6	**0**
1	24-30	8	2	1	1	-6	**1**
2	31-37	9	3	2	2-3	-5	**2**
3	38-44	10	4	3	4-5	-4	**3**
4	45-50	11-12	5	4-5	6-7	-3	**4**
5	51-57	13	6	6	8-9	-2 - -1	**5**
6	58-64	14	7	7	10	0	**6**
7	65-71	15	8	8-9	11-12	1	**7**
8	72-78	16	9	10	13-14	2	**8**
9	79-84	17	10	11	15-16	3	**9**
10	85-91	18	11-12	12-13	17-18	4	**10**
11	92-98	19	13	14	19-20	5-6	**11**
12	99-105	20	14	15	21	7	**12**
13	106-111	21	15	16-17	22-23	8	**13**
14	112-118	22	16	18	24-25	9	**14**
15	119-125	23	17	19	26-27	10	**15**
16	126-132	24	18	20-21	28-29	11	**16**
17	133-139	25	19	22	30	12-13	**17**
18	140-145	26	20	23	31-32	14	**18**
19	146-152	27	21	24-25	33-34	15	**19**
20	153-217	28	22-23	>25	>34	>15	**20**

9 years, 9 Months–9 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-25	0-7	0-1	0	0	< -6	**0**
1	26-32	8	2	1	1-2	-6	**1**
2	33-39	9-10	3	2	3-4	-5	**2**
3	40-45	11	4	3-4	5-6	-4	**3**
4	46-52	12	5	5	7	-3	**4**
5	53-59	13	6	6-7	8-9	-2 - -1	**5**
6	60-66	14	7	8	10-11	0	**6**
7	67-73	15	8-9	9	12-13	1	**7**
8	74-79	16	10	10-11	14-15	2	**8**
9	80-86	17	11	12	16-17	3	**9**
10	87-93	18	12	13	18	4	**10**
11	94-100	19	13	14-15	19-20	5-6	**11**
12	101-106	20	14	16	21-22	7	**12**
13	107-113	21	15	17	23-24	8	**13**
14	114-120	22	16	18-19	25-26	9	**14**
15	121-127	23	17	20	27-28	10	**15**
16	128-133	24	18	21-22	29	11	**16**
17	134-140	25	19	23	30-31	12-13	**17**
18	141-147	26	20	24	32-33	14	**18**
19	148-154	27	21	25-26	34-35	15	**19**
20	155-217	28	22-23	>26	>35	>15	**20**

10 years, 0 Months–10 years, 2 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-27	0-8	0-1	0	0-1	< -6	**0**
1	28-34	9	2	1	2	-6	**1**
2	35-41	10	3	2-3	3-4	-5	**2**
3	42-47	11	4-5	4	5-6	-4	**3**
4	48-54	12	6	5-6	7-8	-3	**4**
5	55-61	13	7	7	9-10	-2 - -1	**5**
6	62-68	14	8	8	11-12	0	**6**
7	69-75	15	9	9-10	13-14	1	**7**
8	76-81	16	10	11	15	2	**8**
9	82-88	17	11	12-13	16-17	3	**9**
10	89-95	18-19	12	14	18-19	4-5	**10**
11	96-102	20	13	15	20-21	6	**11**
12	103-108	21	14	16-17	22-23	7	**12**
13	109-115	22	15	18	24-25	8	**13**
14	116-122	23	16	19-20	26-27	9	**14**
15	123-129	24	17	21	28	10-11	**15**
16	130-135	25	18	22	29-30	12	**16**
17	136-142	26	19	23-24	31-32	13	**17**
18	143-149	27	20	25	33-34	14	**18**
19	150-156		21	26-27	35-36	15	**19**
20	157-217	28	22-23	>27	>36	>15	**20**

10 years, 3 Months–10 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-29	0-8	0-2	0	0-1	< -6	**0**
1	30-35	9	3	1-2	2-3	-6	**1**
2	36-42	10	4	3	4-5	-5	**2**
3	43-49	11	5	4	6-7	-4	**3**
4	50-56	12	6	5-6	8	-3 - -2	**4**
5	57-63	13	7	7	9-10	-1	**5**
6	64-69	14	8	8-9	11-12	0	**6**
7	70-76	15	9	10	13-14	1	**7**
8	77-83	16-17	10	11-12	15-16	2	**8**
9	84-90	18	11	13	17-18	3-4	**9**
10	91-97	19	12	14	19-20	5	**10**
11	98-103	20	13	15-16	21-22	6	**11**
12	104-110	21	14	17	23-24	7	**12**
13	111-117	22	15	18-19	25	8	**13**
14	118-124	23	16	20	26-27	9-10	**14**
15	125-130	24	17	21-22	28-29	11	**15**
16	132-137	25	18	23	30-31	12	**16**
17	138-144	26	19-20	24	32-33	13	**17**
18	145-151	27	21	25-26	34-35	14	**18**
19	152-158		22	27	36-37	15-16	**19**
20	159-217	28	23	>27	>37	>16	**20**

Attention/Memory Subtests

10 years, 6 Months–10 years, 8 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-32	0-8	0-2	0	0-2	< -6	**0**
1	33-39	9	3	1-2	3	-6	**1**
2	40-46	10	4	3	4-5	-5	**2**
3	47-53	11	5	4-5	6-7	-4	**3**
4	54-59	12-13	6	6	8-9	-3 - -2	**4**
5	60-66	14	7	7-8	10-11	-1	**5**
6	67-73	15	8	9	12-13	0	**6**
7	74-80	16	9	10-11	14-15	1	**7**
8	81-87	17	10	12	16-17	2	**8**
9	88-93	18	11	13-14	18-19	3-4	**9**
10	94-100	19	12	15	20-21	5	**10**
11	101-107	20	13	16-17	22	6	**11**
12	108-114	21	14	18	23-24	7	**12**
13	115-121	22	15	19-20	25-26	8	**13**
14	122-127	23	16-17	21	27-28	9-10	**14**
15	128-134	24	18	22	29-30	11	**15**
16	135-141	25	19	23-24	31-32	12	**16**
17	142-148	26	20	25	33-34	13	**17**
18	149-155	27	21	26-27	35-36	14	**18**
19	156-161		22	28	37-38	15-16	**19**
20	162-217	28	23	>28	>38	>16	**20**

10 years, 9 Months–10 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-36	0-9	0-2	0-1	0-2	< -6	**0**
1	37-43	10	3	2	3-4	-6	**1**
2	44-49	11	4	3-4	5-6	-5	**2**
3	50-56	12	5	5	7-8	-4	**3**
4	57-63	13	6	6-7	9-10	-3 - -2	**4**
5	64-70	14	7	8	11-12	-1	**5**
6	71-77	15	8	9-10	13-14	0	**6**
7	78-83	16	9	11	15-16	1	**7**
8	84-90	17	10	12-13	17	2-3	**8**
9	91-97	18	11	14	18-19	4	**9**
10	98-104	19	12-13	15-16	20-21	5	**10**
11	105-111	20	14	17	22-23	6	**11**
12	112-118	21	15	18-19	24-25	7	**12**
13	119-125	22	16	20	26-27	8-9	**13**
14	126-131	23	17	21-22	28-29	10	**14**
15	132-138	24	18	23	30-31	11	**15**
16	139-145	25	19	24-25	32-33	12	**16**
17	146-151	26	20	26	34-35	13-14	**17**
18	152-158	27	21	27-28	36-37	15	**18**
19	159-165		22	29	38	16	**19**
20	166-217	28	23	>29	>38	>16	**20**

11 years, 0 Months–11 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-41	0-9	0-2	0-1	0-3	< -7	**0**
1	42-48	10	3	2	4-5	-7 - -6	**1**
2	49-55	11	4	3-4	6	-5	**2**
3	56-61	12	5	5	7-8	-4	**3**
4	62-68	13-14	6	6-7	9-10	-3 - -2	**4**
5	69-75	15	7	8	11-12	-1	**5**
6	76-82	16	8-9	9-10	13-14	0	**6**
7	83-89	17	10	11	15-16	1	**7**
8	90-96	18	11	12-13	17-18	2-3	**8**
9	97-102	19	12	14	19-20	4	**9**
10	103-109	20	13	15-16	21-22	5	**10**
11	110-116	21	14	17	23-24	6	**11**
12	117-123	22	15	18-19	25-26	7-8	**12**
13	124-130	23	16	20-21	27-28	9	**13**
14	131-137	24	17	22	29-30	10	**14**
15	138-143	25	18	23-24	31-32	11	**15**
16	144-150	26	19	25	33-34	12-13	**16**
17	151-157		20	26-27	35-36	14	**17**
18	158-164	27	21	28	37	15	**18**
19	165-171		22	29-30	38-39	16-17	**19**
20	172-217	28	23	>30	>39	>17	**20**

11 years, 6 Months–11 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-46	0-10	0-2	0-1	0-3	< -7	**0**
1	47-53	11	3-4	2	4-5	-7 - -6	**1**
2	54-60	12	5	3-4	6-7	-5	**2**
3	61-67	13	6	5	8-9	-4	**3**
4	68-73	14	7	6-7	10-11	-3 - -2	**4**
5	74-80	15	8	8-9	12-13	-1	**5**
6	81-87	16	9	10	14-15	0	**6**
7	88-94	17	10	11-12	16-17	1	**7**
8	95-101	18	11	13	18-19	2-3	**8**
9	102-108	19	12	14-15	20-21	4	**9**
10	109-115	20	13	16	22-23	5	**10**
11	116-122	21	14	17-18	24-25	6-7	**11**
12	123-128	22	15	19-20	26-27	8	**12**
13	129-135	23	16	21	28-29	9	**13**
14	136-142	24	17	22-23	30-31	10-11	**14**
15	143-149	25	18	24	32-33	12	**15**
16	150-155	26	19	25-26	34-35	13	**16**
17	156-162		20	27	36-37	14	**17**
18	163-169	27	21	28-29	38	15-16	**18**
19	170-176		22	30	39-40	17	**19**
20	177-217	28	23	>30	>40	>17	**20**

Attention/Memory Subtests

12 years, 0 Months–12 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-49	0-10	0-3	0-1	0-3	< -7	**0**
1	50-56	11	4	2	4-5	-7 - -6	**1**
2	57-63	12	5	3-4	6-7	-5	**2**
3	64-70	13	6	5-6	8-9	-4	**3**
4	71-77	14	7	7	10-11	-3 - -2	**4**
5	78-84	15	8	8-9	12-13	-1	**5**
6	85-90	16	9	10	14-15	0	**6**
7	91-97	17-18	10	11-12	16-17	1-2	**7**
8	98-104	19	11	13-14	18-19	3	**8**
9	105-111	20	12	15	20-21	4	**9**
10	112-118	21	13	16-17	22-23	5-6	**10**
11	119-125	22	14	18	24-25	7	**11**
12	126-132	23	15	19-20	26-27	8	**12**
13	133-138	24	16	21-22	28-29	9-10	**13**
14	139-145	25	17	23	30-31	11	**14**
15	146-152	26	18	24-25	32-33	12	**15**
16	153-159		19-20	26	34-35	13-14	**16**
17	160-166	27	21	27-28	36-37	15	**17**
18	167-173		22	29-30	38-39	16	**18**
19	174-180			31	40-41	17-18	**19**
20	181-217	28	23	>31	>41	>18	**20**

12 years, 6 Months–12 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-53	0-11	0-4	0-1	0-3	< -7	**0**
1	54-59	12	5	2-3	4-5	-7- -6	**1**
2	60-66	13	6	4	6-7	-5	**2**
3	67-73	14	7	5-6	8-9	-4	**3**
4	74-80	15	8	7	10-11	-3 - -2	**4**
5	81-87	16	9	8-9	12-13	-1	**5**
6	88-94	17	10	10-11	14-15	0	**6**
7	95-101	18	11	12	16-17	1-2	**7**
8	102-108	19	12	13-14	18-19	3	**8**
9	109-115	20	13	15-16	20-21	4	**9**
10	116-122	21	14	17	22-23	5-6	**10**
11	123-128	22	15	18-19	24-25	7	**11**
12	129-135	23	16	20	26-27	8-9	**12**
13	136-142	24	17	21-22	28-29	10	**13**
14	143-149	25	18	23-24	30-31	11	**14**
15	150-156	26	19	25	32-33	12-13	**15**
16	157-162		20	26-27	34-35	14	**16**
17	163-169	27	21	28-29	36-37	15	**17**
18	170-176		22	30	38-39	16-17	**18**
19	177-183			31-32	40-41	18	**19**
20	184-217	28	23	>32	>41	>18	**20**

13 years, 0 Months–13 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-56	0-11	0-4	0-1	0-3	< -7	**0**
1	57-63	12	5	2-3	4-5	-7	**1**
2	64-70	13	6	4	6-7	-6 - -5	**2**
3	71-76	14	7	5-6	8-9	-4	**3**
4	77-83	15	8	7-8	10-11	-3 - -2	**4**
5	84-90	16	9	9	12-13	-1	**5**
6	91-97	17	10	10-11	14-15	0	**6**
7	98-104	18	11	12-13	16-17	1-2	**7**
8	105-111	19	12	14	18-19	3	**8**
9	112-118	20	13	15-16	20-21	4-5	**9**
10	119-125	21	14	17-18	22-23	6	**10**
11	126-132	22	15	19	24-25	7	**11**
12	133-138	23	16	20-21	26-27	8-9	**12**
13	140-145	24	17	22-23	28-30	10	**13**
14	146-152	25	18	24	31-32	11-12	**14**
15	153-159	26	19	25-26	33-34	13	**15**
16	160-166		20	27-28	35-36	14	**16**
17	167-173	27	21	29	37-38	15-16	**17**
18	174-180		22	30-31	39-40	17	**18**
19	181-187			32-33	41-42	18-19	**19**
20	188-217	28	23	>33	>42	>19	**20**

13 years, 6 Months–13 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-59	0-12	0-4	0-1	0-3	< -7	**0**
1	60-66	13	5	2-3	4-5	-7 - -6	**1**
2	67-73	14	6	4-5	6-7	-5	**2**
3	74-80	15	7	6	8-9	-4 - -3	**3**
4	81-87	16	8	7-8	10-11	-2	**4**
5	88-94	17	9	9-10	12-13	-1	**5**
6	95-100	18	10	11	14-15	0-1	**6**
7	101-107		11	12-13	16-17	2	**7**
8	108-114	19	12	14-15	18-19	3-4	**8**
9	115-121	20	13	16	20-21	5	**9**
10	122-128	21	14	17-18	22-24	6-7	**10**
11	129-135	22	15	19-20	25-26	8	**11**
12	136-142	23	16	21-22	27-28	9	**12**
13	143-149	24	17	23	29-30	10-11	**13**
14	150-156	25	18	24-25	31-32	12	**14**
15	157-163	26	19	26-27	33-34	13-14	**15**
16	164-170		20	28	35-36	15	**16**
17	171-177	27	21	29-39	37-38	16-17	**17**
18	178-184		22	31-32	39-40	18	**18**
19	185-191			33	41-42	19-20	**19**
20	192-217	28	23	>33	>42	>20	**20**

Attention/Memory Subtests

14 years, 0 Months–14 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-61	0-12	0-4	0-2	0-3	< -7	**0**
1	62-68	13	5	3	4-5	-7 - -6	**1**
2	69-75	14	6	4-5	6-7	-5	**2**
3	76-82	15	7	6-7	8-9	-4 - -3	**3**
4	83-89	16	8	8	10-11	-2	**4**
5	90-96	17	9	9-10	12-14	-1-0	**5**
6	97-103	18	10	11-12	15-16	1	**6**
7	104-110	19	11	13-14	17-18	2	**7**
8	111-117	20	12	15	19-20	3-4	**8**
9	118-124	21	13	16-17	21-22	5	**9**
10	125-130	22	14	18-19	23-24	6-7	**10**
11	131-137	23	15	20-21	25-26	8	**11**
12	138-144	24	16	22	27-29	9-10	**12**
13	145-151	25	17	23-24	30-31	11	**13**
14	152-158	26	18	25-26	32-33	12-13	**14**
15	159-165		19	27-28	34-35	14	**15**
16	166-172	27	20-21	29	36-37	15-16	**16**
17	173-179		22	30-31	38-39	17	**17**
18	180-186-			32-33	40-41	18-19	**18**
19	187-193	28		34	42-43	20	**19**
20	194-217		23	>34	>43	>20	**20**

14 years, 6 Months–14 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-63	0-12	0-5	0-2	0-3	< -7	**0**
1	64-70	13	6	3-4	4-6	-7	**1**
2	71-77	14	7	5-6	7-8	-6 - -5	**2**
3	78-84	15	8	7	9-10	-4	**3**
4	85-91	16	9	8-9	11-12	-3 - -2	**4**
5	92-98	17	10	10-11	13-14	-1	**5**
6	99-105	18	11	12-13	15-16	0-1	**6**
7	106-112	19	12	14	17-19	2-3	**7**
8	113-119	20	13	15-16	20-21	4-	**8**
9	120-126	21	14	17-18	22-23	5-6	**9**
10	127-133	22	15	19-20	24-25	7	**10**
11	134-140	23	16	21	26-27	8-9	**11**
12	141-146	24	17	22-23	28-29	10	**12**
13	147-153	25	18	24-25	30-32	11-12	**13**
14	154-160	26	19	26-27	33-34	13	**14**
15	161-167		20	28-29	35-36	14-15	**15**
16	168-174	27	21	30	37-38	16	**16**
17	175-181		22	31-32	39-40	17-18	**17**
18	182-188			33-34	41-42	19	**18**
19	189-195	28		35-36	43-45	20-21	**19**
20	196-217		23	>36	>45	>21	**20**

15 years, 0 Months–15 years, 5 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-66	0-13	0-5	0-2	0-4	< -7	**0**
1	67-73	14	6	3-4	5-6	-7	**1**
2	74-80	15	7	5-6	7-8	-6 - -5	**2**
3	81-87	16	8	7-8	9-11	-4	**3**
4	88-94		9	9-10	12-13	-3 - -2	**4**
5	95-101	17	10	11	14-15	-1-0	**5**
6	102-108	18	11	12-13	16-17	1	**6**
7	109-115	19	12	14-15	18-19	2-3	**7**
8	116-122	20	13	16-17	20-22	4	**8**
9	123-128	21	14	18-19	23-24	5-6	**9**
10	129-135	22	15	20	25-26	7-8	**10**
11	136-142	23	16	21-22	27-28	9	**11**
12	143-149	24	17	23-24	29-30	10-11	**12**
13	150-156	25	18	25-26	31-33	12	**13**
14	157-163	26	19	27-28	34-35	13-14	**14**
15	164-170		20	29	36-37	15-16	**15**
16	171-177	27	21	30-31	38-39	17	**16**
17	178-184		22	32-33	40-41	18-19	**17**
18	185-191			34-35	42-44	20	**18**
19	192-198	28		36-37	45-46	21-22	**19**
20	199-217		23	>37	>46	>22	**20**

15 years, 6 Months–15 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-68	0-13	0-5	0-3	0-5	< -7	**0**
1	69-75	14	6	4-5	6-7	-7	**1**
2	76-82	15	7	6	8-10	-6 - -5	**2**
3	83-89	16	8	7-8	11-12	-4- -3	**3**
4	90-96	17	9	9-10	13-14	-2	**4**
5	97-103	18	10	11-12	15-16	-1-0	**5**
6	104110	19	11	13-14	17-19	1-2	**6**
7	111-117	20	12	15-16	20-21	3	**7**
8	118-124	21	13	17	22-23	4-5	**8**
9	125-131	22	14	18-19	24-25	6-7	**9**
10	132-138	23	15	20-21	26-28	8	**10**
11	139-145		16	22-23	29-30	9-10	**11**
12	146-152	24	17	24-25	31-32	11-12	**12**
13	153-159	25	18	26-27	33-34	13	**13**
14	160-166	26	19	28	35-37	14-15	**14**
15	167-173		20	29-30	38-39	16-17	**15**
16	174-180	27	21	31-32	40-41	18	**16**
17	181-187		22	33-34	42-43	19-20	**17**
18	188-194			35-36	44-45	21-22	**18**
19	195-201	28		37-38	46-48	23	**19**
20	202-217		23	>38	>48	>23	**20**

Attention/Memory Subtests

16 years, 0 Months–16 years,11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-72	0-14	0-5	0-3	0-6	< -7	**0**
1	73-79	15	6	4-5	7-9	-7	**1**
2	80-86	16	7	6-7	10-11	-6 - -5	**2**
3	87-93		8	8-9	12-13	-4 - -3	**3**
4	94-100	17	9	10	14-15	-2 - -1	**4**
5	101-107	18	10	11-12	16-18	0	**5**
6	108-114	19	11	13-14	19-20	1-2	**6**
7	115-121	20	12	15-16	21-22	3-4	**7**
8	122-128	21	13	17-18	23-25	5	**8**
9	129-135	22	14	19-20	26-27	6-7	**9**
10	136-142	23	15	21-22	28-29	8-9	**10**
11	143-149	24	16	23	30-31	10	**11**
12	150-156	25	17	24-25	32-34	11-12	**12**
13	157-163		18	26-27	35-36	13-14	**13**
14	164-170	26	19	28-29	37-38	15-16	**14**
15	171-177		20	30-31	39-41	17	**15**
16	178-184	27	21	32-33	42-43	18-19	**16**
17	185-191		22	34-35	44-45	20-21	**17**
18	192-198			36-37	46-48	22	**18**
19	199-205	28		38	49-50	23-24	**19**
20	206-217		23	>38	>50	>24	**20**

17 years, 0 Months–17 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-76	0-15	0-6	0-4	0-7	< -7	**0**
1	77-83		7	5-6	8-10	-7 - -6	**1**
2	84-90	16	8	7	11-12	-5	**2**
3	91-97	17	9	8-9	13-14	-4 - -3	**3**
4	98-104	18	10	10-11	15-16	-2 - -1	**4**
5	105-111	19	11	12-13	17-19	0-1	**5**
6	112-118	20	12	14-15	20-21	2	**6**
7	119-125	21	13	16-17	22-24	3-4	**7**
8	126-132		14	18-19	25-26	5-6	**8**
9	133-139	22	15	20-21	27-28	7-8	**9**
10	140-146	23	16	22-23	29-31	9	**10**
11	147-153	24	17	24-25	32-33	10-11	**11**
12	154-160	25	18	26	34-35	12-13	**12**
13	161-167	26	19	27-28	36-38	14-15	**13**
14	168-174		20	29-30	39-40	16	**14**
15	175-182	27	21	31-32	41-43	17-18	**15**
16	183-189		22	33-34	44-45	19-20	**16**
17	190-196			35-36	46-47	21	**17**
18	197-203	28		37-38	48-50	22-23	**18**
19	204-210		23	39-40	51-52	24-25	**19**
20	211-217			>40	>52	>25	**20**

18 years, 0 Months–18 years,11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-76	0-15	0-7	0-4	0-8	< -7	**0**
1	77-83	16	8	5-6	9-10	-7 - -6	**1**
2	84-91	17	9	7-8	11-12	-5 - -4	**2**
3	92-98	18	10	9-10	13-15	-3	**3**
4	99-105	19	11	11-12	16-17	-2 - -1	**4**
5	106-112		12	13-14	18-20	0-1	**5**
6	113-119	20	13	15-16	21-22	2-3	**6**
7	120-126	21		17-18	23-25	4-5	**7**
8	127-133	22	14	19-20	26-27	6	**8**
9	134-140	23	15	21-22	28-30	7-8	**9**
10	141-147	24	16	23-24	31-32	9-10	**10**
11	148-154	25	17	25-26	33-35	11-12	**11**
12	155-162		18	27	36-37	13	**12**
13	163-169	26	19	28-29	38-40	14-15	**13**
14	170-176		20	30-31	41-42	16-17	**14**
15	177-183	27	21	32-33	43-45	18-19	**15**
16	184-190		22	34-35	46-47	20	**16**
17	191-197			36-37	48-49	21-22	**17**
18	198-204	28		38-39	50-52	23-24	**18**
19	205-211		23	40-41	53-54	25-26	**19**
20	212-217			>41	>54	>26	**20**

19 years, 0 Months–19 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-77	0-16	0-6	0-4	0-9	< -7	**0**
1	78-84	17	7	5-7	10-12	-7	**1**
2	85-91	18	8	8-9	13-14	-6 - -5	**2**
3	92-98		9	10-11	15-17	-4 - -3	**3**
4	99-105	19	10	12-13	18-19	-2 - -1	**4**
5	106-113	20	11	14-15	20-21	0-1	**5**
6	114-120	21	12	16-17	22-24	2	**6**
7	121-127	22	13	18-19	25-26	3-4	**7**
8	128-134	23	14	20-21	27-29	5-6	**8**
9	135-141		15	22-23	30-31	7-8	**9**
10	142-148	24	16	24-25	32-34	9-10	**10**
11	149-156	25	17	26-27	35-36	11	**11**
12	157-163		18	28-29	37-39	12-13	**12**
13	164-170	26	19	30-31	40-41	14-15	**13**
14	171-177		20	32-33	42-44	16-17	**14**
15	178-184	27	21	34-35	45-46	18-19	**15**
16	185-191		22	36-37	47-48	20	**16**
17	192-199			38-39	49-51	21-22	**17**
18	200-206	28		40-41	52-53	23-24	**18**
19	207-213		23	42-43	54-56	25-26	**19**
20	214-217			>43	>56	>26	**20**

Attention/Memory Subtests

20 years, 0 Months–24 years,11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-77	0-15	0-6	0-5	0-9	< -8	**0**
1	78-84	16	7	6-7	10-11	-8 - -7	**1**
2	85-91			8-9	12-14	-6 - -5	**2**
3	92-99	17	8	10-11	15-16	-4	**3**
4	100-106	18	9	12-13	17-19	-3 - -2	**4**
5	107-113	19	10	14-15	20-21	-1-0	**5**
6	114-120	20	11	16-17	22-23	1-2	**6**
7	121-128	21	12	18-19	24-26	3-4	**7**
8	129-135	22	13	20-21	27-28	5-6	**8**
9	136-142	23	14	22-23	29-31	7	**9**
10	143-149		15	24-25	32-33	8-9	**10**
11	150-157	24	16	26-27	34-36	10-11	**11**
12	158-164	25	17	28-29	37-38	12-13	**12**
13	165-171		18	30-31	39-41	14-15	**13**
14	172-179	26	19	32-33	42-43	16-17	**14**
15	180-186		20	34-35	44-45	18	**15**
16	187-193	27	21	36-37	46-48	19-20	**16**
17	194-200		22	38-39	49-50	21-22	**17**
18	201-208	28		40-41	51-53	23-24	**18**
19	209-215			42-43	54-55	25-26	**19**
20	216-217		23	>43	>55	>26	**20**

25 years, 0 Months–29 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-79	0-15	0-5	0-5	0-8	< -9	**0**
1	80-86		6	6-7	9-11	-9 - -8	**1**
2	87-94	16	7	8-9	12-13	-7 - -6	**2**
3	95-101	17	8	10	14-16	-5 - -4	**3**
4	102-108	18	9	11-12	17-18	-3 - -2	**4**
5	109-116		10	13-14	19-21	-1-0	**5**
6	117-123	19	11	15-16	22-23	1-2	**6**
7	124-131	20	12	17-18	24-25	3	**7**
8	132-138	21	13	19-20	26-28	4-5	**8**
9	139-146	22	14	21-22	29-30	6-7	**9**
10	147-153	23	15	23-24	31-33	8-9	**10**
11	154-161		16	25-26	34-35	10-11	**11**
12	162-168	24		27-28	36-38	12-13	**12**
13	169-176	25	17	29-30	39-40	14-15	**13**
14	177-183		18	31-32	41-42	16	**14**
15	184-191	26	19	33-34	43-45	17-18	**15**
16	192-198	27	20	35-36	46-47	19-20	**16**
17	199-206		21	37-38	48-50	21-22	**17**
18	207-213	28	22	39-40	51-52	23-24	**18**
19	214-216			41-42	53-54	25-26	**19**
20	217		23	>42	>54	>26	**20**

30 years, 0 Months–39 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-75	0-15	0-5	0-4	0-8	< -9	**0**
1	76-82		6	5-6	9-11	-9 - -8	**1**
2	83-90	16		7-8	12-13	-7 - -6	**2**
3	91-97	17	7	9-10	14-15	-5 - -4	**3**
4	98-104	18	8	11-12	16-18	-3 - -2	**4**
5	105-112		9	13-14	19-20	-1	**5**
6	113-119	19	10	15-16	21-23	0-1	**6**
7	120-127	20	11	17-18	24-25	2-3	**7**
8	128-134	21	12	19-20	26-27	4-5	**8**
9	135-141		13	21-22	28-30	6-7	**9**
10	142-149	22	14	23-24	31-32	8-9	**10**
11	150-157	23	15	25-26	33-35	10-11	**11**
12	158-164	24	16	27	36-37	12	**12**
13	165-172		17	28-29	38-39	13-14	**13**
14	173-179	25	18	30-31	40-42	15-16	**14**
15	180-187	26	19	32-33	43-44	17-18	**15**
16	188-194	27	20	34-35	45-47	19-20	**16**
17	195-202		21	36-37	48-49	21-22	**17**
18	203-209	28		38-39	50-51	23-24	**18**
19	210-216		22	40-41	52-54	25	**19**
20	217		23	>41	>54	>25	**20**

40 years, 0 Months–49 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-69	0-15	0-4	0-4	0-7	< -9	**0**
1	70-76		5	5-6	8-9	-9 - -8	**1**
2	77-84	16	6	7-8	10-13	-7 - -6	**2**
3	85-91	17	7	9-10	14-15	-5 - -4	**3**
4	92-98	18	8	11-12	16-17	-3	**4**
5	99-106		9	13-14	18-20	-2 - -1	**5**
6	107-113	19	10	15	21-22	0-1	**6**
7	114-121	20		16-17	23-25	2-3	**7**
8	122-128	21	11	18-19	26-27	4-5	**8**
9	129-135		12	20-21	28-29	6-7	**9**
10	136-143	22	13	22-23	30-32	8	**10**
11	144-151	23	14	24-25	33-34	9-10	**11**
12	152-158	24	15	26-27	35-36	11-12	**12**
13	159-166		16	28-29	37-39	13-14	**13**
14	167-173	25	17	30-31	40-41	15-16	**14**
15	174-181	26	18	32-33	42-44	17-18	**15**
16	182-188	27	19	34	45-46	19	**16**
17	189-196		20	35-36	47-48	20-21	**17**
18	197-203	28	21	37-38	49-51	22-23	**18**
19	204-210		22	39-40	52-53	24-25	**19**
20	211-217		23	>40	>53	>25	**20**

Attention/Memory Subtests

50 years, 0 Months–59 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-62	0-14	0-3	0-4	0-6	< -9	**0**
1	63-69	15	4	5-6	7-8	-9 - -8	**1**
2	70-77	16	5	7	9-11	-7--6	**2**
3	78-84	17	6	8-9	12-14	-5	**3**
4	85-91		7	10-11	15-16	-4 - -3	**4**
5	92-99	18	8	12-13	17-19	-2 - -1	**5**
6	100-106	19	9	14-15	20-21	0-1	**6**
7	107-114	20	10	16-17	22-23	2-3	**7**
8	115-121		11	18-19	24-26	4	**8**
9	122-128	21	12	20-21	27-28	5-6	**9**
10	129-136	22	13	22	29-31	7-8	**10**
11	137-144	23	14	23-24	32-33	9-10	**11**
12	145-151		15	25-26	34-35	11-12	**12**
13	152-159	24	16	27-28	36-38	13-14	**13**
14	160-167	25	17	29-30	39-40	15	**14**
15	168-175	26	18	31-32	41-43	16-17	**15**
16	176-182		19	33-34	44-45	18-19	**16**
17	183-190	27	20	35	46-47	20-21	**17**
18	191-197		21	36-37	48-50	22-23	**18**
19	198-204	28	22	38-39	51-52	24	**19**
20	205-217		23	>39	>52	>24	**20**

60 years, 0 Months–69 years, 11 Months

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-49	0-12	0-2	0-3	0-5	< -10	**0**
1	50-56	13	3	4-5	6-7	-10	**1**
2	57-64		4	6-7	8-10	-9 - -8	**2**
3	65-71	14	5	8-9	11-13	-7 - -6	**3**
4	72-78	15	6	10	14-15	-5 - -4	**4**
5	79-86	16	7	11-12	16-18	-3 - -2	**5**
6	87-93	17	8	13-14	19-20	-1	**6**
7	94-101	18	9	15-16	21-22	0-1	**7**
8	102-108		10	17-18	23-25	2-3	**8**
9	109-115	19	11	19-20	26-27	4-5	**9**
10	116-123	20	12	21	28-30	6-	**10**
11	124-131	21	13	22-23	31-32	7-8	**11**
12	132-138	22	14	24-25	33-35	9-10	**12**
13	139-146	23	15	26-27	36-37	11-12	**13**
14	147-154		16	28-29	38-39	13	**14**
15	155-162	24	17	30-31	40-42	14-15	**15**
16	163-169	25	18	32	43-44	16-17	**16**
17	170-177	26	19	33-34	45-47	18-19	**17**
18	178-184	27	20	35-36	48-49	20-21	**18**
19	185-191		21	37-38	50-52	22	**19**
20	192-217	28	22-23	>38	>52	>22	**20**

70+ years

Scaled Score	Attention Sustained	Forward Memory	Reverse Memory	Nonverbal Stroop Incongruent Correct	Nonverbal Stroop Congruent Correct	Nonverbal Stroop Effect	Scaled Score
0	0-39	0-9	0-1	0-1	0-3	< -11	**0**
1	40-46	10	2	2-3	4-5	-11 - -10	**1**
2	47-54	11	3	4-5	6-8	-9 - -8	**2**
3	55-61	12	4	6-7	9-10	-7	**3**
4	62-68	13	5	8-9	11-12	-6 - -5	**4**
5	69-76	14	6	10	13-15	-4 - -3	**5**
6	77-83	15	7	11-12	16-17	-2	**6**
7	84-91	16	8	13	18-19	-1-0	**7**
8	92-98	17	9	14-15	20-22	1-2	**8**
9	99-105	18	10	16-17	23-24	3-4	**9**
10	106-113	19	11	18	25-27	5	**10**
11	114-121		12	19-20	28-29	6-7	**11**
12	122-128	20	13	21-22	30-32	8-9	**12**
13	129-136	21	14	23-24	33-35	10	**13**
14	137-144	22	15	25-26	36-37	11-12	**14**
15	145-152	23	16	27-28	38-40	13-14	**15**
16	153-159	24	17	29-30	41-42	15-16	**16**
17	160-167	25	18	31-32	43-45	17	**17**
18	168-174	26	19	33-34	46-47	18-19	**18**
19	175-181	27	20	35-36	48-50	20-21	**19**
20	182-217	28	21-23	>36	>50	>21	**20**

C.1 Appendix Attention Sustained Error Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 3

Raw Score	Percentile	Scaled Score
16	1.0	**3**
15	3.7	**5**
14	5.0	**5**
13	6.2	**5**
12	6.8	**6**
11	7.4	**6**
10	11.1	**6**
9	12.3	**7**
8	17.3	**7**
7	18.5	**7**
6	22.2	**8**
5	29.6	**8**
4	38.3	**9**
3	50.6	**10**
2	61.4	**11**
1	70.3	**12**
0	75.0	**12**

Age 4-5

Raw Score	Percentile	Scaled Score
16	0.5	**2**
15	0.9	**3**
14	1.0	**3**
13	1.2	**3**
12	1.3	**3**
11	1.5	**4**
10	3.8	**5**
9	4.2	**5**
8	4.5	**5**
7	7.5	**6**
6	8.7	**6**
5	9.8	**6**
4	13.5	**7**
3	16.5	**7**
2	25.6	**8**
1	41.4	**9**
0	75.0	**12**

Age 6-8

Raw Score	Percentile	Scaled Score
21	0.4	**2**
20	0.9	**3**
19	1.8	**4**
18	2.7	**4**
17	3.2	**4**
16	3.7	**5**
15	4.0	**5**
14	4.3	**5**
13	4.6	**5**
12	5.0	**5**
11	5.6	**5**
10	6.2	**5**
9	6.9	**6**
8	8.9	**6**
7	9.9	**6**
6	12.9	**7**
5	13.9	**7**
4	17.3	**7**
3	26.7	**8**
2	40.1	**9**
1	65.3	**11**
0	75.0	**12**

Age 9-10

Raw Score	Percentile	Scaled Score
21	0.3	**2**
20	0.8	**3**
19	1.6	**4**
18	2.6	**4**
17	3.1	**4**
16	4.2	**5**
15	4.9	**5**
14	5.6	**5**
13	6.2	**5**
12	6.5	**5**
11	7.3	**6**
10	8.9	**6**
9	9.7	**6**
8	10.5	**6**
7	11.6	**6**
6	12.7	**7**
5	13.7	**7**
4	16.9	**7**
3	22.6	**8**
2	35.5	**9**
1	62.1	**11**
0	75.0	**12**

Age 11-14

Raw Score	Percentile	Scaled Score
>20	0.2	**2**
20	0.5	**2**
19	0.9	**3**
18	1.4	**3**
17	1.7	**4**
16	2.0	**4**
15	2.3	**4**
14	2.6	**4**
13	2.8	**4**
12	4.6	**5**
11	5.1	**5**
10	5.5	**5**
9	6.0	**5**
8	6.5	**5**
7	7.0	**6**
6	7.4	**6**
5	8.8	**6**
4	12.9	**7**
3	17.5	**7**
2	31.3	**9**
1	49.6	**10**
0	75.0	**12**

Age 15-18

Raw Score	Percentile	Scaled Score
>10	0.1	**2**
10	0.3	**2**
9	0.5	**2**
8	0.7	**3**
7	0.9	**3**
6	1.0	**3**
5	1.5	**4**
4	2.5	**4**
3	7.0	**6**
2	14.6	**7**
1	35.7	**9**
0	75.0	**12**

Age 19-59

Raw Score	Percentile	Scaled Score
>10	0.1	**2**
10	0.4	**2**
9	0.9	**3**
8	1.5	**4**
7	1.7	**4**
6	1.8	**4**
5	2.0	**4**
4	2.8	**4**
3	5.9	**5**
2	12.5	**7**
1	31.4	**9**
0	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
>10	0.5	**2**
10	1.2	**3**
9	2.4	**4**
8	4.9	**5**
7	6.1	**5**
6	8.6	**6**
5	11.0	**6**
4	11.6	**6**
3	12.2	**7**
2	24.4	**8**
1	46.3	**10**
0	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

C.2 Appendix Attention Divided Correct Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 3

Raw Score	Percentile	Scaled Score
0	3.2	**4**
1	5.4	**5**
2	6.5	**5**
3	7.6	**6**
4	8.6	**6**
5	9.3	**6**
6	10.0	**6**
7	11.4	**6**
8	12.9	**7**
9	15.7	**7**
10	18.6	**7**
11	24.0	**8**
12	30.0	**8**
13	35.7	**9**
14	47.1	**10**
15	58.6	**11**
16	75.0	**12**

Age 4-5

Raw Score	Percentile	Scaled Score
0	0.6	**3**
1	1.1	**3**
2	1.3	**3**
3	1.6	**4**
4	3.2	**4**
5	3.6	**5**
6	4.0	**5**
7	4.8	**5**
8	7.3	**6**
9	9.7	**6**
10	10.5	**6**
11	12.1	**6**
12	21.8	**8**
13	25.0	**8**
14	32.3	**9**
15	41.9	**9**
16	75.0	**12**

Age 6-8

Raw Score	Percentile	Scaled Score
< 5	1.0	**3**
5	1.3	**3**
6	1.8	**4**
7	2.3	**4**
8	2.7	**4**
9	3.0	**4**
10	3.3	**4**
11	3.6	**5**
12	3.9	**5**
13	4.1	**5**
14	5.3	**5**
15	6.9	**6**
16	8.3	**6**
17	9.8	**6**
18	11.2	**6**
19	12.4	**7**
20	16.0	**7**
21	18.9	**7**
22	20.1	**7**
23	20.7	**8**
24	29.0	**8**
25	32.0	**9**
26	34.9	**9**
27	38.5	**9**
28	44.4	**10**
29	46.2	**10**
30	52.1	**10**
31	58.0	**11**
32	75.0	**12**

Age 9-10

Raw Score	Percentile	Scaled Score
< 5	< 0.1	**2**
5	0.1	**2**
6	0.1	**2**
7	0.2	**2**
8	0.2	**2**
9	0.3	**2**
10	0.5	**2**
11	0.6	**3**
12	0.8	**3**
13	1.0	**3**
14	1.3	**3**
15	1.6	**4**
16	1.9	**4**
17	3.8	**5**
18	4.8	**5**
19	5.8	**5**
20	7.7	**6**
21	10.6	**6**
22	14.4	**7**
23	16.3	**7**
24	22.1	**8**
25	25.0	**8**
26	26.5	**8**
27	27.9	**8**
28	33.7	**9**
29	42.3	**9**
30	47.1	**10**
31	51.9	**10**
32	75.0	**12**

Age 11-14

Raw Score	Percentile	Scaled Score
<10	0.4	**2**
10	0.5	**2**
11	0.8	**3**
12	0.9	**3**
13	1.0	**3**
14	1.3	**3**
15	1.7	**4**
16	1.8	**4**
17	2.6	**4**
18	2.8	**4**
19	3.0	**4**
20	3.3	**4**
21	3.7	**5**
22	4.1	**5**
23	4.5	**5**
24	4.9	**5**
25	5.2	**5**
26	7.3	**6**
27	7.9	**6**
28	8.4	**6**
29	9.4	**6**
30	11.0	**6**
31	13.1	**7**
32	14.1	**7**
33	15.7	**7**
34	16.2	**7**
35	17.3	**7**
36	20.4	**8**
37	23.0	**8**
38	24.6	**8**
39	27.2	**8**
40	28.3	**8**
41	29.8	**8**
42	30.9	**9**
43	31.9	**9**
44	36.1	**9**
45	39.3	**9**
46	44.5	**10**
47	59.2	**11**
48	75.0	**12**

Age 15-18

Raw Score	Percentile	Scaled Score
< 10	0.4	**2**
10	0.5	**2**
11	0.6	**3**
12	0.7	**3**
13	0.8	**3**
14	0.9	**3**
15	1.0	**3**
16	1.3	**3**
17	1.6	**4**
18	1.8	**4**
19	2.0	**4**
20	2.2	**4**
21	2.4	**4**
22	2.6	**4**
23	2.8	**4**
24	3.0	**4**
25	3.2	**4**
26	3.7	**5**
27	4.2	**5**
28	4.7	**5**
29	5.0	**5**
30	5.3	**5**
31	5.6	**5**
32	5.9	**5**
33	6.3	**5**
34	6.7	**6**
35	7.3	**6**
36	8.9	**6**
37	10.5	**6**
38	11.0	**6**
39	13.1	**7**
40	14.7	**7**
41	15.0	**7**
42	15.2	**7**
43	15.7	**7**
44	18.3	**7**
45	24.6	**8**
46	30.4	**8**
47	45.0	**10**
48	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

Attention Divided Correct Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 19-59

Raw Score	Percentile	Scaled Score
< 10	0.5	**2**
10	0.8	**3**
11	1.0	**3**
12	1.2	**3**
13	1.4	**3**
14	1.6	**4**
15	1.8	**4**
16	2.0	**4**
17	2.2	**4**
18	2.4	**4**
19	2.6	**4**
20	2.9	**4**
21	3.4	**5**
22	3.6	**5**
23	3.9	**5**
24	4.5	**5**
25	4.7	**5**
26	5.2	**5**
27	6.5	**5**
28	6.8	**6**
29	7.9	**6**
30	9.2	**6**
31	9.7	**6**
32	10.1	**6**
33	10.5	**6**
34	11.5	**6**
35	13.9	**7**
36	20.9	**8**
37	22.0	**8**
38	23.8	**8**
39	24.6	**8**
40	25.7	**8**
41	26.2	**8**
42	27.2	**8**
43	28.0	**8**
44	30.6	**8**
45	33.2	**9**
46	37.2	**9**
47	46.9	**10**
48	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
< 10	0.5	**2**
10	1.0	**3**
11	1.2	**3**
12	1.4	**3**
13	1.7	**4**
14	2.1	**4**
15	2.5	**4**
16	2.9	**4**
17	3.3	**4**
18	3.6	**5**
19	3.8	**5**
20	4.0	**5**
21	4.2	**5**
22	9.9	**6**
23	12.0	**6**
24	13.2	**7**
25	14.4	**7**
26	15.5	**7**
27	16.6	**7**
28	17.7	**7**
29	18.7	**7**
30	19.7	**7**
31	20.6	**8**
32	21.2	**8**
33	21.9	**8**
34	22.5	**8**
35	23.9	**8**
36	35.2	**9**
37	38.7	**9**
38	42.3	**9**
39	44.1	**10**
40	45.1	**10**
41	46.5	**10**
42	47.9	**10**
43	50.7	**10**
44	53.5	**10**
45	56.3	**10**
46	62.0	**11**
47	69.0	**11**
48	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

C.3 Appendix Attention Divided Incorrect Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 3

Raw Score	Percentile	Scaled Score
16	0.9	**3**
15	2.0	**4**
14	3.2	**4**
13	4.0	**5**
12	4.8	**5**
11	5.6	**5**
10	6.4	**5**
9	7.2	**6**
8	8.4	**6**
7	9.6	**6**
6	10.8	**6**
5	15.5	**7**
4	21.7	**8**
3	27.7	**8**
2	36.1	**9**
1	45.7	**10**
0	75.0	**12**

Age 4-5

Raw Score	Percentile	Scaled Score
16	0.3	**2**
15	0.5	**2**
14	0.7	**3**
13	0.9	**3**
12	1.1	**3**
11	1.3	**3**
10	1.5	**4**
9	2.0	**4**
8	2.3	**4**
7	2.6	**4**
6	3.6	**5**
5	6.5	**5**
4	12.3	**7**
3	18.3	**7**
2	33.3	**9**
1	46.5	**10**
0	75.0	**12**

Age 6-8

Raw Score	Percentile	Scaled Score
> 20	0.5	**2**
20	0.9	**3**
19	1.2	**3**
18	1.8	**4**
17	2.5	**4**
16	3.1	**4**
15	4.2	**5**
14	4.6	**5**
13	5.3	**5**
12	6.2	**5**
11	6.8	**6**
10	7.2	**6**
9	8.2	**6**
8	9.2	**6**
7	10.5	**6**
6	14.3	**7**
5	16.9	**7**
4	21.8	**8**
3	26.6	**8**
2	37.0	**9**
1	53.6	**10**
0	75.0	**12**

Age 9-10

Raw Score	Percentile	Scaled Score
> 20	0.7	**3**
20	1.6	**4**
19	2.5	**4**
18	3.0	**4**
17	3.7	**5**
16	4.1	**5**
15	4.9	**5**
14	5.4	**5**
13	5.9	**5**
12	6.7	**5**
11	7.0	**6**
10	8.1	**6**
9	9.3	**6**
8	10.7	**6**
7	13.1	**7**
6	15.6	**7**
5	18.8	**7**
4	23.3	**8**
3	27.9	**8**
2	38.0	**9**
1	55.5	**10**
0	75.0	**12**

Age 11-14

Raw Score	Percentile	Scaled Score
> 20	1.4	**3**
20	2.3	**4**
19	3.0	**4**
18	3.5	**5**
17	3.9	**5**
16	5.3	**5**
15	5.6	**5**
14	5.8	**5**
13	6.3	**5**
12	6.8	**6**
11	7.3	**6**
10	8.7	**6**
9	10.7	**6**
8	11.2	**6**
7	13.6	**7**
6	16.0	**7**
5	19.4	**7**
4	23.8	**8**
3	28.2	**8**
2	38.2	**9**
1	56.8	**11**
0	75.0	**12**

Age 15-18

Raw Score	Percentile	Scaled Score
> 20	0.1	**2**
20	0.2	**2**
19	0.4	**2**
18	0.6	**3**
17	0.8	**3**
16	1.0	**3**
15	1.2	**3**
14	1.4	**3**
13	1.6	**4**
12	1.8	**4**
11	2.3	**4**
10	2.6	**4**
9	2.9	**4**
8	3.3	**4**
7	3.8	**5**
6	4.5	**5**
5	5.5	**5**
4	7.5	**6**
3	15.0	**7**
2	22.5	**8**
1	41.0	**9**
0	75.0	**12**

Age 19-59

Raw Score	Percentile	Scaled Score
> 20	0.2	**2**
20	0.4	**2**
19	0.6	**3**
18	0.8	**3**
17	1.0	**3**
16	1.3	**3**
15	1.5	**4**
14	1.8	**4**
13	2.0	**4**
12	2.3	**4**
11	2.6	**4**
10	2.8	**4**
9	3.0	**4**
8	3.5	**5**
7	4.5	**5**
6	5.2	**5**
5	5.7	**5**
4	10.9	**6**
3	17.4	**7**
2	24.6	**8**
1	44.5	**10**
0	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
> 20	0.4	**2**
20	0.8	**3**
19	1.0	**3**
18	1.2	**3**
17	2.5	**4**
16	3.7	**5**
15	4.9	**5**
14	6.1	**5**
13	7.3	**6**
12	8.6	**6**
11	9.0	**6**
10	9.4	**6**
9	9.9	**6**
8	11.1	**6**
7	12.3	**7**
6	14.8	**7**
5	19.5	**7**
4	25.7	**8**
3	39.7	**9**
2	56.8	**11**
1	68.9	**11**
0	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

C.4 Appendix

Noverbal Stroop Congruent Incorrect Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 3

Raw Score	Percentile	Scaled Score
9	0.7	**3**
8	1.5	**4**
7	3.6	**5**
6	7.1	**6**
5	9.5	**6**
4	11.9	**6**
3	14.3	**7**
2	19.6	**7**
1	28.6	**8**
0	75.0	**12**

Age 4-5

Raw Score	Percentile	Scaled Score
9	0.1	**2**
8	0.5	**2**
7	1.0	**3**
6	2.1	**4**
5	3.5	**5**
4	4.9	**5**
3	6.3	**5**
2	15.6	**7**
1	39.6	**9**
0	75.0	**12**

Age 6-8

Raw Score	Percentile	Scaled Score
13	0.4	**2**
12	1.1	**3**
11	1.5	**4**
10	1.9	**4**
9	2.3	**4**
8	2.9	**4**
7	3.4	**5**
6	4.2	**5**
5	5.0	**5**
4	5.7	**5**
3	6.3	**5**
2	12.0	**6**
1	25.7	**8**
0	75.0	**12**

Age 9-10

Raw Score	Percentile	Scaled Score
13	0.1	**2**
12	0.5	**2**
11	0.9	**3**
10	1.5	**4**
9	2.1	**4**
8	2.6	**4**
7	3.1	**4**
6	3.5	**5**
5	4.3	**5**
4	6.1	**5**
3	7.0	**6**
2	12.2	**7**
1	25.0	**8**
0	75.0	**12**

Age 11-14

Raw Score	Percentile	Scaled Score
13	0.7	**3**
12	0.9	**3**
11	1.1	**3**
10	1.3	**3**
9	1.5	**3**
8	1.8	**4**
7	2.0	**4**
6	2.5	**4**
5	3.0	**4**
4	3.8	**5**
3	4.5	**5**
2	8.1	**6**
1	24.0	**8**
0	75.0	**12**

Age 15-18

Raw Score	Percentile	Scaled Score
11	0.0	**2**
10	0.1	**2**
9	0.1	**2**
8	0.6	**3**
7	1.2	**3**
6	1.8	**4**
5	2.4	**4**
4	3.2	**4**
3	4.7	**5**
2	6.2	**5**
1	24.6	**8**
0	75.0	**12**

Age 19-59

Raw Score	Percentile	Scaled Score
11	0.1	**2**
10	0.2	**2**
9	0.3	**2**
8	0.4	**2**
7	0.4	**2**
6	0.5	**2**
5	0.6	**3**
4	0.8	**3**
3	1.0	**3**
2	1.8	**4**
1	25.0	**8**
0	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
11	0.1	**2**
10	0.1	**2**
9	1.4	**3**
8	2.0	**4**
7	2.6	**4**
6	3.3	**4**
5	3.9	**5**
4	4.5	**5**
3	7.7	**6**
2	10.3	**6**
1	23.1	**8**
0	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

C.5 Appendix

Nonverbal Stroop Incongruent Incorrect Tables

Conversion of Raw Scores to Percentiles and Scaled Scores

Age 3

Raw Score	Percentile	Scaled Score
13	0.4	**2**
12	0.6	**3**
11	0.9	**3**
10	1.6	**4**
9	2.5	**4**
8	3.6	**5**
7	4.7	**5**
6	5.8	**5**
5	6.9	**6**
4	8.0	**6**
3	9.1	**6**
2	25.5	**8**
1	50.9	**10**
0	75.0	**12**

Age 4-5

Raw Score	Percentile	Scaled Score
13	0.3	**2**
12	0.5	**2**
11	1.0	**3**
10	1.3	**3**
9	2.1	**4**
8	2.6	**4**
7	3.1	**4**
6	3.6	**5**
5	4.1	**5**
4	4.6	**5**
3	5.2	**5**
2	10.4	**6**
1	28.1	**8**
0	75.0	**12**

Age 6-8

Raw Score	Percentile	Scaled Score
11	0.5	**2**
10	1.0	**3**
9	1.5	**4**
8	1.9	**4**
7	2.3	**4**
6	2.9	**4**
5	4.6	**5**
4	5.1	**5**
3	8.7	**6**
2	13.5	**7**
1	23.0	**8**
0	75.0	**12**

Age 9-10

Raw Score	Percentile	Scaled Score
11	0.2	**2**
10	0.5	**2**
9	1.0	**3**
8	1.5	**4**
7	2.7	**4**
6	6.0	**5**
5	7.8	**6**
4	11.2	**6**
3	14.7	**7**
2	18.1	**7**
1	25.0	**8**
0	75.0	**12**

Age 11-14

Raw Score	Percentile	Scaled Score
11	0.1	**2**
10	0.6	**3**
9	1.0	**3**
8	2.0	**4**
7	2.3	**4**
6	2.5	**4**
5	3.3	**4**
4	4.0	**5**
3	5.5	**5**
2	13.4	**7**
1	24.1	**8**
0	75.0	**12**

Age 15-18

Raw Score	Percentile	Scaled Score
6	0.5	**3**
5	1.0	**3**
4	1.5	**4**
3	2.0	**4**
2	2.6	**4**
1	24.3	**8**
0	75.0	**12**

Age 19-59

Raw Score	Percentile	Scaled Score
6	0.5	**3**
5	1.2	**3**
4	1.6	**4**
3	2.0	**4**
2	2.7	**4**
1	25.1	**8**
0	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
6	1.1	**3**
5	2.9	**4**
4	3.2	**4**
3	4.5	**5**
2	5.8	**5**
1	27.9	**8**
0	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

D.1 Appendix Nonverbal IQ Equivalents

Sum of Scaled Scores	Core IQ Score
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37
8	39
9	41
10	43
11	45
12	47
13	49
14	51
15	53
16	55
17	57
18	59
19	61
20	63
21	65
22	67
23	69
24	70
25	71
26	72
27	73
28	74
29	75
30	77
31	78
32	81
33	84
34	87
35	90
36	93
37	95
38	96
39	97
40	98
41	99
42	100
43	101

Sum of Scaled Scores	Core IQ Score
44	103
45	105
46	107
47	108
48	110
49	111
50	113
51	114
52	115
53	116
54	117
55	119
56	120
57	121
58	123
59	125
60	126
61	128
62	129
63	131
64	132
65	133
66	135
67	137
68	139
69	141
70	143
71	145
72	147
73	149
74	152
75	155
76	158
77	161
78	164
79	167
80	170

Memory Composites and Processing Speed Composites

Sum of Scaled Scores	Nonverbal Memory Composite Score	Processing Speed Composite Score
0	48	48
1	51	50
2	54	53
3	56	56
4	59	58
5	61	61
6	64	63
7	66	66
8	69	69
9	71	71
10	74	74
11	77	77
12	79	79
13	82	82
14	84	84
15	87	87
16	89	90
17	92	92
18	95	95
19	97	98
20	100	100
21	102	103

Sum of Scaled Scores	Nonverbal Memory Composite Score	Processing Speed Composite Score
22	105	105
23	107	108
24	110	111
25	113	113
26	115	116
27	118	119
28	120	121
29	123	124
30	125	126
31	128	129
32	131	132
33	133	134
34	136	137
35	138	139
36	140	142
37	143	145
38	146	148
39	149	151
40	153	156

D.3 Appendix Confidence Intervals for IQ and Composite Scores

Nonverbal IQ—95% Confidence Interval

Nonverbal IQ	Low	High
31	25	37
32	26	38
33	27	39
34	28	40
35	29	41
36	30	42
37	31	43
38	32	44
39	33	45
40	34	46
41	35	47
42	36	48
43	37	49
44	38	50
45	39	51
46	40	52
47	41	53
48	42	54
49	43	55
50	44	56
51	45	57
52	46	58
53	47	59
54	48	60
55	49	61
56	50	62
57	51	63
58	52	64
59	53	65
60	54	66
61	55	67
62	56	68
63	57	69
64	58	70
65	59	71
66	60	72
67	61	73
68	62	74

Nonverbal IQ	Low	High
69	63	75
70	64	76
71	65	77
72	66	78
73	67	79
74	68	80
75	69	81
76	70	82
77	71	83
78	72	84
79	73	85
80	74	86
81	75	87
82	76	88
83	77	89
84	78	90
85	79	91
86	80	92
87	81	93
88	82	94
89	83	95
90	84	96
91	85	97
92	86	98
93	87	99
94	88	100
95	89	101
96	90	102
97	91	104
98	92	104
99	93	105
100	94	106
101	95	108
102	96	108
103	97	109
104	98	110
105	99	112
106	100	112

Nonverbal IQ	Low	High
107	101	113
108	102	114
109	103	115
110	103	116
111	105	117
112	106	118
113	107	119
114	107	120
115	109	121
116	110	122
117	111	123
118	112	124
119	113	125
120	114	126
121	115	127
122	116	128
123	117	129
124	118	130
125	119	131
126	120	132
127	121	133
128	122	134
129	123	135
130	124	136
131	125	137
132	126	138
133	127	139
134	128	140
135	129	141
136	130	142
137	131	143
138	132	144
139	133	145
140	134	146
141	135	147
142	136	148
143	137	149
144	138	150

Nonverbal IQ	Low	High
145	139	151
146	140	152
147	141	153
148	142	154
149	143	155
150	144	156
151	145	157
152	146	158
153	147	159
154	148	160
155	149	161
156	150	162
157	151	163
158	152	164
159	153	165
160	154	166
161	155	167
162	156	168
163	157	169
164	158	170
165	159	171
166	160	172
167	161	173
168	162	174
169	163	175
170	164	176

NOTE. Confidence intervals were calculated by adding or subtracting 1.96 times the average SEM for each score (e.g., rounded to 3 + 3 for NV IQ).

D.3 Appendix Confidence Intervals for IQ and Composite Scores

Nonverbal Memory—95% Confidence Interval

Nonverbal Memory	Low	High
48	38	58
51	41	61
54	44	64
56	46	66
59	49	69
61	51	71
64	54	74
66	56	76
69	59	79
71	61	81
74	64	84
77	67	87
79	69	89
82	72	92
84	74	94
87	77	97
89	79	99
92	82	102
95	85	105
97	87	107
100	90	110
102	92	112
105	95	115
107	97	117
110	100	120
113	103	123
115	105	125
118	108	128
120	110	130
123	113	133
125	115	135
128	118	138
131	121	141
133	123	143
136	126	146
138	128	148
140	130	150
143	133	153
146	136	156
149	139	159
153	143	163

Processing Speed—95% Confidence Interval

Processing Speed	Low	High
48	41	55
50	44	58
53	47	61
56	49	63
58	52	66
61	54	68
63	57	71
66	59	73
69	62	76
71	64	78
74	67	81
77	70	84
79	72	86
82	75	89
84	77	91
87	80	94
90	82	96
92	85	99
95	88	102
98	90	104
100	93	107
103	95	109
105	98	112
108	100	114
111	103	117
113	106	120
116	108	122
119	111	125
121	113	127
124	116	130
126	118	132
129	121	135
132	124	138
134	126	140
137	129	143
139	131	145
142	133	147
145	136	150
148	139	153
151	142	156
156	146	160

Examiner Rating Scale (Attention)

Raw Score to Percentiles and Scales Score Conversions for Attention Subscore Score

Age 3

Raw Score	Percentile	Scaled Score
< 8	0.9	**3**
8	2.0	**4**
9	6.0	**5**
10	10.4	**6**
11	13.7	**7**
12	16.9	**7**
13	18.2	**7**
14	20.2	**7**
15	22.1	**8**
16	27.3	**8**
17	28.6	**8**
18	31.2	**9**
19	36.4	**9**
20	44.2	**10**
21	50.6	**10**
22	55.8	**10**
23	57.1	**11**
24	61.0	**11**
25	70.1	**12**
26	71.4	**12**
27	77.9	**12**
28	81.8	**13**
29	84.0	**13**
30	90.0	**14**

Age 4

Raw Score	Percentile	Scaled Score
< 8	0.5	**2**
8	1.1	**3**
9	2.4	**4**
10	3.6	**5**
11	6.0	**5**
12	6.6	**5**
13	7.1	**6**
14	8.3	**6**
15	9.5	**6**
16	10.7	**6**
17	13.1	**7**
18	15.5	**7**
19	17.9	**7**
20	22.6	**8**
21	29.8	**8**
22	33.3	**9**
23	38.1	**9**
24	42.9	**9**
25	46.4	**10**
26	53.6	**10**
27	57.1	**11**
28	60.7	**11**
29	67.9	**11**
30	75.0	**12**

Age 5-6

Raw Score	Percentile	Scaled Score
< 8	0.4	**2**
8	1.0	**3**
9	2.3	**4**
10	4.6	**5**
11	4.8	**5**
12	5.0	**5**
13	5.3	**5**
14	6.1	**5**
15	6.9	**6**
16	8.4	**6**
17	9.2	**6**
18	12.2	**7**
19	14.5	**7**
20	18.3	**7**
21	22.1	**8**
22	23.7	**8**
23	28.2	**8**
24	33.6	**9**
25	38.2	**9**
26	43.5	**10**
27	48.9	**10**
28	55.7	**10**
29	63.4	**11**
30	75.0	**12**

Age 7-13

Raw Score	Percentile	Scaled Score
< 10	0.1	**2**
10	0.3	**2**
11	0.8	**3**
12	1.3	**3**
13	1.8	**4**
14	2.0	**4**
15	3.0	**4**
16	3.3	**4**
17	4.3	**5**
18	4.8	**5**
19	7.3	**6**
20	13.7	**7**
21	15.2	**7**
22	15.9	**7**
23	17.0	**7**
24	18.7	**7**
25	21.0	**8**
26	25.8	**8**
27	30.9	**9**
28	36.7	**9**
29	42.5	**9**
30	75.0	**12**

Age 14-59

Raw Score	Percentile	Scaled Score
<15	0.1	**2**
15	0.2	**2**
16	0.5	**2**
17	0.6	**3**
18	0.8	**3**
19	0.9	**3**
20	1.1	**3**
21	1.2	**3**
22	2.1	**4**
23	2.7	**4**
24	3.5	**5**
25	5.3	**5**
26	8.4	**6**
27	11.7	**6**
28	15.8	**7**
29	25.1	**8**
30	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
< 15	0.50	**2**
15	0.90	**3**
16	1.10	**3**
17	1.60	**4**
18	2.10	**4**
19	2.70	**4**
20	3.30	**4**
21	3.90	**5**
22	7.79	**6**
23	9.09	**6**
24	14.29	**7**
25	19.48	**7**
26	24.68	**8**
27	31.17	**9**
28	38.96	**9**
29	49.35	**10**
30	75.00	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels . Clinically significant levels are below 7. The symbol < means all values less than the value shown.

Examiner Rating Scales (Organization/Impulse Control)

Raw Scores to Percentiles and Scaled Scores for the Examiner Rating Organization/Impulse Control Subscore Score

Age 3

Raw Score	Percentile	Scaled Score
5	1.1	**3**
6	5.2	**5**
7	10.1	**6**
8	15.3	**7**
9	19.5	**7**
10	23.4	**8**
11	24.7	**8**
12	31.2	**9**
13	32.5	**9**
14	35.1	**9**
15	37.7	**9**
16	45.5	**10**
17	55.8	**10**
18	66.2	**11**
19	71.4	**12**
20	76.6	**12**
21	81.0	**13**
22	82.5	**13**
23	84.0	**13**
24	90.0	**14**

Age 4

Raw Score	Percentile	Scaled Score
5	0.1	**2**
6	1.6	**4**
7	3.6	**5**
8	4.8	**5**
9	8.3	**6**
10	10.1	**6**
11	11.9	**6**
12	15.5	**7**
13	17.9	**7**
14	19.0	**7**
15	23.8	**8**
16	26.2	**8**
17	33.3	**9**
18	36.9	**9**
19	38.1	**9**
20	47.6	**10**
21	56.0	**10**
22	67.9	**11**
23	71.4	**12**
24	75.0	**12**

Age 5-6

Raw Score	Percentile	Scaled Score
5	0.1	**2**
6	0.1	**2**
7	1.1	**3**
8	2.0	**4**
9	3.1	**4**
10	4.6	**5**
11	8.4	**6**
12	9.9	**6**
13	11.5	**6**
14	14.5	**7**
15	16.8	**7**
16	21.4	**8**
17	25.2	**8**
18	29.8	**8**
19	35.9	**9**
20	41.2	**9**
21	46.6	**10**
22	55.0	**10**
23	62.6	**11**
24	75.0	**12**

Age 7-13

Raw Score	Percentile	Scaled Score
7	0.5	**2**
8	1.0	**3**
9	1.5	**4**
10	2.0	**4**
11	2.5	**4**
12	4.2	**5**
13	5.8	**5**
14	6.3	**5**
15	9.6	**6**
16	13.9	**7**
17	16.7	**7**
18	20.0	**7**
19	22.3	**8**
20	25.3	**8**
21	30.9	**9**
22	37.2	**9**
23	46.1	**10**
24	75.0	**12**

NOTE: Except for Age 3, Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

E.2 Appendix Examiner Rating Scales (Organization/Impulse Control)

Raw Scores to Percentiles and Scaled Scores for the Examiner Rating Organization/Impulse Control Subscore Score

Age 14-59

Raw Score	Percentile	Scaled Score
11	0.1	**2**
12	0.6	**3**
13	0.8	**3**
14	0.9	**3**
15	1.3	**3**
16	1.7	**4**
17	2.4	**4**
18	3.2	**4**
19	4.2	**5**
20	6.0	**5**
21	11.0	**6**
22	19.7	**7**
23	30.9	**9**
24	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
11	0.2	**2**
12	0.8	**3**
13	1.2	**3**
14	1.6	**4**
15	2.0	**4**
16	3.3	**4**
17	5.2	**5**
18	11.7	**6**
19	13.0	**7**
20	19.5	**7**
21	22.1	**8**
22	33.8	**9**
23	55.8	**10**
24	75.0	**12**

NOTE: Except for Age 3, Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels.

Examiner Rating Scales (Energy and Feelings)

Raw Score to Percentiles and Scales Score Conversions for Energy Subscore Score

Age 3

Raw Score	Percentile	Scaled Score
< 5	0.9	**3**
5	1.2	**3**
6	2.3	**4**
7	3.2	**4**
8	3.9	**5**
9	5.9	**5**
10	7.9	**6**
11	9.9	**6**
12	11.7	**6**
13	18.2	**7**
14	24.7	**8**
15	32.5	**9**
16	40.3	**9**
17	50.6	**10**
18	75.0	**12**

Age 4

Raw Score	Percentile	Scaled Score
< 5	0.1	**2**
5	1.1	**3**
6	2.4	**4**
7	3.0	**4**
8	3.6	**5**
9	4.8	**5**
10	7.1	**6**
11	11.9	**6**
12	13.1	**7**
13	16.7	**7**
14	20.2	**8**
15	25.0	**8**
16	33.3	**9**
17	45.2	**10**
18	75.0	**12**

Age 5-6

Raw Score	Percentile	Scaled Score
< 5	0.3	**2**
5	0.9	**3**
6	1.5	**4**
7	3.1	**4**
8	3.8	**5**
9	4.2	**5**
10	4.6	**5**
11	7.3	**6**
12	9.9	**6**
13	13.7	**7**
14	16.0	**7**
15	20.6	**8**
16	26.7	**8**
17	38.9	**9**
18	75.0	**12**

Age 7-13

Raw Score	Percentile	Scaled Score
< 8	0.8	**3**
8	1.1	**3**
9	1.4	**3**
10	1.8	**4**
11	2.0	**4**
12	6.3	**5**
13	8.9	**6**
14	11.9	**6**
15	16.5	**7**
16	20.5	**8**
17	31.9	**9**
18	75.0	**12**

Examiner Rating Scales (Energy)

Raw Score to Percentiles and Scales Score Conversions for Energy Subscore Score

Age 14-59

Raw Score	Percentile	Scaled Score
< 8	0.0	**2**
8	0.1	**2**
9	0.3	**2**
10	0.8	**3**
11	1.4	**3**
12	3.5	**5**
13	4.4	**5**
14	6.2	**5**
15	9.3	**6**
16	14.9	**7**
17	25.2	**8**
18	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
< 8	0.1	**2**
8	0.3	**2**
9	0.8	**3**
10	1.4	**3**
11	3.5	**5**
12	7.8	**6**
13	10.4	**6**
14	14.3	**7**
15	28.6	**8**
16	36.4	**9**
17	50.6	**10**
18	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels . Clinically significant levels are below 7. The symbol < means all values less than the value shown.

Examiner Rating Scales (Anxiety)

Raw Score to Percentiles and Scales Score Conversions for Anxiety Subscore Score

Age 3

Raw Score	Percentile	Scaled Score
< 5	1.0	**3**
5	1.7	**4**
6	2.1	**4**
7	2.6	**4**
8	3.3	**4**
9	3.9	**5**
10	6.5	**5**
11	11.7	**6**
12	15.6	**7**
13	20.8	**8**
14	28.6	**8**
15	31.2	**9**
16	42.9	**9**
17	62.3	**11**
18	75.0	**12**

Age 4

Raw Score	Percentile	Scaled Score
< 5	0.1	**2**
5	0.8	**3**
6	1.2	**3**
7	2.4	**4**
8	3.6	**5**
9	4.8	**5**
10	8.3	**6**
11	9.5	**6**
12	11.9	**6**
13	13.1	**7**
14	15.5	**7**
15	21.4	**8**
16	32.1	**9**
17	44.0	**10**
18	75.0	**12**

Age 5-6

Raw Score	Percentile	Scaled Score
< 5	0.1	**2**
5	0.8	**3**
6	1.2	**3**
7	1.5	**4**
8	3.4	**5**
9	5.3	**5**
10	6.1	**5**
11	6.9	**6**
12	10.7	**6**
13	13.7	**7**
14	15.3	**7**
15	21.4	**8**
16	32.1	**9**
17	41.2	**9**
18	75.0	**12**

Age 7-13

Raw Score	Percentile	Scaled Score
< 5	0.1	**2**
5	0.8	**3**
6	1.0	**3**
7	1.2	**3**
8	1.5	**4**
9	2.3	**4**
10	4.1	**5**
11	4.8	**5**
12	9.1	**6**
13	10.4	**6**
14	14.4	**7**
15	18.2	**7**
16	22.5	**8**
17	32.4	**9**
18	75.0	**12**

Age 14-59

Raw Score	Percentile	Scaled Score
< 8	0.0	**2**
8	0.2	**2**
9	0.4	**2**
10	0.5	**2**
11	0.8	**3**
12	1.8	**4**
13	2.6	**4**
14	5.0	**5**
15	7.8	**6**
16	10.5	**6**
17	19.4	**7**
18	75.0	**12**

Age 60+

Raw Score	Percentile	Scaled Score
< 8	0.1	**2**
8	0.2	**2**
9	0.5	**2**
10	1.3	**3**
11	2.6	**4**
12	5.2	**5**
13	7.8	**6**
14	15.6	**7**
15	22.1	**8**
16	32.5	**9**
17	41.6	**9**
18	75.0	**12**

NOTE. Percentiles are capped at 75 and Scaled Scores at 12 due to the large number of individuals who had perfect scores. The purpose of these scores is primarily to assess cases where individuals score at the average or lower performance levels. Therefore, the table emphasizes scores at the average or lower levels . Clinically significant levels are below 7. The symbol < means all values less than the value shown.

E.5 Appendix

Examiner Rating Scale– Cognitive/Social Composite

Raw Scores to Composite Score Conversions

Raw Score	Age Groups								Raw Score
	3	4 and 5	6 and 7	8 to 10	11 to 14	15-18	19-59	60+	
20	62	61	58	57	56	53	54	55	**20**
21	62	61	58	57	56	53	54	55	**21**
22	63	62	59	58	57	53	54	55	**22**
23	63	62	59	58	57	54	55	56	**23**
24	64	63	60	59	58	54	55	56	**24**
25	64	63	60	59	58	54	55	56	**25**
26	66	64	61	60	59	55	56	57	**26**
27	69	66	61	60	59	55	56	57	**27**
28	72	68	62	61	60	55	56	58	**28**
29	75	70	62	61	60	56	57	58	**29**
30	77	72	63	62	60	56	57	58	**30**
31	79	73	63	62	61	56	57	58	**31**
32	80	74	64	63	61	56	57	59	**32**
33	81	75	64	63	61	57	58	59	**33**
34	82	76	65	64	62	57	58	60	**34**
35	83	76	65	64	62	57	58	60	**35**
36	83	77	66	65	63	57	58	60	**36**
37	84	77	66	65	63	58	59	60	**37**
38	84	78	67	66	64	58	59	61	**38**
39	85	78	67	66	64	58	60	61	**39**
40	85	79	68	67	65	59	60	61	**40**
41	86	79	68	67	65	59	60	62	**41**
42	86	80	69	68	66	59	60	62	**42**
43	87	80	70	69	66	60	61	62	**43**
44	89	81	71	69	67	60	61	63	**44**
45	90	81	72	70	67	60	61	63	**45**
46	92	82	73	71	68	61	62	63	**46**
47	93	83	74	72	68	61	62	64	**47**
48	93	83	75	73	69	61	62	64	**48**
49	94	84	77	74	69	62	63	64	**49**
50	94	84	78	75	70	62	63	65	**50**
51	95	85	78	76	70	62	63	65	**51**
52	95	85	79	76	71	63	64	65	**52**

Raw Score	Age Groups								Raw Score
	3	4 and 5	6 and 7	8 to 10	11 to 14	15-18	19-59	60+	
53	96	86	79	77	71	63	64	66	**53**
54	96	87	80	78	72	63	64	66	**54**
55	97	88	81	79	73	64	65	67	**55**
56	98	89	82	80	74	64	65	67	**56**
57	99	89	83	81	75	65	65	68	**57**
58	100	90	84	82	76	65	66	68	**58**
59	103	90	85	83	76	66	66	69	**59**
60	105	91	86	83	77	66	67	69	**60**
61	108	92	87	84	77	67	67	70	**61**
62	110	93	88	85	78	67	68	71	**62**
63	113	94	89	86	78	68	68	73	**63**
64	115	96	90	87	79	68	69	75	**64**
65	118	98	91	88	81	69	69	77	**65**
66	120	100	92	89	82	69	70	79	**66**
67	123	103	94	90	83	70	71	80	**67**
68	125	106	96	91	84	71	71	81	**68**
69	128	109	98	92	85	71	72	82	**69**
70	130	112	100	94	86	72	74	84	**70**
71	133	115	103	96	87	74	76	87	**71**
72	135	118	106	98	88	76	78	88	**72**
73	138	121	109	100	91	78	80	90	**73**
74	140	124	112	104	94	80	85	92	**74**
75	143	127	115	108	97	85	90	96	**75**
76	145	130	118	111	100	90	95	100	**76**
77	148	133	121	115	104	95	100	105	**77**
78	150	136	124	119	108	100	105	110	**78**
79	153	139	127	123	111	105	110	115	**79**
80	155	142	130	126	115	110	115	120	**80**
81	158	145	133	130	119	115	120	125	**81**

E.6 Appendix

Examiner Rating Scale– Emotions/Regulations Composite

Raw Scores to Composite Score Conversions

Raw Score	Age Groups								Raw Score
	3	4 and 5	6 and 7	8 to 10	11 to 14	15-18	19-59	60+	
20	60	59	55	53	52	50	51	54	**20**
21	61	60	56	54	53	50	52	55	**21**
22	62	61	57	55	54	51	53	56	**22**
23	63	62	58	56	55	52	54	57	**23**
24	64	63	59	57	56	53	55	58	**24**
25	65	64	60	58	57	54	56	59	**25**
26	66	65	60	59	58	55	57	60	**26**
27	67	66	61	60	59	56	58	61	**27**
28	68	67	62	60	59	57	59	62	**28**
29	69	68	63	61	60	58	59	63	**29**
30	70	69	64	62	61	59	61	64	**30**
31	71	70	66	64	62	59	62	65	**31**
32	72	71	67	66	64	61	63	66	**32**
33	73	72	67	66	65	62	64	67	**33**
34	74	73	68	67	66	63	65	68	**34**
35	75	74	68	67	66	64	66	68	**35**
36	76	75	69	68	67	65	66	68	**36**
37	76	75	69	68	67	66	67	69	**37**
38	77	76	69	68	67	66	67	69	**38**
39	77	76	70	69	68	67	68	70	**39**
40	78	77	70	69	68	67	68	71	**40**
41	79	78	71	70	69	67	68	71	**41**
42	79	78	72	70	69	68	69	72	**42**
43	80	79	73	71	70	68	69	73	**43**
44	81	80	74	72	71	69	70	73	**44**
45	82	81	75	73	71	69	71	74	**45**
46	83	81	76	74	72	70	71	74	**46**
47	84	82	77	75	73	71	72	75	**47**
48	85	83	78	76	74	71	73	76	**48**
49	86	84	79	77	75	72	74	77	**49**
50	87	86	79	78	76	73	75	78	**50**
51	88	87	80	79	77	74	76	79	**51**
52	89	88	80	79	77	75	77	80	**52**
53	91	90	81	80	78	76	77	81	**53**
54	93	91	82	81	79	77	78	82	**54**
55	95	92	84	83	80	77	79	83	**55**
56	97	93	86	85	81	78	80	84	**56**
57	99	94	88	87	82	79	80	88	**57**
58	100	96	91	89	84	80	82	90	**58**
59	103	98	94	91	87	80	82	92	**59**
60	106	100	97	94	91	82	85	94	**60**
61	109	104	100	97	94	85	90	97	**61**
62	112	108	104	100	97	90	95	100	**62**
63	115	111	108	105	100	95	100	108	**63**
64	118	115	111	110	105	100	108	115	**64**
65	121	119	115	115	110	108	115	123	**65**
66	124	123	119	120	115	115	123	130	**66**

Appendix F

Percentile Ranks, Scaled Scores, and Normal Curve Equivalents (NCEs)

Corresponding to Composite Standardized Scores

Standard Score	Percentile Rank	Normal Curve Equivalent	Scaled Score
170			
169			
168			
167			
166			
165			
164			
163			
162			
161			
160			
159			
158			
157			
156			
155			
154			
153			
152	>99.9		20
151	>99.9		
150	>99.9		
149	>99.9		
148	99.9		
147	99.9		19
146	99.9		
145	99.9		
144	99.8		
143	99.8		
142	99.7		18
141	99.7		
140	99.6		
139	99.5		
138	99		

Standard Score	Percentile Rank	Normal Curve Equivalent	Scaled Score
137	99		17
136	99	>99	
135	99	99	
134	99	98	
133	99	96	
132	98	95	16
131	98	94	
130	98	92	
129	97	91	
128	97	89	
127	96	88	15
126	96	87	
125	95	85	
124	95	84	
123	94	82	
122	93	81	14
121	92	79	
120	91	78	
119	90	77	
118	88	75	
117	87	74	13
116	86	72	
115	84	71	
114	82	70	
113	81	68	
112	79	67	12
111	77	65	
110	75	64	
109	73	63	
108	70	61	
107	68	60	11
106	66	58	
105	63	57	
104	61	56	
103	58	54	

Standard Score	Percentile Rank	Normal Curve Equivalent	Scaled Score
102	55	53	
101	53	51	
100	50	50	10
99	47	49	
98	45	47	
97	42	46	
96	39	44	
95	37	43	9
94	34	42	
93	32	40	
92	30	39	
91	27	37	
90	25	36	8
89	23	35	
88	21	33	
87	19	32	
86	18	30	
85	16	29	7
84	14	28	
83	13	26	
82	12	25	
81	10	23	
80	9	22	6
79	8	21	
78	7	19	
77	6	18	
76	5	16	
75	5	15	5
74	4	13	
73	4	12	
72	3	11	
71	3	9	
70	2	8	4
69	2	6	
68	2	5	
67	1	4	
66	1	2	
65	1	1	3
64	1	<1	
63	1		

Standard Score	Percentile Rank	Normal Curve Equivalent	Scaled Score
62	1		
61	0.5		
60	0.4		2
59	0.3		
58	0.3		
57	0.2		
56	0.2		
55	0.1		1
54	0.1		
53	0.1		
52	0.1		
51	<0.1		
50	<0.1		0
49	<0.1		
48	<0.1		
47			
46			
45			
44			
43			
42			
41			
40			
39			
38			
37			
36			
35			
34			
33			
32			
31			
30			

G.1 Appendix

Growth Scores– Cognitive Subtests

Raw Scores to Growth Score Conversions

Sum-SCORE	Nonverbal IQ Growth	Nonverbal IQ SEM	Classification/ Analogies Growth	Classification/ Analogies SEM	Form Completion Growth	Form Completion SEM	Figure Ground Growth	Figure Ground SEM	Sequential Order Growth	Sequential Order SEM	Visual Patterns Growth	Visual Patterns SEM	Sum-SCORE
0	373	17	361	17	343	18	363	18	363	19	346	17	**0**
1	385	10	374	11	358	12	378	12	381	14	358	10	**1**
2	393	7	384	9	370	9	390	9	396	10	367	8	**2**
3	398	6	393	9	378	8	398	8	404	8	374	7	**3**
4	401	6	401	8	385	7	405	7	411	8	379	7	**4**
5	404	5	408	8	390	7	410	7	417	8	383	6	**5**
6	407	5	414	7	396	7	416	7	424	8	388	6	**6**
7	410	5	420	7	402	7	422	7	431	8	392	6	**7**
8	412	4	425	7	408	7	428	7	438	8	395	6	**8**
9	414	4	430	7	414	7	434	7	444	7	399	6	**9**
10	416	4	435	7	420	8	440	8	450	7	403	6	**10**
11	417	4	440	7	427	8	447	8	455	7	406	6	**11**
12	419	4	444	7	435	9	455	9	460	6	410	6	**12**
13	421	4	449	7	443	8	463	8	464	6	413	6	**13**
14	422	4	454	7	450	8	470	8	468	6	417	6	**14**
15	424	4	459	7	456	7	476	7	471	5	421	6	**15**
16	425	4	464	7	461	7	481	7	474	5	424	6	**16**
17	426	4	471	8	466	7	486	7	476	5	428	6	**17**
18	428	3	479	9	471	6	491	6	479	5	431	5	**18**
19	429	3	488	9	475	6	495	6	481	4	434	5	**19**
20	430	3	497	8	480	6	500	6	483	4	437	5	**20**
21	431	3	503	7	484	6	504	6	485	4	440	5	**21**
22	433	3	508	6	487	6	507	6	487	4	443	5	**22**
23	434	3	512	6	491	5	511	5	489	4	446	5	**23**
24	435	3	515	6	494	5	514	5	491	4	449	5	**24**
25	436	3	519	6	497	5	517	5	493	4	452	5	**25**
26	438	3	522	6	500	5	520	5	495	4	455	5	**26**
27	439	3	526	6	503	5	523	5	497	4	458	5	**27**
28	440	3	530	6	506	5	526	5	500	5	461	5	**28**
29	441	3	534	7	510	6	530	6	502	5	464	5	**29**
30	442	3	540	8	514	6	534	6	505	5	467	6	**30**
31	443	3	548	10	518	7	538	7	507	5	471	6	**31**
32	444	3	560	17	524	7	544	7	510	5	474	6	**32**
33	446	3			531	8	551	8	513	5	479	6	**33**
34	447	3			540	10	560	10	516	5	483	7	**34**
35	448	3			553	17	573	17	519	5	489	7	**35**
36	449	3							522	5	494	7	**36**
37	450	3							525	5	500	7	**37**
38	451	3							528	5	506	7	**38**
39	452	3							530	5	511	7	**39**
40	453	3							533	5	518	8	**40**
41	455	3							536	5	526	10	**41**
42	456	3							538	5	538	17	**42**
43	457	3							541	5			**43**
44	458	3							543	5			**44**
45	459	3							546	5			**45**
46	460	3							550	6			**46**
47	461	3							553	6			**47**
48	462	3							558	7			**48**
49	463	3							565	10			**49**
50	464	3							577	17			**50**
51	465	3											**51**
52	466	3											**52**
53	467	3											**53**
54	468	3											**54**

SEM– Standard Error of the Measurement

Sum-SCORE	Nonverbal IQ Growth	Nonverbal IQ SEM	Classification/ Analogies Growth	Classification/ Analogies SEM	Form Completion Growth	Form Completion SEM	Figure Ground Growth	Figure Ground SEM	Sequential Order Growth	Sequential Order SEM	Visual Patterns Growth	Visual Patterns SEM	Sum-SCORE
55	469	3											55
56	470	3											56
57	471	3											57
58	472	3											58
59	473	3											59
60	474	3											60
61	475	3											61
62	476	3											62
63	477	3											63
64	478	3											64
65	478	3											65
66	479	3											66
67	480	3											67
68	481	3											68
69	482	3											69
70	483	3											70
71	484	3											71
72	484	3											72
73	485	3											73
74	486	3											74
75	487	3											75
76	488	3											76
77	488	3											77
78	489	3											78
79	490	3											79
80	491	3											80
81	491	3											81
82	492	3											82
83	493	3											83
84	493	3											84
85	494	3											85
86	495	3											86
87	496	3											87
88	496	3											88
89	497	3											89
90	498	2											90
91	498	2											91
92	499	2											92
93	500	2											93
94	500	2											94
95	501	2											95
96	502	2											96
97	502	2											97
98	503	2											98
99	504	2											99
100	504	2											100
101	505	2											101
102	506	2											102
103	506	2											103
104	507	2											104
105	508	2											105
106	508	2											106
107	509	2											107
108	510	2											108
109	510	2											109

Growth Scores– Cognitive Subtests

Raw Scores to Growth Score Conversions

Sum-SCORE	Nonverbal IQ Growth	Nonverbal IQ SEM	Classification/ Analogies Growth	Classification/ Analogies SEM	Form Completion Growth	Form Completion SEM	Figure Ground Growth	Figure Ground SEM	Sequential Order Growth	Sequential Order SEM	Visual Patterns Growth	Visual Patterns SEM	Sum-SCORE
110	511	2											**110**
111	512	2											**111**
112	512	2											**112**
113	513	3											**113**
114	514	3											**114**
115	514	3											**115**
116	515	3											**116**
117	516	3											**117**
118	517	3											**118**
119	517	3											**119**
120	518	3											**120**
121	519	3											**121**
122	519	3											**122**
123	520	3											**123**
124	521	3											**124**
125	522	3											**125**
126	522	3											**126**
127	523	3											**127**
128	524	3											**128**
129	525	3											**129**
130	526	3											**130**
131	526	3											**131**
132	527	3											**132**
133	528	3											**133**
134	529	3											**134**
135	530	3											**135**
136	531	3											**136**
137	532	3											**137**
138	533	3											**138**
139	534	3											**139**
140	535	3											**140**
141	536	3											**141**
142	537	3											**142**
143	539	4											**143**
144	540	4											**144**
145	542	4											**145**
146	544	4											**146**
147	546	4											**147**
148	548	5											**148**
149	551	6											**149**
150	555	7											**150**
151	562	9											**151**
152	573	17											**152**

Growth Scores– Memory Subtests

Raw Scores to Growth Score Conversions

Sum SCORE	Nonverbal Memory Growth	Nonverbal Memory SEM	Forward Memory Growth	Forward Memory SEM	Reverse Memory Growth	Reverse Memory SEM	Sum SCORE
0	370	19	363	20	391	19	**0**
1	391	15	386	17	409	14	**1**
2	408	10	406	11	430	14	**2**
3	417	8	417	9	446	10	**3**
4	423	7	426	9	456	9	**4**
5	429	7	433	8	463	8	**5**
6	434	7	440	7	468	7	**6**
7	438	6	445	7	473	7	**7**
8	443	6	450	7	478	7	**8**
9	446	6	455	6	483	7	**9**
10	450	5	459	6	488	7	**10**
11	453	5	463	6	494	7	**11**
12	456	5	468	6	500	7	**12**
13	459	5	472	7	506	7	**13**
14	461	5	477	7	512	7	**14**
15	464	5	482	7	517	7	**15**
16	466	5	487	6	523	7	**16**
17	468	5	491	6	528	7	**17**
18	471	5	495	6	533	7	**18**
19	473	5	500	6	539	7	**19**
20	475	5	504	6	545	8	**20**
21	477	5	509	7	552	8	**21**
22	480	5	514	7	561	10	**22**
23	482	4	521	8	573	17	**23**
24	484	4	528	8			**24**
25	486	4	535	9			**25**
26	489	4	544	9			**26**
27	491	4	554	11			**27**
28	493	4	567	17			**28**
29	495	5					**29**
30	497	5					**30**
31	500	5					**31**
32	502	5					**32**
33	504	5					**33**
34	507	5					**34**
35	509	5					**35**
36	512	5					**36**
37	515	5					**37**
38	517	5					**38**
39	520	5					**39**
40	523	5					**40**
41	526	5					**41**
42	528	5					**42**
43	531	5					**43**
44	534	5					**44**
45	538	5					**45**
46	541	6					**46**
47	545	6					**47**
48	549	6					**48**
49	554	7					**49**
50	562	10					**50**
51	574	17					**51**

G.3 Appendix
Growth Scale–Item Difficulty Values
Cognitive Subtests

Sequential Order

Item	Difficulty
SO1MY1	405
SO1MY2	411
SO2LB	434
SO2MB	432
SO3LR	438
SO3MR	445
SO3SR	445
SO4A	446
SO5A	466
SO6A	468
SO6B	468
SO7B	476
SO7A	476
SO8B	495

Item	Difficulty
SO8C	496
SO8A	497
SO9C	498
SO9A	495
SO9F	495
SO9B	496
SO9D	497
SO10F	504
SO10A	501
SO10B	497
SO10E	497
SO10D	499
SO11D	507
SO11F	509

Item	Difficulty
SO11C	507
SO11E	508
SO11A	506
SO12C	512
SO12E	514
SO12B	514
SO12D	516
SO12F	516
SO13B	530
SO13C	531
SO13A	529
SO13E	531
SO13F	532
SO14C	536

Item	Difficulty
SO14D	530
SO14B	537
SO14E	532
SO14A	530
SO15B	538
SO15F	539
SO15E	541
SO15A	539
SO15D	542

Form Completion

Item	Difficulty
FC1MBs	418
FC2MRs	426
FC3A	430
FC4A	438
FC5A	434
FC5B	437
FC6A	435
FC6B	438
FC6C	445
FC7A	449

Item	Difficulty
FC7B	448
FC7C	450
FC8A	455
FC8B	461
FC8C	470
FC9B	475
FC9C	473
FC9A	475
FC10C	488
FC10B	482

Item	Difficulty
FC10A	484
FC11B	508
FC11A	496
FC11C	502
FC12B	507
FC12C	501
FC12A	507
FC13A	510
FC13C	509
FC13B	509

Item	Difficulty
FC14B	516
FC14A	516
FC14C	507
FC15B	539
FC15C	534
FC15A	536

Classification/Analogy

Item	Difficulty
CA1MY	426
CA1MR	427
CA1MB	427
CA2A	439
CA3B	446
CA3A	446
CA4A	455
CA4B	453
CA5B	463

Item	Difficulty
CA5A	461
CA6B	468
CA6A	466
CA7B	476
CA7A	475
CA8B	470
CA9B	478
CA10C	482
CA11A	482

Item	Difficulty
CA12D	494
CA13B	512
CA14B	522
CA14E	522
CA14A	519
CA15D	528
CA15E	529
CA15B	527
CA16E	526

Item	Difficulty
CA16B	526
CA16C	520
CA17A	538
CA17C	540
CA17E	543

Figure Ground

Item	Difficulty
FG1A	405
FG1B	422
FG2A	420
FG2B	420
FG2C	428
FG3A	437
FG3B	444
FG3C	452
FG4A	456

Item	Difficulty
FG4B	458
FG4C	463
FG5A	474
FG5B	480
FG5C	483
FG6A	496
FG6B	495
FG6C	502
FG7A	484

Item	Difficulty
FG7B	500
FG7C	505
FG8A	513
FG8B	510
FG8C	513
FG9A	513
FG9B	519
FG9C	527
FG10	526

Item	Difficulty
FG11	527
FG12A	516
FG12B	522
FG12C	522
FG12D	528
FG12E	539

Visual Patterns

Item	Difficulty
VP1MB	411
VP1MY	415
VP2MB	425
VP2MY	421
VP2MR	411
VP3MBt	429
VP3MBs	426
VP3MBc	430
VP4MYt	434
VP4MBs	431

Item	Difficulty
VP4MRc	429
VP5C	438
VP5B	438
VP5A	438
VP6C	449
VP6B	446
VP6A	445
VP7B	454
VP7C	454
VP7A	455
VP8C	461

Item	Difficulty
VP8B	460
VP8A	456
VP9C	468
VP9B	471
VP9A	467
VP10C	488
VP10B	488
VP10A	488
VP6A	466
VP7A	475
VP7B	473
VP8C	477

Item	Difficulty
VP8A	477
VP9A	502
VP9C	496
VP10B	515
VP10C	517
VP11D	525
VP11B	525
VP12D	524
VP12A	526

Growth Scale–Item Difficulty Values Memory Subtests

Forward Memory

Item	Difficulty
FM1	390
FM2A	422
FM2B	430
FM3A	439
FM3B	441
FM3C	455
FM3D	459

Item	Difficulty
FM4A	467
FM4B	459
FM4C	471
FM4D	474
FM5A	471
FM5B	471
FM5C	472

Item	Difficulty
FM5D	488
FM5E	506
FM5F	500
FM5G	501
FM6A	499
FM6B	502
FM6C	511

Item	Difficulty
FM6D	514
FM6E	528
FM6F	522
FM6G	537
FM6H	544
FM6I	550
FM6J	553

Reverse Memory

Item	Difficulty
RM1	426
RM2	438
RM3A	462
RM3B	473
RM3C	485

Item	Difficulty
RM4A	486
RM4B	480
RM4C	503
RM4D	493
RM5A	490
RM5B	485

Item	Difficulty
RM5C	505
RM5D	507
RM5E	521
RM5F	525
RM5G	534
RM5H	528
RM5I	533

Item	Difficulty
RM5J	540
RM5K	550
RM5L	546
RM5M	553
RM5N	557

G.5 Appendix
Growth Scale–Age Equivalents for the Cognitive Growth Scale

Age 3

Month	Core Growth
0	451
1	452
2	453
3	454
4	455
5	456
6	457
7	458
8	459
9	460
10	461
11	462

Age 4

Month	Core Growth
0	463
1	463
2	464
3	464
4	464
5	465
6	465
7	466
8	466
9	467
10	467
11	468

Age 5

Month	Core Growth
0	469
1	470
2	471
3	472
4	473
5	474
6	475
7	476
8	477
9	478
10	479
11	480

Age 6

Month	Core Growth
0	480
1	481
2	482
3	483
4	484
5	485
6	486
7	487
8	487
9	488
10	489
11	490

Age 7

Month	Core Growth
0	490
1	491
2	491
3	492
4	492
5	492
6	493
7	493
8	493
9	493
10	494
11	494

Age 8

Month	Core Growth
0	494
1	494
2	495
3	495
4	495
5	495
6	496
7	496
8	496
9	496
10	497
11	497

Age 9

Month	Core Growth
0	497
1	497
2	498
3	498
4	498
5	498
6	499
7	499
8	499
9	499
10	499
11	500

Age 10

Month	Core Growth
0	500
1	500
2	500
3	500
4	500
5	501
6	501
7	502
8	502
9	503
10	503
11	503

Age 11

Month	Core Growth
0	504
1	504
2	504
3	504
4	504
5	505
6	505
7	505
8	505
9	505
10	506
11	506

Age 12

Month	Core Growth
0	506
1	506
2	507
3	507
4	507
5	507
6	508
7	508
8	508
9	508
10	508
11	509

Age 13

Month	Core Growth
0	509
1	509
2	509
3	510
4	510
5	510
6	510
7	511
8	511
9	511
10	511
11	512

Age 14

Month	Core Growth
0	512
1	512
2	512
3	512
4	513
5	513
6	513
7	513
8	513
9	513
10	514
11	514

Age 15

Month	Core Growth
0	514
1	514
2	514
3	514
4	514
5	514
6	514
7	515
8	515
9	515
10	515
11	515

Age 16

Month	Core Growth
0	515
1	515
2	515
3	515
4	515
5	515
6	515
7	516
8	516
9	516
10	516
11	516

Age 17

Month	Core Growth
0	516
1	516
2	516
3	516
4	516
5	516
6	516
7	517
8	517
9	517
10	517
11	517

Age 18

Month	Core Growth
0	517
1	517
2	517
3	517
4	517
5	517
6	517
7	518
8	518
9	518
10	518
11	518

Age 19

Month	Core Growth
0	518
1	518
2	518
3	518
4	518
5	518
6	518
7	519
8	519
9	519
10	519
11	519

Age 20

Month	Core Growth
0	519
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

G.6 Appendix
Growth Scale–Age Equivalents for the Memory Growth Scale

Age 3

Month	Memory Growth
0	443
1	444
2	445
3	446
4	448
5	449
6	450
7	451
8	452
9	453
10	454
11	455

Age 4

Month	Memory Growth
0	456
1	457
2	458
3	459
4	460
5	460
6	461
7	462
8	463
9	464
10	464
11	465

Age 5

Month	Memory Growth
0	466
1	466
2	467
3	468
4	469
5	470
6	471
7	471
8	472
9	473
10	474
11	475

Age 6

Month	Memory Growth
0	475
1	475
2	476
3	477
4	478
5	480
6	482
7	482
8	483
9	484
10	485
11	486

Age 7

Month	Memory Growth
0	487
1	487
2	488
3	488
4	489
5	489
6	490
7	490
8	490
9	491
10	491
11	491

Age 8

Month	Memory Growth
0	491
1	491
2	492
3	492
4	492
5	493
6	493
7	493
8	494
9	494
10	495
11	495

Age 9

Month	Memory Growth
0	495
1	495
2	496
3	496
4	496
5	497
6	497
7	497
8	498
9	498
10	499
11	499

Age 10

Month	Memory Growth
0	500
1	500
2	500
3	500
4	500
5	501
6	501
7	502
8	502
9	503
10	503
11	504

Age 11

Month	Memory Growth
0	504
1	504
2	504
3	505
4	505
5	505
6	505
7	506
8	506
9	506
10	506
11	507

Age 12

Month	Memory Growth
0	507
1	507
2	507
3	507
4	508
5	508
6	508
7	508
8	508
9	509
10	509
11	509

Age 13

Month	Memory Growth
0	509
1	509
2	510
3	510
4	510
5	510
6	510
7	511
8	511
9	511
10	511
11	512

Age 14

Month	Memory Growth
0	512
1	512
2	512
3	513
4	513
5	513
6	513
7	514
8	514
9	514
10	514
11	515

Age 15

Month	Memory Growth
0	515
1	515
2	515
3	515
4	516
5	516
6	516
7	516
8	516
9	516
10	517
11	517

Age 16

Month	Memory Growth
0	517
1	517
2	517
3	518
4	518
5	518
6	518
7	519
8	519
9	519
10	519
11	520

Age 17

Month	Memory Growth
0	520
1	520
2	520
3	521
4	521
5	521
6	521
7	522
8	522
9	522
10	522
11	523

Age 18

Month	Memory Growth
0	523
1	523
2	523
3	523
4	523
5	523
6	523
7	523
8	523
9	523
10	523
11	523

Age 19

Month	Memory Growth
0	523
1	523
2	523
3	523
4	523
5	523
6	523
7	523
8	523
9	523
10	523
11	523

H.1 Appendix
IQ and Composite Score Differences

Required for Statistical Significance at the .05 Level by Age Group

	Ages 2-5	Ages 6-54	Ages 55+
Nonverbal IQ vs Nonverbal Memory	7.87	9.02	9.07
Nonverbal IQ vs Processing Speed	9.55	11.66	10.16
Nonverbal Memory vs Processing Speed	10.29	11.87	11.62

H.2 Appendix
Composite Score Differences at 3 Age Levels

Nonverbal IQ vs Nonverbal Memory and Nonverbal IQ vs Processing Speed

Ages 2-5

Score Difference	Nonverbal IQ vs. Nonverbal Memory	Nonverbal IQ vs. Processing Speed	Nonverbal Memory vs. Processing Speed
55	0.0	0.0	0.0
54	0.0	0.0	0.0
53	0.0	0.0	0.0
52	0.0	0.0	0.0
51	0.0	0.0	0.0
50	0.0	0.0	0.0
49	0.0	0.0	0.0
48	0.0	0.0	0.0
47	0.0	0.0	0.0
46	0.0	0.0	0.0
45	0.0	0.0	0.0
44	0.0	0.0	0.0
43	0.0	0.0	0.0
42	0.0	0.0	0.0
41	0.0	0.0	0.5
40	0.0	0.7	.9
39	0.0	1.1	1.8
38	0.0	1.4	2.6
37	0.0	2.1	3.5
36	0.0	2.3	4.8
35	0.0	2.5	6.1
34	0.0	2.8	6.6
33	0.0	3.5	7.0
32	0.0	4.4	7.5
31	0.0	5.3	7.9
30	0.0	6.3	8.4
29	0.8	6.7	8.8
28	1.6	7.0	10.5
27	4.0	7.8	11.4
26	4.8	8.5	12.3
25	7.1	9.2	13.2
24	7.9	9.6	15.8
23	9.5	9.9	17.5
22	12.7	10.6	19.7
21	14.3	11.3	21.9
20	15.1	14.8	24.6
19	15.9	17.6	28.1
18	19.0	22.5	32.5
17	21.4	24.6	33.3
16	24.6	31.7	38.6
15	28.6	35.2	43.0
14	31.7	41.5	43.9
13	33.3	45.8	47.4
12	35.7	50.0	49.1
11	41.3	53.5	53.5
10	46.0	59.9	58.8
9	53.2	61.3	61.4
8	58.7	64.8	64.0
7	64.3	67.6	66.7
6	73.0	70.4	71.1
5	77.8	75.4	78.9
4	82.5	77.5	83.3
3	86.5	82.4	87.7
2	91.3	87.3	93.9
1	96.8	96.5	96.5
0	100.0	100.0	100.0

Ages 6-54

Score Difference	Nonverbal IQ vs. Nonverbal Memory	Nonverbal IQ vs. Processing Speed	Nonverbal Memory vs. Processing Speed
55	0.1	0.1	0.0
54	0.1	0.1	0.0
53	0.1	0.1	0.0
52	0.2	0.2	0.0
51	0.2	0.2	0.0
50	0.2	0.2	0.1
49	0.3	0.3	0.1
48	0.3	0.4	0.2
47	0.3	0.5	0.3
46	0.3	0.7	0.4
45	0.4	0.7	0.5
44	0.4	0.8	0.6
43	0.4	0.8	0.7
42	0.5	0.8	0.8
41	0.5	1.1	0.9

Ages 6-54

Score Difference	Nonverbal IQ vs. Nonverbal Memory	Nonverbal IQ vs. Processing Speed	Nonverbal Memory vs. Processing Speed
40	0.8	1.2	1.0
39	1.1	1.3	1.1
38	1.4	1.4	1.2
37	1.5	1.7	1.3
36	1.9	2.1	2.1
35	2.1	2.5	2.2
34	2.3	2.9	2.4
33	2.4	3.5	2.8
32	3.1	4.0	3.4
31	3.9	4.4	4.6
30	4.4	5.1	4.7
29	5.1	6.6	5.8
28	6.0	7.6	6.9
27	6.6	8.8	7.6
26	7.4	10.3	9.5
25	8.9	12.0	9.9
24	10.1	13.6	12.1
23	11.5	15.7	14.2
22	13.1	18.5	14.5
21	15.0	20.8	16.6
20	16.3	22.7	17.8
19	18.1	23.9	20.7
18	20.1	26.5	23.3
17	22.4	29.2	24.6
16	26.0	32.0	28.5
15	29.4	36.3	32.7
14	33.8	39.1	34.4
13	37.6	42.8	40.0
12	41.3	47.9	42.5
11	45.8	50.9	47.7
10	49.7	55.8	52.8
9	55.4	60.7	54.0
8	59.1	64.3	60.5
7	64.7	68.6	65.6
6	69.7	72.9	71.8
5	74.4	78.8	76.6
4	80.6	82.9	78.5
3	87.0	88.1	84.4
2	91.8	93.8	91.2
1	97.5	98.3	96.1
0	100.0	100.0	100.0

Ages 55+

Score Difference	Nonverbal IQ vs. Nonverbal Memory	Nonverbal IQ vs. Processing Speed	Nonverbal Memory vs. Processing Speed
55	0.0	0.0	0.0
54	0.0	0.0	0.0
53	0.0	0.0	0.0
52	0.0	0.0	0.0

Ages 55+

Score Difference	Nonverbal IQ vs. Nonverbal Memory	Nonverbal IQ vs. Processing Speed	Nonverbal Memory vs. Processing Speed
51	0.0	0.0	0.0
50	0.0	0.0	0.0
49	0.0	0.0	0.0
48	0.0	0.0	0.0
47	0.0	0.0	0.0
46	0.0	0.0	0.0
45	0.0	0.0	0.0
44	0.0	0.0	0.0
43	0.0	0.0	0.0
42	0.0	0.0	0.0
41	0.0	0.0	0.0
40	1.5	0.1	0.2
39	1.7	0.2	0.5
38	1.8	0.3	0.9
37	2.2	0.4	1.9
36	2.6	0.5	2.8
35	3.0	0.6	3.8
34	3.4	0.7	4.7
33	3.6	0.9	5.6
32	4.1	1.3	6.1
31	4.5	1.7	6.5
30	5.4	2.1	7.2
29	6.3	2.5	7.8
28	7.2	2.8	8.4
27	8.1	3.3	9.4
26	11.7	3.7	10.3
25	13.5	4.6	12.1
24	14.7	5.6	14.0
23	15.9	6.5	15.9
22	17.1	7.9	16.4
21	19.8	9.3	16.8
20	20.7	10.2	19.6
19	23.4	12.0	21.5
18	27.0	14.8	23.4
17	32.4	17.6	25.2
16	35.1	20.4	27.1
15	37.8	25.9	34.6
14	40.5	27.8	37.0
13	46.8	31.5	39.3
12	51.4	35.2	45.8
11	55.0	39.8	47.7
10	59.5	44.4	56.1
9	65.8	51.9	57.9
8	68.5	52.8	64.5
7	75.7	59.3	67.3
6	80.2	63.9	70.1
5	82.0	70.4	81.3
4	84.7	78.7	82.2
3	89.2	84.3	87.9
2	91.0	92.6	93.5
1	99.1	98.1	98.1
0	100.0	100.0	100.0

NOTE: Differences between scores were calculated for all examinees in the standardization sample. One rule of thumb is to consider any difference amount occuring less than 5% of the time becomes a possible "clinically significant" difference in the profile and should be noted in any report of test results. In addition to this table of "frequency of differences," the user should note whether or not the differences in pairs of scores are statistically significant (See Table H1.1)

H.3 Appendix Cognitive Profile Averages and Cognitive Subtest Scaled Score Differences

for 4 Core Subtests by Age Group: Significance Values for Differences and Various Percentiles of Differences

4 Core Subtests vs. Each Subtest	Significant Difference* (.05)	1.0 1%	2.0 2%	5.0 5%	10.0 10%	25 25%
AGES 2-5						
Figure Ground	3.46	5.0	4.8	3.8	3.0	2.0
Form Completion	3.10	6.5	5.0	3.3	3.0	1.8
Classification/Analogies	3.42	5.0	4.8	3.8	3.0	2.3
Sequential Order	3.26	6.5	5.3	4.3	3.5	2.3
Visual Patterns**	4.42	7.6	6.4	5.1	3.8	2.3
AGES 6-54						
Figure Ground	3.38	6.5	5.5	4.8	4.0	2.8
Form Completion	3.32	6.5	5.8	5.0	4.3	3.0
Classification/Analogies	3.42	6.8	6.3	5.0	4.3	3.0
Sequential Order	2.99	5.8	5.3	4.5	3.8	2.8
Visual Patterns**	3.32	5.8	5.1	4.3	3.6	2.4
AGES 55+						
Figure Ground	4.08	8.3	6.3	5.8	4.8	3.8
Form Completion	4.16	7.5	7.0	5.3	4.5	3.0
Classification/Analogies	3.87	6.8	6.0	4.8	4.3	2.5
Sequential Order	3.46	7.0	6.3	4.8	4.0	2.8
Visual Patterns**	4.47	6.4	5.6	4.1	3.4	2.6

NOTE. See Chapter 6 for the formulas used to calculate these values.
* The significance level for the differences between scores was set at the traditional .05 level
**Assumes that the optional subtest, Visual Patterns, replaced one of the the other 4 core cognitive subtests

H.4 Appendix Differences Between Pairs of Core Cognitive Subtests

Required for Statistical Significance at the .05 Level by Age Group

	Figure Ground	Form Completion	Classification/A	Sequential Order	Visual Patterns
AGES 2-5					
Figure Ground					
Form Completion	2.96				
Classification/Analogies	3.36	2.9			
Sequential Order	3.16	2.66	3.1		
Visual Patterns	4.23	3.87	4.19	4.03	
AGES 6-54					
Figure Ground					
Form Completion	3.19				
Classification/Analogies	3.32	3.25			
Sequential Order	2.75	2.67	2.82		
Visual Patterns	3.16	3.09	3.22	2.63	
AGES 55+					
Figure Ground					
Form Completion	4.17				
Classification/Analogies	3.8	3.91			
Sequential Order	3.27	3.4	2.94		
Visual Patterns	4.32	4.42	4.08	3.59	

NOTE. See Chapter 6 for the methods and formulas for calculating these values. Differences between subtests in each pair are compared based on the standard errors of measurement of both scores. Only the lower triangle of comparisons among the subtests is shown because the upper triangle duplicates the lower.

Percentages of Standardization Sample Showing Amount of Scatter

H.5 Appendix

Scatter among the Core Cognitive (IQ) Subtests for 4 Age Groupings

Scatter Amount	Age 3-6	Age 7-11	Age 12-54	Age 55-75+
> 16	0.0	0.0	.2	0.0
16	0.0	0.0	.3	0.3
15	0.0	0.0	.4	.8
14	0.0	0.0	1.2	1.7
13	.3	0.5	1.9	2.5
12	.6	.8	3.3	3.3
11	1.5	2.0	5.7	5.7
10	2.7	4.8	8.5	10.7
9	5.1	10.1	14.9	17.2
8	8.4	20.2	25.4	27.9
7	12.9	28.3	37.6	40.2
6	21.6	45.5	52.9	54.1
5	39.6	63.9	67.6	66.4
4	58.9	81.6	83.5	81.1
3	77.5	88.6	93.4	91.8
2	93.7	97.0	98.0	99.2
1	99.9	99.8	99.7	99.9
0	100.0	100.0	100.0	100.0
Mean	4.2	5.4	5.9	6.0
Standard Deviation	2.3	2.3	2.6	2.7
Median	4	5	6	6

NOTE. "Scatter" is defined as the difference between the highest and lowest scaled scores for subtests being compared in a given profile--the Cognitive profile and the A/M profile. One rule of thumb is to consider any scatter occuring less than 5% of the time becomes a possible "clinically significant" difference in the profile and should be noted in any report of test results.

Differences Required for Statistical Significance

H.6 Appendix

at the .05 Level for Gains in Growth Score ("G1" from 4-subtest Core Cognitive) upon Retest ("G2") by Age Group

Age Group	Correlation of G1 and G2	R-Squared	N	Prediction Equation*	Standard Error of Estimate**	Critical Value of Gain Amount***
Ages 3 to 14	0.94	0.88	81	G2 = 1.02*G1 - 7.8	6.84	13
Ages 15 to 75+	0.85	0.72	68	G2 = 1.04*G1 - 17.0	8.75	17

NOTE. Based on test-retest data (see Chapter 6 for a full description of the retest sample)

*The raw score predition equation can be used to calculate the predicted gain in Growth Score from one time to another, using the score on Time 1 (G1) multiplied by the constant shown, with subtraction of the final constant.

** Standard error of estimation is a standardized value to reflect the degree of error in prediction G2 from G1, as calculated in SPSS v. 20.

***The critical value is the amount of gain considered to be statistically significant. Any gain greater than the value shown should be considered highly significant. The value is calculated by multiplying the standard error of estimate times 1.96, the traditional value derived from the normal curve for testing .05 level.

H.7 Appendix A/M Profile Averages and Cognitive Subtest Scaled Score Differences by Age Group

Significance Values for Differences and Various Percentiles of Differences

5 A/M Profile Core Subtests vs. Each Subtest	Significant Difference (.05)*	1%	2%	5%	10%	25%
AGES 2-5						
Attention Sustained	5.54	6.0	5.6	5.0	4.0	2.6
Forward Memory	4.33	7.5	6.8	5.8	4.8	3.0
Reverse Memory	4.73	6.6	6.2	4.6	4.2	3.0
Nonverbal Stroop Congruent Correct	4.31	6.8	6.0	4.8	4.0	2.6
Nonverbal Stroop Incongruent Correct	4.31	8.2	7.0	5.6	4.6	3.0
Nonverbal Stroop Effect	4.93	10.8	9.2	7.6	6.0	4.4
AGES 6-54						
Attention Sustained	4.56	6.6	5.4	4.2	3.6	2.6
Forward Memory	4.18	5.8	5.2	4.2	3.6	2.6
Reverse Memory	4.23	5.8	5.2	4.4	3.8	2.6
Nonverbal Stroop Congruent Correct	3.93	6.4	5.4	4.4	3.6	2.6
Nonverbal Stroop Incongruent Correct	4.14	6.6	5.0	3.8	3.0	2.2
Nonverbal Stroop Effect	4.18	10.2	9.4	7.8	6.2	4.2
AGES 55+						
Attention Sustained	4.22	6.2	4.8	3.8	3.0	2.2
Forward Memory	4.55	5.8	5.4	4.4	4.0	2.8
Reverse Memory	4.4	6.6	5.8	4.8	4.4	3.2
Nonverbal Stroop Incongruent Correct	3.68	6.0	5.4	4.8	4.0	3.2
Nonverbal Stroop Congruent Correct	4.02	5.0	4.4	4.0	3.0	2.2
Nonverbal Stroop Effect	3.86	9.2	8.0	7.0	5.6	3.6

NOTE. See Chapter 6 for the formulas used to calculate these values.
*The significance level for the differences between scores was set at the traditional .05 level

H.8 Appendix Differences Between Pairs of A/M Subtests

Required for Statistical Significance at the .05 Level by Age Group

	Attention Sustained	Forward Memory	Reverse Memory	NS Incongruent	NS Congruent	Stroop Effect
AGES 2-5						
Forward Memory	4.39					
Reverse Memory	4.72	3.52				
Nonverbal Stroop Incongruent Correct	4.38	3.04	3.5			
Nonverbal Stroop Congruent Correct	4.37	3.04	3.5	3.02		
Nonverbal Stroop Effect	4.89	3.74	4.13	3.73	3.73	
AGES 6-54						
Attention Sustained						
Forward Memory	3.76					
Reverse Memory	3.81	3.43				
Nonverbal Stroop Incongruent Correct	3.73	3.34	3.39			
Nonverbal Stroop Congruent Correct	3.54	3.12	3.18	3.08		
Nonverbal Stroop Effect	3.76	3.37	3.43	3.34	3.12	
AGES 55+						
Attention Sustained						
Forward Memory	3.89					
Reverse Memory	3.74	4.05				
Nonverbal Stroop Incongruent Correct	3.37	3.71	3.55			
Nonverbal Stroop Congruent Correct	3.03	3.41	3.23	2.8		
Nonverbal Stroop Effect	3.21	3.57	3.41	2.99	2.61	

NOTE. Only the lower triangle of comparisons among the subtests is shown because the upper triangle duplicates the lower.

Percentages of Standardization Sample

Showing Amount of Subtests Scatter among the 6 Possible A/M Scores for 4 Age Groupings:

Scatter Amount	Age 3-6	Age 7-11	Age 12-54	Age 55-75+
>18	.1	0.2	.4	0.0
18	.4	0.7	.8	0.0
17	.7	1.4	.6	0.0
16	1.4	2.0	.7	0.0
15	2.0	3.1	1.0	0.0
14	3.1	3.7	2.1	0.2
13	5.1	5.9	3.3	.8
12	7.5	8.5	5.0	1.7
11	11.6	10.1	6.9	4.2
10	13.6	14.4	11.6	13.6
9	19.0	22.0	17.3	16.1
8	24.1	29.0	23.7	24.6
7	30.3	39.4	38.5	39.8
6	44.6	53.5	54.8	56.8
5	53.7	65.4	69.0	72.0
4	66.0	80.0	82.1	88.1
3	76.9	89.3	92.4	93.2
2	84.7	94.6	98.3	96.6
1	90.8	97.5	99.3	98.3
0	100.0	100.0	100.0	100.0
Mean	5.4	6.2	6.1	6.1
Standard Deviation	3.8	3.4	2.9	2.6
Median	5	6	6	6

NOTE: "Scatter" is defined as the difference between the highest and lowest scaled scores for subtests being compared in a given profile--the Cognitive profile and the A/M profile. One rule of thumb is to consider any scatter occuring less than 5% of the time becomes a possible "clinically significant" difference in the profile and should be noted in any report of test results.

Appendix I

Subtest Intercorrelations

Ages 3-6

	CA	FC	FG	SO	VP	FM	RM	AS	NI	NS	STROOP
FC	0.42										
FG	0.37	0.46									
SO	0.19	0.32	0.24								
VP	0.10	0.37	0.13	0.33							
FM	0.26	0.20	0.27	0.18	0.16						
RM	0.26	0.21	0.20	0.32	0.21	0.41					
AS	0.35	0.27	0.26	0.22	0.17	0.21	0.38				
NI	0.07	0.07	0.01	0.16	0.28	-0.06	0.24	0.34			
NS	0.10	0.10	0.01	0.05	0.12	0.02	0.21	0.29	0.64		
Stroop	0.03	0.04	0.01	-0.14	-0.19	0.10	-0.08	-0.09	-0.54	0.29	
Mean	10.9	10.8	10.3	10.4	10.8	9.9	10.1	10.5	10.0	9.9	9.9
SD	2.6	2.2	2.5	2.5	3.3	2.7	3.4	3.2	3.6	3.2	3.1

N=148

Ages 7-11

	CA	FC	FG	SO	VP	FM	RM	AS	NI	NS	STROOP
FC	0.47										
FG	0.58	0.73									
SO	0.53	0.57	0.58								
VP	0.50	0.49	0.56	0.45							
FM	0.45	0.72	0.55	0.41	0.51						
RM	0.40	0.65	0.58	0.52	0.46	0.72					
AS	0.36	0.53	0.44	0.31	0.29	0.65	0.52				
NI	0.34	0.46	0.50	0.38	0.37	0.46	0.46	0.47			
NS	0.21	0.25	0.33	0.28	0.25	0.29	0.24	0.35	0.68		
Stroop	-0.16	-0.27	-0.24	-0.13	-0.17	-0.25	-0.31	-0.18	-0.47	0.32	
Mean	10.4	11.6	9.9	10.1	10.2	10.2	10.4	10.2	10.5	10.2	9.4
SD	3.1	4.5	3.3	3.5	3.2	3.7	3.6	4.0	3.5	3.2	3.0

N=175

Ages 12-16

	CA	FC	FG	SO	VP	FM	RM	AS	NI	NS	STROOP
FC	0.22										
FG	0.25	0.50									
SO	0.33	0.39	0.40								
VP	0.41	0.32	0.38	0.44							
FM	0.28	0.43	0.32	0.32	0.30						
RM	0.33	0.43	0.36	0.40	0.28	0.67					
AS	0.12	0.34	0.37	0.25	0.11	0.41	0.35				
NI	0.19	0.35	0.36	0.26	0.21	0.43	0.43	0.59			
NS	0.20	0.27	0.31	0.22	0.17	0.41	0.42	0.53	0.64		
Stroop	0.04	-0.06	-0.01	-0.01	-0.03	0.00	0.02	-0.03	-0.34	0.49	
Mean	10.4	11.5	10.7	10.2	10.2	10.0	10.2	9.9	10.6	10.8	10.0
SD	2.8	3.5	4.0	3.2	3.1	2.7	3.1	3.5	3.2	3.4	3.0

N=291

Ages 17-29

	CA	FC	FG	SO	VP	FM	RM	AS	NI	NS	STROOP
FC	0.25										
FG	0.38	0.48									
SO	0.45	0.39	0.59								
VP	0.35	0.35	0.47	0.48							
FM	0.27	0.36	0.38	0.37	0.23						
RM	0.38	0.36	0.36	0.44	0.27	0.59					
AS	0.20	0.25	0.32	0.20	0.18	0.23	0.32				
NI	0.32	0.35	0.36	0.40	0.33	0.40	0.51	0.52			
NS	0.23	0.31	0.33	0.40	0.27	0.35	0.47	0.51	0.73		
Stroop	-0.08	-0.02	0.00	0.04	-0.05	-0.04	0.00	0.03	-0.28	0.45	
Mean	10.7	10.3	11.2	10.6	10.9	9.7	10.4	10.1	10.4	11.4	10.9
SD	4.0	3.2	3.9	3.8	3.0	3.0	3.1	3.2	3.2	3.4	2.8

N=201

Ages 30-75+

	CA	FC	FG	SO	VP	FM	RM	AS	NI	NS	STROOP
FC	0.30										
FG	0.40	0.52									
SO	0.45	0.49	0.53								
VP	0.45	0.44	0.50	0.56							
FM	0.33	0.30	0.28	0.34	0.39						
RM	0.34	0.39	0.34	0.33	0.45	0.59					
AS	0.25	0.35	0.41	0.36	0.36	0.38	0.38				
NI	0.28	0.36	0.43	0.45	0.44	0.35	0.44	0.57			
NS	0.29	0.35	0.37	0.44	0.39	0.36	0.39	0.50	0.74		
Stroop	0.08	0.07	0.01	0.08	0.04	0.08	0.02	0.03	-0.15	0.55	
Mean	9.8	9.9	10.6	10.6	9.8	9.9	11.2	9.7	9.3	9.6	10.2
SD	3.5	3.8	4.2	3.7	3.7	3.3	3.2	2.8	3.0	3.5	2.7

N=309

Appendix J Definitions of Typical and Atypical Categories

To provide uniformity in the selection of typical and atypical subjects (ages 2-75+, called "children" for simplicity) for the Leiter-3 standardization project, the following definitions were provided. Reference is made to DSM-IV categories, but these are for reference only since criteria for the Leiter-3 project were slightly different from DSM-IV. If a DSM-IV diagnosis were available for an atypical child, the information was included on the child's record form for research purposes.

Typical Child
No indication of birth risk factors such as low birth weight, prematurity, etc., and no evidence by parents, teachers or physicians that the child has any developmental or medical disability. A child who qualifies for any of the categories below CAN NOT be included in this category.

1. Severe Speech or Language Impairment
Child has a documented communication impairment. Communication is delayed more than 1.5 standard deviations, based on age-norms from an individually--administered nationally-standardized scale of language or communication. Delays may be in any or all of the following communication domains: oral expression (syntax, morphology, and/or semantics), pragmatics (interactive language), or written language. Targeted are those children who do NOT have cognitive impairments, i.e., the child should have standardized test results showing general cognitive abilities within normal limits (above the 9th percentile or IQ greater than 79).

DSM-IV reference categories: 315.39 Phonological disorder, 315.31 Expressive Language or Mixed Expressive-Receptive Language Disorder, 309.0 Stuttering, 309.9 Communication Disorder, not otherwise specified.

2. Severe Hearing Impairment
Profound hearing loss with hearing level greater than 90 decibel level as measured by a pure tone audiogram, with examination administered by an audiologist. Any age of onset is acceptable, as is any cause or site of lesion (i.e., conductive or sensorineural hearing loss). If ears do not have the same level of hearing loss, loss must be categorized as profound in both ears.

3. Severe Motoric Delay or Deviation
The primary group of children in this sample are those with a diagnosis of cerebral palsy: severe static disorder of movement and posture that is due to a nonprogressive abnormality of the brain which occurs during the prenatal, perinatal, or postnatal period. The child may have associated handicaps such as auditory deficits, seizures, learning disabilities, feedings, speech and behavior problems, but the motor delay would be the primary impairment. Also, the child CANNOT be diagnosed with autism, emotional disorders, syndromes which cause mental retardation, or other organic brain deficits. The child should have a standardized general-cognitive or IQ score above 79, or above the 9th percentile, or have indications from parents and teachers that the child is cognitively within average ability levels compared to age peers. In addition, preferred are children who are affected bilaterally, rather than children who have "normal" development on one side (hemiplegia). If tested on a standardized scale of motor proficiency, these children would be lower than 1.5 standard deviations below the age-based mean performance.

Children with other motor disabilities such as muscular dystrophy, spina bifida, and other motor disabilities may also be included if cognitive abilities are within the limits stated above. However, clear differentiation of diagnosis or medical and behavioral descriptions must be made on the record form.

4. Traumatic Brain Injury (TBI)
The child has an acquired injury to the brain caused by an external physical force, resulting in total or partial disability or psychosocial impairment, or both, that adversely affects the child's educational and/or employment performance. Brain injury should have been established by a physician based on medical diagnosis including physical examination of neurological abnormalities, CT results, and other assessment data. As defined by DSM-IV, severe closed-head injury (the primary condition that constitutes TBI) is evaluated as the presence

of any two of the following criteria: (1) a period of unconsciousness lasting more than 5 minutes, (2) a period of posttraumatic amnesia that last more than 12 hours after the closed head injury, or (3) a new onset of seizures (or marked worsening of a pre-existing seizure disorder) that occurs within the first 6 months after the injury. The term does not apply to brain injuries that are congenital or degenerative, or brain injuries induced by birth trauma.

DSM-IV reference: Post concussional disorder.

5. Significant Cognitive Delay
The child must have documentation of ALL the following:
1. Performance of less than 2 standard deviations below the mean (i.e., < 70) on an individually administered, nationally-standardized norm-referenced scale of intelligence such as Wechsler, McCarthy, Kaufman, WJ-III or Stanford-Binet-5.
2. Concurrent deficit in adaptive behavior in at least two of the following areas: communication, self-care, home living, social-interpersonal skills, use of community resources, self-direction, functional academic skills, work, health and safety.
3. Designation by a local, county or State education agency as qualified for special services for mental retardation.

6. Attention Deficit Disorder (with or without Hyperactivity)
The child can only be included if formally diagnosed as ADD or ADHD utilizing DSM-IV diagnostic criteria for categories 314.00, 314.01 or 314.9. Additionally, the child is excluded from this category if they have been diagnosed with Schizophrenia, Mood Disorder, Anxiety Disorder, Dissociative Disorder, PDD, or Personality Disorder.

7. Gifted
The child must have documentation of BOTH the following:
1. Performance of more than 2 standard deviations above the mean (i.e., IQ or standard score > 130, with mean 100, SD 15) on a nationally standardized instrument -either individually administered (Wechsler, McCarthy, Kaufman, WJ-III, Stanford-Binet-5) or group-administered (e.g., Otis-Lennon, CogAT).

2. Official designation by local, county or State education agency as qualified for gifted/talented (or equivalent) school services.

8. and 9. Learning Disability
Although many States vary in the qualifications for learning disabilities (LD), the following criteria are most widely accepted by State and Federal agencies and form the major criteria that must be largely present for inclusion of the child in the Leiter-3 LD validity studies. (Note also that DSM-IV is largely consistent with the following, except for its emphasis on math, reading and writing only):

1. Academic achievement shows a substantial discrepancy from intellectual capacity, with both achievement and IQ measured by individually- administered nationally-standardized instruments.
2. Specific learning disabilities can be identified by discrepancies in any of 7 areas as originally defined in PL 94-142 and the IDEA legislation: mathematics calculation, mathematics reasoning, basic word reading, reading comprehension, listening comprehension, spoken or written expression.
3. Severe discrepancy is best defined by appropriate formulas derived from regression or prediction methods (e.g., as implemented in WJ-III and WIAT/WISC-IV batteries), which typically translate into a discrepancy of approximately 1.5 standard-deviation units in magnitude, or any discrepancy significant at the p =.05 level. If a related but different formula-method is employed as an official State-wide procedure, documentation of the method should be obtained and submitted with protocols.

Two research-based types of LD are needed for the Leiter-3 project:

8. Learning Disability with Verbal superior to Nonverbal/Intelligence
In addition to the criteria for LD, described above, the child shows a significant (e.g., 1.5 SD) difference

between Verbal (e.g., VIQ on WISC-IV) and Nonverbal (e.g., PIQ on WISC-IV) composite score, in favor of the Verbal score.

9. Learning Disability with Nonverbal superior to Verba/Intelligence

In addition to the criteria for LD, described above, the child shows a significant (e.g., 1.5 SD) difference between Verbal (e.g., VIQ on WISC-IV) and Nonverbal (e.g., PIQ on WISC-IV) composite score, in favor of the Nonverbal (Performance) score.

10. English as a Second Language–Spanish (ESL-Spanish)

The child has an ethnic background and/or home environment in which English is not the dominant language, AND, language dominance in Spanish has been documented by AT LEAST 2 OF THE FOLLOWING:

1. Direct observation by a bilingual educator who designates the child as Spanish dominant.
2. Evidence from a well standardized language-assessment instrument, officially sanctioned by a State or School District for ESL identification, such as the Woodcock-Munoz Language Survey (Riverside Publishers; using the Comparative Language Index demonstrating Spanish dominance) or the Language Assessment Scale (Linguametrics; showing a score less than 3). Documentation of alternative, State/District approved measures should be submitted with protocols.
3. Official designation as ESL-Spanish by a local School District, County educational agency, or State education agency.

11. English as a Second Language-Asian or Other (ESL-Asian/Other)

The child has an ethnic background and/or home environment in which English is not the dominant language, AND, language dominance in the non-English language has been documented by AT LEAST 2 OF THE FOLLOWING:

1. Direct observation by a bilingual educator who is a native speaker in the designated non-English language, who states in writing that the child is non-English dominant.
2. Official designation as ESL (any language other than Spanish) by a local, county or State education agency.
3. Official designation in school records as Asian, Eastern European, Middle-Eastern, native-speaking African, or other non-English-speaking national origin, AND report by the parent or guardian of family/child's recent immigrant status (e.g., possession by parent or guardian of a federal 11 green card") during the most recent 24 months, from a country/location known as non-English speaking.

General Guidelines in Using the Leiter-3 with Deaf/Hard of Hearing Individuals

K
Appendix

By Steven Hardy-Braz

The school or clinic based psychological assessment of deaf and hard of hearing individuals can be fraught with difficulty and some rather unique situations. A culturally respectful assessment with these individuals warrants extra attention and preparation. The use of the terms deaf and hard of hearing refer to individuals who have an educationally significant inability to hear clearly, if at all, in a psych-acoustically appropriate environment. This measured inability may be unilateral or bilateral in nature and the line between the two may vary between educational jurisdictions as well as with a given individual depending upon the accessibility of the context. While the assessment process may present additional difficulties and challenges, an appropriate assessment may be essential to comprehensively identify and support all of the developmental, learning, social, emotional, cognitive, and neuropsychological needs of a referred deaf or hard of hearing individual as well as their strengths and talents. The Leiter-3 has been developed with the goal of being an appropriate instrument that may assist psychologists in their assessments in a manner that is fair and comparable to those individuals who can hear.

Due to the inherent potential negative consequences to the individual, ethically appropriate psychological assessments of deaf and hard of hearing individuals, is best done by psychologists who are trained, qualified, and able to communicate effectively and directly in the individual's primary language (signed or spoken) or mode of communication. Examiners are strongly encouraged to be cognizant of the National Association of School Psychologists' (NASP) 2012 position paper on serving students who are deaf or hard of hearing (National Association of School Psychologists, 2012).

Due to the completely nonverbal, or non-vocal, nature of the administration of this instrument, it may prove of great use with deaf or hard of hearing individuals but examiners should be mindful that such individuals are extremely heterogeneous. Tremendous variability exists between deaf or hard of hearing individuals in regards to issues and variables which may impact an assessment's results (e.g. etiologies, degree of the inability, sound frequencies impacted, age of onset, parental hearing status and communication skills, communication history, co-morbid conditions, educational placement) (Sattler, J.M., Hardy-Braz, S.T., & Willis, J.O.,2006).

The potential of the communication difference and inability to hear masking the existence of co-morbid conditions and situations (e.g at higher risk social/emotional/ and academic struggles, language and learning issues, and at risk for abuse) necessitates that psychological assessments are to be done with these populations by examiners who are highly trained and have the skills matching the needs presented by the examinee.

Both of the previous editions of the Leiter International Performance Scale were frequently major components in a comprehensive psychological assessment of D/HH individuals. The Leiter-3 appears to continue and build upon that tradition by continuing to offer an assessment instrument containing components not found elsewhere. This affords psychologists the ability to measure critical cognitive constructs without requiring a linguistic response from the examinee. The Leiter-3 is unique in its provision of growth scores assessed nonverbally. The scores may afford examiners to measure and document the development and/or progress of a given individual over multiple assessments. This ability of the instrument may offer a unique means of measurement of change over time that is otherwise lost by other test instruments. Examiners need to be aware that although the administration of the Leiter-3 is completely non-vocal, examiners may need to be able to communicate directly with an examinee in their native language or communication modality in order to establish and maintain clinical rapport as well as to properly assess other aspects of their development and functioning. A trained, bilingual psychologist, fluent in both English or American Sign Language (ASL), may be necessary for examinees whose first language is ASL, regardless of their degree of hearing loss. If the examiner is unable to communicate directly with an examinee, a qualified professional interpreter may be used to assist in this

process. Psychologists should take the additional time to prepare, train, and debrief the interpreter as part of this assessment process. Assessments of deaf or hard of hearing individuals, when done appropriately, will require significant amounts of additional time and resources. Psychologists must remain cognizant that the presence and use of an interpreter may add complexity and a potential source of errors into all aspects of the assessment. Psychologists should not presume that the examinee is familiar and knowledgeable about the role and effective use of a professional interpreter. Training and review of roles in the beginning of the assessment process may greatly enhance a fluid administration. Examiners should note and document in their report the impact on and use of a professional interpreter for the assessment process. Examiners who are able to communicate directly with a deaf or hard of hearing examinee should note and document the effectiveness of the communication between the examiner and examinee as well as any impact on the obtained results. The Leiter-3 gestural laminate card and pantomimed movements provided in the general administration guidelines were used to collect information during the standardization process. Any alteration of or deviation from these gestures should be noted in the assessment report.

When assessing individuals who use assistive listening devices (e.g. hearing aids, cochlear implants), it is strongly recommended that the assessment is conducted in a location without any ambient noise or visual distractions. Assistive listening devices often only amplify all sounds and may thus become a source of distracting information and increased difficulty without inferring the examiner. The interaction between some lighting sources, radio transmitters, or other electronic devices may also result in perceived interference with assistive listening devices. It is strongly recommended that the examiner conducts a brief review of the assistive listening device with the examinee to confirm an appropriate level of function.

Over the course of the development of the Leiter-3, a clinical validity study of deaf and hard of hearing individuals was conducted. The results from this study, n=46 and reported in Chapter 7, did not suggest that the scores from the administration of the Leiter-3 varied significantly from those individuals in the normative sample. Due to the limited size of this study and the age ranges included, this information should not be misconstrued as representing the typical performance of all deaf or hard of hearing individuals. It should not be cited as providing "deaf/hard of hearing norms" the purpose of this limited sample was to gather data regarding the fairness of the instrument as compared to typically developing peers. While further research is beneficial to evaluate the use of the Leiter-3 amongst various subgroups within the deaf and hard of hearing communities, developmental research appears to support its appropriateness for use with these populations in a fair and comparable manner.

Equating Table for the Conversion of Leiter-R to Leiter-3 with Confidence Intervals

L
Appendix

Leiter-R Brief IQ	"Leiter-3 NV IQ"	"Confidence Interval for Leiter-3" Low	High
30	36	30	42
31	37	31	43
32	38	32	44
33	39	33	45
34	40	34	46
35	41	35	47
36	41	35	47
37	42	36	48
38	43	37	49
39	44	38	50
40	45	39	51
41	46	40	52
42	47	41	53
43	48	42	54
44	49	43	55
45	50	44	56
46	51	45	57
47	52	46	58
48	53	47	59
49	54	48	60
50	55	49	61
51	56	50	62
52	57	51	63
53	58	52	64
54	59	53	65
55	59	53	65
56	60	54	66
57	61	55	67
58	62	56	68
59	63	57	69
60	64	58	70
61	65	59	71
62	66	60	72
63	67	61	73
64	68	62	74
65	69	63	75
66	70	64	76
67	71	65	77
68	72	66	78
69	73	67	79
70	74	68	80
71	75	69	81
72	76	70	82
73	77	71	83
74	78	72	84
75	79	73	85
76	80	74	86
77	81	75	87
78	82	76	88
79	83	77	89
80	84	78	90
81	85	79	91
82	86	80	92
83	87	81	93
84	87	81	93
85	88	82	94
86	89	83	95
87	90	84	96
88	91	85	97
89	92	86	98
90	93	87	99
91	94	88	100
92	95	89	101
93	96	90	102
94	97	91	103
95	98	92	104
96	99	93	105
97	100	94	106
98	101	95	107
99	102	96	108
100	103	97	109
101	104	98	110
102	105	99	111
103	106	100	112
104	107	101	113
105	108	102	114
106	109	103	115

Leiter-R Brief IQ	"Leiter-3 NV IQ"	"Confidence Interval for Leiter-3" Low	High
107	110	104	116
108	111	105	117
109	112	106	118
110	113	107	119
111	113	107	119
112	114	108	120
113	115	109	121
114	116	110	122
115	117	111	123
116	118	112	124
117	119	113	125
118	120	114	126
119	121	115	127
120	122	116	128
121	123	117	129
122	124	118	130
123	124	118	130
124	125	119	131
125	126	120	132
126	127	121	133
127	128	122	134
128	129	123	135
129	130	124	136
130	131	125	137
131	131	125	137
132	132	126	138
133	133	127	139
134	134	128	140
135	135	129	141
136	135	129	141
137	136	130	142
138	137	131	143
139	138	132	144
140	139	133	145
141	140	134	146
142	141	135	147
143	142	136	148
144	143	137	149
145	143	137	149
146	144	138	150
147	145	139	151
148	146	140	152
149	147	141	153
150	148	142	154
151	149	143	155
152	150	144	156
153	150	144	156
154	151	145	157
155	152	146	158
156	153	147	159
157	154	148	160
158	154	148	160
159	155	149	161
160	156	150	162
161	157	151	163
162	157	151	163
163	158	152	164
164	159	153	165
165	160	154	166
166	160	154	166
167	161	155	167
168	162	156	168
169	163	157	169
170	164	158	170

NOTE. The values for Leiter-3 Nonverbal IQ were calculated from the sample of N = 60 described in Chapter 7. Equating studies included linear and equipercentile methods (see Chapter 7). Confidence interval values were calculated by adding or subtracting twice the value of the standard error of measurement for Nonverbal IQ, averaging 3.0

Appendix M

Introduction to the Rasch Model

by Kathy E. Green[1] and Gale H. Roid

Background and Assumptions of the Model

Two contrasting views of psychological testing are represented by the classical test–theory ("true–score") model and the family of item–response–theory (IRT) models. Classical test theory and some of the early work on IRT theory was reviewed in psychometric textbooks, such as Nunnally (1978), including pioneering work by L. L. Thurstone. The 1970's and 1980's brought an emergence of several key publications on IRT, such as those by Hambleton and Swaminathan (1985), Lord (1980), Rasch (1980), Woodcock and Dahl (1971), and Wright and Stone (1979). One of the most prominent IRT models, widely used in education and psychology, is the Rasch model, named for the Danish mathematician, Georg Rasch (1980). Rasch actually developed several models for use in Danish ability and achievement tests, but the "one–parameter logistic model" is the one that has found wide application and is, hence, referred to as "the Rasch model" (Wright &. Stone, 1979; Woodcock&. Johnson, 1977).

The Rasch model uses mathematical formulas to relate a person's ability to the probability of correctly answering a question or completing a task. The fundamental assumption of the Rasch model is that a single, continuous latent trait is measured by a set of items and the item responses indicate the examinee's location on that trait. Thus, the Core Cognitive subtests and the Memory portions of the Leiter-3 were scaled separately to maintain the assumption of separate traits. (Note. The Core Cogntive factors are so highly correlated that they fit the model of a unitary "super factor", and the memory factors are similarly correlated). This exact same model was used in the Leiter-R to determine Growth Scores, and has been carried over into the Leiter-3.

Another fundamental assumption of the Rasch model is that performance on a test can be predicted from two key pieces of information: the ability level of the person ("A" for Ability) and the difficulty of a given item ("D" for Difficulty). The odds of a person, with ability A, successfully passing item D can be expressed as a ratio, A/D. When ability is higher than difficulty, the odds of success are also high. When ability is low compared to item difficulty, the odds of success are low. Rasch (1980) discovered that a log transformation of the ratio resulted in an additive model: LogOdds =A- D. As Embretson (1996) has explained, this places the Rasch model in the center of fundamental measurement–employing the basic tenet of additive decomposition, in that two parameters are additively related to a third variable. Embretson (1996, p. 348) says, "In the Rasch model additive decomposition is achieved; the log odds that a person endorses or solves an item is the simple difference between his or her trait level...and the items's difficulty...." The Embretson (1996) article is very key, because it shows that the IRT models, including the Rasch, have matured to the point that they contribute "New Rules of Measurement" that are superior to the "rules" of classical test theory. For example, IRT models provide standard errors for all ability levels, rather than the sample–dependent estimates (SEMs) that apply to all scores in a particular population.

Embretson (1996) also showed that unbiased estimates of item properties can be obtained by IRT methods, even with unrepresentative samples, in contrast to classical methods which depend greatly on the characteristics of the sample. For the Rasch model, both the ability estimates and the item difficulties are calculated by computer programs, using the basic item–response data as input. For the LeiterR, the computer program was BIGSTEPS (Wright &. Linacre, 1995). Once estimated ("calibrated"), the item difficulties can be used for a variety of purposes, such as comparing scores from multiple test forms (or subtests) derived from the same item pool.

Comparison to Classical Test Theory

With classical test theory, estimation of a person's ability comes from raw scores or some conversion of a raw score, usually in reference to a given normative sample. If two subtests from a battery differ in length, their raw scores may differ dramatically. If two subtests have markedly different items, their raw scores may differ dramatically. With the Rasch model, in contrast, if all subtests are calibrated together, scores on each subset of

items can be made comparable by transforming them into "Rasch" ability scores, since all items are calibrated to the same underlying trait dimension. Thus, a person's score (estimated ability level) is not dependent on a particular set of items.

In classical test theory, interval properties of scales are achieved by selecting items that yield raw score distributions that are approximately normal (Embretson, 1996),and which can be transformed to normalized standard scores. With the Rasch model, items are calibrated and ability estimates derived from a transformation of the raw–score scale into an equal–interval Rasch scale. The units of a Rasch scale are called "logits" for "log–odds units" and are calibrated to have a midpoint of 0.0 and a range of approximately -4.0 to +4.0. These units can then be transformed in various ways, such as the "Growth Scale" used in the Leiter-3, and the "W-scale" used in the Woodcock–Johnson tests (Woodcock & Johnson, 1977; 1989). With the Growth Scale and theW-scale, logit units are multiplied by 9.1024 and have a constant added to them so that the center of the scale (500) is located at approximately the beginning of fifth grade (age 10 years, 4 months). The multiplying factor, 9.1024, is employed because it allows interpretation of the differences between item difficulties and ability estimates. For example, the difference of 20 points on the Growth Scale has special meaning. If a person's ability is 20 points higher than the difficulty of the item, there is a 90% chance that he or she will pass the item. If the ability is 20 points lower than the difficulty of the item, the chances of passing are only 10% (Note that the probabilities are in even numbers for these examples—hence the reason for choosing 9.1024 as the multiplier).

With classical test theory, the measure of an item's difficulty is the proportion of people answering it correctly in a given sample. This proportion varies with the average ability level of the group sampled. With the Rasch model, the number representing an item's difficulty (the Growth Scale Item Difficulty value in the Leiter-3), called a "logit," is on the same scale as the ability estimates, and is relatively sample independent. Thus, we could calibrate the items on the lower–ability children in a sample, then, recalibarte them on the higher–ability children, and achieve nearly the same calibrations (Wright & Stone, 1979) except for a linear displacement factor.

Benefits of the Rasch Model

As discussed previously, ability estimates for examinees can be obtained from any subset of items that have been calibrated on the same trait, using the Rasch model computer programs. Also, item–difficulty estimates are relatively invariant across different derivation samples. These benefits cannot be achieved with classical test theory without elaborate test equating and parallel–test construction (Embretson, 1996).

With the Rasch model, both the items and examinees can be measured on the same ("logit") scale. In the Leiter-3, both the item Growth Scale difficulty values and the children's Growth Scores are measured on the same "W-scale," converted from logits. As a consequence, inspection of examinee location and item location tell us which items are easy for each person and which items are difficult for each person. The meaningful interpretation of the score scale is enhanced by having the items "pegged" at locations along the scale, and, thus, the trait represented by the scale takes on enhanced meaning.

All IRT models, including Rasch, assist the test developer in designing precise measurement. Inspection of items by difficulty value allows the developer to notice multiple items at a given level, and gaps along the scale where items are missing. Measurement precision is enhanced when the examinee's ability can be "bracketed" by a few easy items on one side and a few difficult items on the other side of their ability location on the trait continuum. Because all items in a given collection (e.g., in a large battery of items) can be calibrated together, examinees can be given "tailored" subsets of items selected to match their ability level. This "tailored testing" (Lord, 1980) is the basis of modern computerized adaptive testing (Embretson, 1996). Instead of re–norming each new tailored test,

the developer is freed to assemble different tests (from the same item bank) for different persons, while maintaining comparability of scores.

The use of the Rasch model also allows us to convert raw scores into interval measures without relying on the normalization of score distributions. Because interval scales can be analyzed by a wider range of statistical methods, as compared with ordinal scales, the model allows more data–analytic options. The Rasch model further allows us to estimate a standard error for each ability level, rather than a single error of measurement for an entire test. Appendix G of the Leiter-3 Manual shows the standard error values for each Growth–Scale score in each subtest and composite on the Leiter-3. An inspection of Appendix G will reveal that the error increases as the person's score is more extreme (either very low or very high) on each subtest or composite. This essential fact of measurement—increased error of measurement when person's are extreme on the trait continuum —is emphasized more clearly with IRT models as compared to classical theory.

Since the Rasch model can be used to predict the likelihood of a person succeeding with a given item, we can observe and calculate how well the prediction fits the observed responses. Thus, as detailed in Chapter 4, "person fit" to the model can be helpful in identifying persons who have "lapses in attention" or gaps in ability. If a person of high ability misses very easy items, we are surprised and suspect carelessness, a lack of motivation, or difficulty with mechanics of the test. The methods of "person fit" and, also, "item fit" to the model, are extremely helpful to the test developer, providing methods that supplement classical item–analysis in identifying flawed items or in identifying inappropriate test–taking behavior. Also, the methods of "item fit" are employed in studying differential item functioning across gender or ethnic groups ("item bias" studies).

Further Information

For further information on the Rasch model, the reader is referred to Wright and Stone (1979), the newer editions of psychometric textbooks (e.g., Hambleton, Swaminathan &. Rogers, 1991), the review article by Embretson (1996) or other test manuals such as those of Woodcock and Johnson (1977; 1989), or Thorndike, Hagen, &. Sattler (1986), or the excellent discussion of Rasch models in Elliott (1990). Advanced treatments include those by Lord (1980), Rasch (1980), Holland&. Wainer (1993), and Linacre and Wright (1990).

Continuous Norming (CN) Methods of Calculating Test Norms

N
Appendix

Gale Roid & Richard Gorsuch

Executive Summary

With increased interest in testing and assessment in clinics, hospitals, and schools, there is a growing need for efficient methods of standardizing tests. And, for purposes of research and program evaluation, educators and researchers often need "local norms" to provide a comparative, local standard of student performance. This paper reviews the development and application of innovative methods, during the last three decades, for computerized calculation of test norms. One of the central concepts of these developments is called continuous norming (CN). CN is a variation of Continuous Parameter Estimation Methods (CPEM; Gorsuch, 2010) because it estimates parameters such as the mean, standard deviation, and skewness of test-scores within a representative sample of a population. These parameters are then used to create tables of percentiles and other normative scores. CN methods have been used in the standardization of numerous tests but often only mentioned in a brief paragraph of the technical manuals of the tests such as the Wechsler Memory Scale—(WMS-R, Wechsler, 1987 and WMS-IV, Wechsler, 2009). This paper presents a summary of CN developments over 3 decades, the computer programs for implementing CN, the essential statistical basis of the methods, references to published applications, and discusses future directions for research along with some new data on recent applications.

CN estimates the shape of test-score distributions in subgroups of subjects along a continuum of a demographic variable such as grade-level or age. Trends in the magnitudes of estimated parameters, such as means, are modeled statistically and smoothed across grade groups, for example. For published tests and local measures, percentiles of raw score distributions are derived across groups for purposes of analytic creation of standard-score normative tables. This paper reviews those methods and provides further references for interested readers.

Introduction

In recent years there has been increased attention to psychological and educational testing under various State initiatives, the No Child Left Behind Act of 2001 (Public Law 107-110), and the Individuals with Disabilities Education Improvement Act (IDEA, 2004; Public Law 108-466). Also, the efforts by the American Psychiatric Association to produce the new edition of the diagnostic guide DSM-V include many psychological assessment issues. School districts and special education departments have been confronted with the need to design testing systems, measure progress, and examine the response of students to instructional interventions. For purposes of curriculum and program evaluation, educational agencies and school districts often need "local norms" to provide a comparative, local standard of student performance.

When assessing the effectiveness of reading, for example, student performance is sometimes measured by counting the number of words read correctly (or incorrectly), and then the number of words is compared to the average obtained in a school district, state, or nation. When counting correct responses or frequencies of behaviors, the shape of the distribution of scores among a sample of students becomes important. Error counts do not often show a normal-curve distribution, for example, because many students commit few errors. Thus, developing a normative standard for some test scores may require methods of standardization and "smoothing" (elimination of small-sample irregularities) that are different from traditional methods based on large-samples and the normal curve (Salvia, Ysseldyke, & Bolt, 2007). Several new methods of computer-based norming were developed to address these issues and will be detailed here.

Brief Literature Review

The purpose of CN methods is to estimate the characteristics of variables in each of several demographic groups (e.g., age) for research or assessment applications (Gorsuch, 2005). The concept of these methods was suggested by the early work of Gorsuch, Shenanigan, & Barnard (1972) that showed major differences in reliabilities of scores from a children's locus of control measure across groups representing levels of verbal ability. In test

development, CN (Gorsuch, 1983; Roid, 1986) has been used to estimate tables of normative scores by fitting the progression of means and standard deviations of test scores across age group. The progression of mean scores by age group can be plotted, for example, and fitted to a polynomial regression curve, providing both a smooth trend line and estimated values for each age group (Roid, 1992). Additionally, if the regression provides a highly significant fit, values of each test score can be estimated to a greater degree of precision (e.g., down to days or months of age) than is usually provided by published normative tables as shown by Zachary and Gorsuch (1985). Angoff and Robertson (1987) developed a method similar to CN using the trends in test scores across the total sample of test subjects rather than the smaller age groups for the Kaufman Assessment Battery for Children (K-ABC; Kaufman & Kaufman, 1983). Other than these early publications, little published material has appeared in journal articles nor collected in one publication. For example, CN methods were used in the standardization of numerous tests but often only mentioned in a brief paragraph of the technical manuals of the tests. Therefore, most professionals remain unaware of the potential of the CN methods. Thus, there is a critical need for more discussion and updating of these methods at professional conferences and in further publications.

Designing a Normative Study

Scores on tests are interpreted in many ways such as criterion-referenced (performance compared to a defined standard or skill level) and norm-referenced (performance compared to peers) methods. The concept of a normative standard ("norm") is that an individual's test score can be interpreted by comparing his or her score to the typical scores obtained by a sample of peers. The topic of test-norm development is a large topic and only a brief description can be provided here. The reader is referred to measurement texts (e.g., Salvia, Ysseldyke, & Bolt, 2007; Gregory, 2007) or the test-development literature (e.g., Angoff, 1984; Roid, 2006; Thorndike, 1982. See Chapter 5 for a description of methods used on the Leiter-3.

Calculation of Norms: Continuous Norming

Continuous norming (CN) is a family of methods for fitting the progression of statistics such as mean or standard deviation across a continuous (or discrete) demographic variable such as age or educational level to create normative, interpretative guidelines for tests. They differ from older norming processes in that a continuous variable such as age is actually analyzed as a continuous variable (earlier procedures divided age in a set of categories). Also, CN methods use the entire cross-age sample (or the entire sample across any demographic variable such as school grade level) to calculate norms instead of within each of the many age-groups or sub-groups. This across-level approach increases the overall number of subjects, and, thus, the statistical power of the technique in comparison to conventional level by level norming. For individually-administered tests such as intelligence batteries, each age level may only have 200 subjects but have 2200 across the entire normative sample.

CN methods were first developed in a series of unpublished papers (Gorsuch, 1983; Roid, 1983; Wendler, 1983; Zachary, 1983). The purpose of CN is to estimate and model the shape of the distribution of variables such as test scores across various demographic groups. In test development, CN has been used to estimate tables of normative scores by fitting the progression of means and standard deviations or modeling the shape of distributions of test scores across age groups.

Three methods of CN will be described: a regression modeling method a smoothing method, and a "method of moments" that uses the first four moments (mean, standard deviation, skewness, and flatness or "kurtosis") of the score distribution across demographic groups. In each case, the result are percentiles derived from the smoothed, cumulative frequency distributions of raw scores which are then converted to standard scores by transformation to z-scores and its various derivatives (e.g., T scores are calculated as 10 times z plus 50).

The Regression Method

The progression of mean scores by age group can

be plotted, for example, and fitted to a polynomial regression curve, providing both a smooth trend line and estimated values for each age group (Roid, 1983, 1992). Alternatively, the shape of the test-score distributions in various age groups can be modeled using statistical methods of fitting distributions (Johnson, 1949; Johnson, Kotz, & Balakrishnan, 1995; Karian & Dudewicz, 2000). Once the distributions have been fitted, percentiles for each raw-score point can be derived at various ages. The result of these estimations is the creation of normative tables to aid in the interpretation of test results.

If CN methods provide a good fit to the data, values of each test standard score or percentile can be estimated with greater precision (e.g., for refined levels of age, such as months or weeks) than is usually provided by published normative tables. Applying CN methods to data from two intelligence tests, for example, Zachary, Paulson, and Gorsuch (1985) were able to provide more refined normative estimates for the prediction of IQ scores on the Wechsler Adult Intelligence Scale Revised Edition (WAIS-R; Wechsler1981). Other potential advantages of CN methods are (a) reducing time and resources needed to create published norm tables (Zachary & Gorsuch, 1985) or preliminary norms for local tests and trends in research variables (Gorsuch, 2005), (b) increasing statistical power and reducing data-collection costs by using the trends in an entire national sample instead of smaller sub-samples (Angoff & Robertson, 1987), (c) providing analytic methods of producing computer-based test scoring (Roid, 1986), and specialized applications such as (d) facilitating the creation of norms conditioned on demographics (e.g., intelligence scores conditioned on pre-morbid educational level in brain injury and stroke victims; Kaufman, McLean, & Reynolds, 1988).

Thus, the CN method is related to more general methods of fitting statistical distributions, a procedure that has received growing attention in many academic disciplines such as medicine, psychology, education, engineering, and management (Karian & Dudewicz, 2000). CN is also a subset of a more general approach called continuous parameter estimation (CPE; Gorsuch, 2005), that may be used to estimate the progression of parameters across demographic variables, such as trends in reliability coefficients (Gorsuch, Hennighan, & Bernard, 1972), standard errors, correlations, and other psychometric and statistical parameters.

The regression-based CN methods were first employed by Gorsuch (1983), Roid (1983), and Zachary and Gorsuch (1985). The concept of the method was suggested by the earlier work of Gorsuch, Shenanigan, & Barnard (1972) that showed major differences in reliabilities of scores from a children's locus of control measure across groups representing levels of verbal ability using a regression analysis with age and age squared as the independent variables and reliability as the dependent variable. Early versions of CN methods employed polynomial regression, principally, as a curve fitting method to estimate the progression of test-score means and standard deviations. Roid (1983) showed, for example, that the progression of mean scores for an auditory memory test (for each month of age between 5 and 13 years) was highly predictable. The multiple correlations for best fitting regression lines (using age, age-squared, and age-cubed to predict means) were .92 in the derivation sample (N = 3,465) and .90 in the cross-validation sample (N = 393). The standard deviations were less predictable (.63 derivation, .65 cross-validation).

The regression methods were applied to several published tests developed at Western Psychological Services in Los Angeles (e.g., the Shipley Institute of Living Scale, Zachary, 1986; Zachary, Paulson, & Gorsuch, 1985). Some of the early work was summarized in a review of computer technology in testing by Roid (1986). Also, methods developed independently by Angoff and Robertson (1987) are highly related to CN.

Woodcock and Mather (1989) used an innovative variation of CN regression methods to fit the means and standard deviations of W-scores (scores derived by Rasch, 1980, procedures) across age groups. Because some of the score distributions

had skewness or other differences in the upper tail (above the mean score) or lower tail of the score distribution, Woodcock and Mather plotted and modeled the progression of all standard deviations of upper-tail scores separately from the progression of standard deviations of lower-tail scores. With these methods, they were able to construct norm tables for means and percentiles for every month of age between 2 years, 0 months and 18 years, 11 months, and every year of age, 19 to 90 years. Obviously, this demonstrates the power of the CN methods to provide fine-tuned and detailed norms that fit the unique shapes of test-score distributions.

Choice of Metric for Scores

There are a variety of score types that can be calculated directly from the CN methods. These include percentiles, standard z scores (using means and standard deviations), scaled scores (e.g., Wechsler, 1991, style profile scores with mean 10 and SD 3), stanines, T-scores, IQ scores, normal-curve equivalent (NCE) scores, and many others. Table 1 shows some of these variations with the means and standard deviations of each. Most of these scores can be derived directly from a normalized z score (mean 0, SD 1) that can be derived from a normalized percentile. Software routines calculate the z scores or normal-curve percentiles and then standard scores are derived, in turn, from those basic values. With scores derived from item-response theory, such as Rasch scores, scores are "centered" at a particular value (e.g., beginning of 5th grade reading level or age 10 years 4 months) and have an "expansion factor" similar to a standard deviation to "spread the scores" with a defined increment (see Table 1).

Table 1: Various Standard-Score Metrics for Use in Continuous Norming

Type of Scale	Mean	Standard Deviation	Typical Range
z-scores	0	1.0	-4.0 to +4.0
C-scale (centiles)	5	2.0	0 to 10
Stanine	5	1.96	1 to 9
Scaled Scores	10	3.0	1 to 19 (or 0 to 20)
T-scores	50	10.0	~10 to 90
NCE	50	21.06	1 to 99
IQ scores	100	15.0 (or 16.0)	~30 to 170
SAT (ETS) scale	500	100	200 to 800
	Center	Expansion	Typical Range
Rasch W Scale	500	9.1024	400 to 600
(also SB5 Change-sensitive score and Leiter-3 Growth Score)			
Extended IQ (SB5)	100	15	10 to 225

NOTE. See McGrew and Woodcock (2001) for W score on WJ III as well as the Leiter-3 manual.See Roid (2003; Interpretive Manual) for the SB5 Change-Sensitive Score and the Extended IQ. For an early discussion of normalized scores, see Guilford and Fruchter (1978).

The Smoothing Method

The tradition of hand-smoothing test score distributions to derive standard scores by graphing has a long history (Terman & Merrill, 1937). Guilford (1965, pp. 519-524; Guilford & Fruchter, 1978, pp. 478-486) detailed the steps in using normal-probability graph paper to derive normalized T-scores, and Thorndike (1982) presented useful descriptions of score conversions, for example. Based on the author's personal experience, these methods require an excessive amount of time. Thus, computer-based methods are desirable, especially for the smoothing of test score distributions (Salvia, Ysseldyke, & Bolt, 2007) or the frequent practice of equating two or more test forms (Holland & Rubin, 1982). Cope and Kolen (1990) and Kolen (1991) compared various smoothing methods, such as cubic splines and kernel estimation, and concluded that smoothed distributions estimated the "true" population distribution more accurately than irregular observed-sample data.
In a series of unpublished studies, Roid (1989, 1992,

and 2003) developed computer programs to smooth the frequencies of each test score in each of a series of demographic groups. The programs also converted the smoothed, cumulative frequencies, and calculated normalized standard scores for use in test-score norming studies. One program, BIGNORM, written originally in FORTRAN, implemented a smoothing technique described by Angoff (1984). In this method, the observed frequencies of each raw score point within a sample are input for a computer routine that implements the Cureton and Tukey (1951) rolling-weighted average smoothing method. This smoothing method preserves the original "moments" (mean, SD, skew, etc.) of the distribution by a method that "rolls" through each successive raw score (e.g., from zero to the highest score). The method uses the frequencies of two additional raw score points (those on either side of the targeted raw score frequency to be smoothed), weights them and updates the targeted frequency. The frequencies for the five scores (the target score and two adjacent scores on each side) are weighted with the following fractional weights: -3/35, 12/35, 17/35, 12/35, and -3/35. The denominator 35 is the sum of the numerators. Near the tails of the score range (e.g., zero and perfect scores), the weights are adjusted for the absence of adjacent scores. This weighting process takes out the "bulges" and "dips" where particular raw scores are unusually frequent or infrequent due to small sample fluctuations. Once the frequencies for each raw score are smoothed, the cumulative frequency is calculated, percentiles derived, and standard scores (such as T-scores, stanines, or deviation IQs) are calculated from the smoothed percentiles. Thus, smoothing creates a more regularized distribution that appears more "smooth" on a graph than the original data, and is meant to match more closely the theoretical distribution of scores in the population (Angoff, 1984; Salvia, Ysseldyke, & Bolt, 2007).

The BIGNORM program has been used in various translations on a wide array of published tests including the Tennessee Self Concept Scale (TSCS; Roid & Fitts, 1988), and the Wechsler Intelligence Scale for Children, Third Edition (Wechsler, 1991).

The Method of Moments

Additional computer methods are needed, however, when some test scores are naturally skewed and do not fit a normal curve. The TSCS, for example, has naturally skewed distributions for some of its global scores because more individuals in the general population have a high self concept as compared to low self concept. In contrast, cognitive-ability scores, such as those on the Wechsler scales, have a nearly normal distribution. Even when a normal distribution is characteristic of an attribute like IQ, a national sample for a given age level in the standardization of the IQ scale may be only 200 people and the distribution will have minor fluctuations from the normal curve. Thus, a method of smoothing was needed that would adapt to the actual shape of the score distribution in the population.

To analyze a full range of distributions, a second program, called JSKEW, was developed by Roid (1989, 1992). The program was derived from the work on Johnson's (1949) system of frequency curves, as implemented by the Hill (1976) and Hill, Hill, and Holder (1976) algorithms. Prior to using the JSKEW program, the researcher tabulates the four moments of each test-score distribution (mean, standard deviation, skewness, and kurtosis) in each age group. Optionally, the progression of these values can be smoothed across age groups using regression or curve-fitting methods. However, experience has shown that skewness, and, particularly kurtosis (flatness of the curve), can be unstable in small samples (e.g., 50-75 cases) and difficult to smooth accurately across groups. Once the four moments have been estimated for each group, the JSKEW program employs the Johnson-curve algorithm to recreate the shape of the distribution and then produce normative standard scores (e.g., z-scores, T-scores, IQ indexes) for each raw score point.

Thus, JSKEW can estimate a series of norm tables by computer for several test scores and several groups at the same time. Roid (1992) showed, for example, that the technique could accurately reproduce skewed distributions such as various chi-square distributions. Table 2 shows the degree of accuracy measured by the absolute average difference

between the JSKEW calculations of percentiles and those from a standard statistical table (Pearson & Hartley, 1976). The less skewed or kurtotic (flat) the distribution, the better the fit to the JSKEW program, even when the standard deviation is fairly large.

Table 2: Statistical Moments of Five Chi-square Distributions and Fit Statistics for the Estimation Accuracy of the JSKEW Program

Degrees of Freedom	Mean	Standard Deviation	Skewness	Kurtosis	Average Absolute Difference
5	5	3.16	1.26	2.40	.00204
10	10	4.47	0.89	1.20	.00056
20	20	6.32	0.63	0.60	.00018
40	40	8.94	0.45	0.30	.00007
80	80	12.65	0.32	0.15	.00001

Practical use of the technique, up to the time of this paper, indicates that the method saves a significant amount of time and energy in deriving norms for tests. The limitation of the method, as with other computer-based methods of analysis, is that it cannot be used in isolation as a totally automated method. Certain values, particularly at the tails of the distributions are poorly estimated on occasion and require "hand smoothing" by the researcher. The values of the estimated percentiles at the tails of the distribution sometimes exceed the limits of the scores (e.g., less than zero; greater than 100%), and these can be easily captured and curtailed. Of course, the author recommends that any smoothing technique implemented by computer or by graphing be checked by an experienced researcher prior to use in any research or published tables.

Comparison of Cureton-Tukey and Johnson-Curve Methods

A previously unpublished study (Roid, 1992) compared the accuracy of the methods used in the BIGNORM program to those of the JSKEW program. A combined sample of raw scores (N = 3300) from two samples of the WISC-III (Wechsler, 1991) Picture Completion subtest were analyzed. The Picture Completion (PC) subtest requires the examinee to identify a missing feature of a colored drawing. The 30-item PC subtest was selected because it is a conventional sum of items correct and the frequency distribution is slightly skewed (mean raw score 19.21, standard deviation 5.42, skewness, -.65, and kurtosis +.10 in the combined sample). Three methods for estimating the cumulative frequencies of each raw score were contrasted—smoothed (Cureton-Tukey rolling weighted average), distribution fitted (Johnson curves), and unsmoothed frequencies—from the BIGNORM, JSKEW, or SPSS (unsmoothed) programs, respectively. Five random samples of 300 subjects each were drawn from the total sample of 3300, and each method applied to the raw scores. Samples of 300 are typical of individually-administered test norms at each age level, or similar to grade-level samples for local norms in school districts.

The results of the comparisons are shown in Table 3. Each of four indexes of estimation accuracy were contrasted for each sample and then averaged across the five samples. The four indexes were: (1) the average absolute difference between estimated cumulative frequencies (on N = 300) and the "true" cumulative frequency in the "population" (total sample of 3300), (2) the mean-square error (average squared discrepancies), (3) average absolute differences between estimated and true z-score transformations of the cumulative frequencies (used to provide a more precise metric for comparison), and (4) the largest discrepancy in frequencies across all 30 raw score points (as suggested by Kolen, 1991).

Table 3: Average Fit Indexes for the Unsmoothed, Cureton-Tukey, and JSKEW Cumulative Frequencies of WISC-III Picture Completion Raw Score Distributions from Five Sub-sample Replications

	Unsmoothed	Cureton Tukey	JSKEW
Mean Square Error of Difference	.00584	.00568	.00589
Average Absolute Difference	.00972	.00930	.00985
Average Standardized Difference	.14147	.12990	.15336
Maximum Difference (K-S)	.02900	.02712	.02941

NOTE: The five random replications had sample size 300 from a total sample of 3300

Table 3 shows that all methods are very closely aligned—meaning that the computerized methods reproduce the actual frequencies extremely well. Overall, the computerized methods showed about 1 percentile point discrepancy in the samples of 300, and only 3 percentile points in terms of maximum differences. The Cureton-Tukey rolling weighted average method was slightly superior in accuracy, showing the importance of smoothing when developing norms. The Johnson-curve method was slightly inferior to the other methods. However, the Johnson-curve (JSKEW program) method uses only four parameters—mean, SD, skew, and kurtosis (all available in standard statistical packages)—at each grade- or age-level to duplicate the raw distributions fairly accurately. With four parameters, continuous norming techniques can be used to study these quantities across various demographic groups and then reproduce the shapes of the raw-score distributions at each level of the demographic variable. Tables of percentile norms can then be derived from the estimated cumulative frequencies at each level. Instead of obtaining the entire frequency table for each grade level, for example, the JSKEW method requires only the four parameters, saving time and making across-grade comparisons and smoothing possible, even when score distributions are skewed or flattened in shape. Of course, the authors experience shows that caution should be taken with distributions that are extremely skewed or flat, and, in all cases, computer estimations should be inspected visually and smoothed by researchers before used in norm tables.

Published Applications of CN

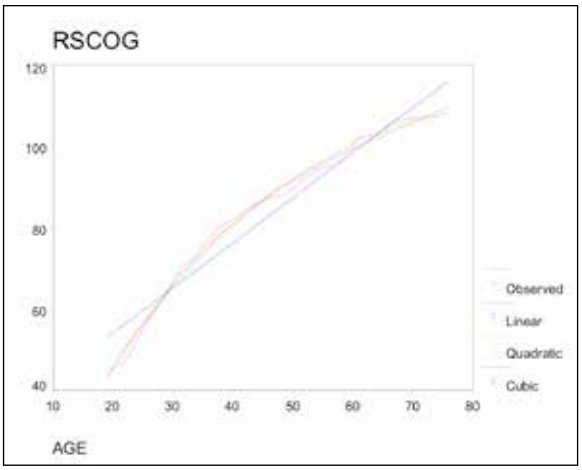
As previously mentioned, variations of the BIGNORM and JSKEW programs, and general CN methods have been applied to numerous published tests since their development in 1983. The programs are often employed during the preliminary analysis of standardization data to produce norms (i.e., not always to produce the final tables). The second edition of the Wechsler Memory Scale--Revised (WMS-R; Wechsler, 1987) was a prime candidate for CN methods because it employed 50 cases at alternating age groups (e.g., 20-24, 30-34, 40-44) rather than across the entire normative age range. Smoothing methods across groups were essential for the WMS-R. Other applications include tests published by Psychological Assessment Resources (e.g., The Pin Test, Satz, 1989; Wide Range Achievement Test, Fourth Edition, Wilkenson & Robertson, 2006). Additionally, extensive use of CN methods was applied to the nonverbal cognitive battery, the Leiter International Performance Scale—Revised (Roid & Miller, 1997) and its recent 3rd edition (Roid, Miller, Koch, & Pomplun, 2013). More recently, an Excel version of BIGNORM was used for various scores and grade-level norms for the Wide Range Achievement Test—Progress Monitoring Version (Roid & Ledbetter, 2006).

Although preliminary analyses of score distributions were analyzed by CN methods for WISC-III (Wechsler, 1991), conventional graphic and hand-smoothing methods were employed for the final tables. Similar preliminary methods were used for the norming of the Stanford-Binet Intelligence Scales, Fifth Edition (SB5; Roid, 2003), and polynomial regression methods were used in the derivation of SB5 age equivalents from age-level mean scores. CN methods were used for the recent Nonverbal Stroop Card

Sorting Test (NSCST, Koch & Roid, 2012). Also, the Canadian Supplement for the WISC-III (Wechsler, 1996; Roid & Worrall, 1997) employed CN methods in the derivation of the actual norm tables. Several tests published by ProEd of Austin, Texas, (e.g., Test of Silent Contextual Reading Fluency, TOSCRF, Hammill, Wiederholt, & Allen, 2006; Test of Memory And Learning, 2nd Edition, TOMAL2, by Reynolds & Voress, 2007) have used an adapted version of the JSKEW program to facilitate the calculation of norm tables. Table 4 and the Figure included show the use of the JSKEW program for the Merrill-Palmer Scales of Development—Revised Edition (Roid & Sampers, 2004).

Table and Figure 4: Continuous Norming Statistics for the Merrill-Palmer Developmental Scales—Revised (MP-R; Roid & Sampers, 2004), Swedish Version (Svensson, 2010): Four moments of the age-group distributions for the Cognitive score (RSCOG) and curve-fit regression using age as a predictor for continuous norming.

Center of Age	Group N-size	Mean	Standard Deviation	Kurtosis	Skewness
19	7	44.71	1.25	1.49	.74
22	5	47.20	3.96	3.50	1.80
25	16	55.44	6.47	.74	.17
28	20	61.90	7.83	.79	.27
31	19	69.47	4.60	1.13	.23
34	17	73.59	5.33	.42	1.00
37	17	79.24	6.49	.88	1.01
40	14	82.00	8.25	.27	.35
43	19	84.89	6.93	1.19	.24
46	29	87.21	7.24	.65	.29
49	22	88.09	7.46	.68	.34
52	18	92.00	6.39	.00	.37
55	13	94.69	5.68	.42	.06
58	16	95.88	6.62	.73	1.17
61	10	102.10	3.25	.05	.38
64	13	103.00	4.02	1.00	.66
67	19	106.16	2.91	3.20	1.69
70	21	106.76	1.87	.02	.69
73	17	107.12	1.87	1.14	.07
76	11	108.18	2.40	.78	.84



Tips for Developers of Local Norms

Good planning and "gearing up" with appropriate computer software are keys to successful development of local norms for tests. First, planners need to develop a "stratified random sampling plan" to collect representative examinees in the most practical and efficient way. Typical strata in such plans include age or grade-in-school, gender, ethnicity/race, and some measure of socio-economic status. In education, sampling may be done by classroom, schools, or even school districts; hence the strata may be location, size or enrollment, percentage of free lunch services, rural/urban, etc. To collect a representative sample, the percentages of examinees in each strata of the sampling plan must match the characteristics found locally. This means that planners much find demographic studies of their location to determine the "target" percentages.

Secondly, local planners must contract with someone (or find a qualified person locally) that can complete the statistical studies and programming necessary to implement the methods described previously in this report. References and copies of software for CN can be obtained by contacting Dr. Roid through the publisher (Stoelting Company, 620 Wheat Lane, Wood Dale, IL 60191, 1-800-860-9775).

Summary and Future Directions

In summary, CN methods are a family of computer-based procedures for analyzing, smoothing, and modeling test score distributions, and then converting the percentiles of these distributions into various derived scores such as T-scores, IQs, etc (see Table 1). Three general procedures were presented for analyzing normative data from a series of demographic subgroups (e.g., age- or grade-level groups) of a representative sample. The first procedure employed polynomial regression to fit the progression of means, standard deviations, and other statistics, for purposes of estimating smoothed parameters used later to derive normative scores. The second procedure applied statistical smoothing techniques to the raw-score frequencies of test scores. And, the final procedure, estimated the four moments of the score distributions in each demographic subgroup (means, standard deviations, skewness, and kurtosis) to reproduce the score distribution for purposes of deriving percentiles and other normative scores for each group. Several examples were presented of the wide application of these procedures "behind the scenes" of many significant test development projects since 1983. Little published material has yet to be released or collected in one publication, however, and, therefore, most professionals remain unaware of the potential of the CN methods.

There are potentially many more procedures and approaches to smoothing and deriving norms for tests that can be applied to test scores (Kolen, 1991; Karian & Dudewicz, 2000) that were not included in this study that have not yet been widely distributed to test developers. Kolen (1991), for example, suggested the use of log-linear methods (maximum likelihood) of estimation. Also, new technologies of scale development (Embretson & Hershberger, 1999; Roid & Woodcock, 2000) are emerging through the further development of item response theory (Lord, 1980; Rasch, 1980) that provide "continuous scaling" across groups, and, thus, provide an alternative to early statistical methods of CN. Statisticians such as Karian and Dudewicz (2000) have recently showed increased interest in the fitting of distributions and they suggest methods such as the generalized lambda family of distributions (Ramberg & Schmeiser, 1974) and generalized bootstrap methods. Such methods have not seen wide application in the test industry at this point in time.

Footnote 1

This Appendix is a revision and augmentation of previous papers presented at the National Council on Measurement in Education, San Francisco, March, 1992, at the annual meetings of the American Psychological Association (APA), Toronto, Canada, August, 2003, and APA, San Diego, August, 2010.

Contact Dr. Roid through the publisher, Stoelting Company, 620 Wheat Lane, Wood Dale, IL 60191, 1-800-860-9775 for more information about the availability of the computer programs described here.

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