

# **Scoring Notebook for the CIFASD Neurobehavioral Test Battery**

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Version 2.0

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\* The listed page numbers are for the items on this Table of Contents only. It is suggested that you use these pages along with photocopies of the pages listed in the text from the actual manuals (i.e. norm charts and tables) to gain the most benefit from this scoring notebook. The photocopied pages should follow the pages above (see ScoringNotebookWithNorms.PDF on the website) and be placed in a three-ring binder with tab dividers separating out each test.

### CIFASD Test Packet Cover Sheet Instructions

**Child's Name:** Enter the child's first name and last name initial(s). Ex. Jill V.V.

**ID#:** Enter your site code and the subject number. Ex. SMS2

(San Diego's site code and a 2 for the second child being tested at this site.)

Please contact Sarah Mattson if you do not know your site's code.

**Sex:** Circle the appropriate sex of the child.

Ex. MALE   FEMALE

**Handedness:** Circle the appropriate handedness of the child for writing skills primarily.

Ask the child their handedness and observe which hand they hold a pencil with. For mixed handedness you will have to observe the child throughout the session and evaluate after looking at all of the subtests. This should also become clear after completing the Edinburgh Handedness scale. Use this handedness as the dominant hand for skills like the Grooved Pegboard. Note which hand the child uses on each test.

RIGHT  LEFT  MIXED

**Grade:** Enter the grade that the child is currently enrolled in or the grade they have just completed if the child is being tested during a time when school is out of session.

Ex. 4<sup>th</sup>  Currently Attending  Just Completed

**Calculating the child's age at time of testing:** This is to be completed per session if needed. Enter in the date of testing and the child's date of birth in the order labeled (Year then Month then Day). Subtract the date of birth from the date of testing. Ex. All months are assumed to have 30 days for the purpose of this calculation.

Session 1:                      Year /Month/ Day

03 / 10 / 22 / 37

Date of Testing:            04 / 11 / 07 (Date of testing = November 7, 2004)

Date of Birth:                94 / 12 / 22 (Child's date of birth = December 22, 1994)

Age at Testing:             09 / 10 / 15 (Child's age = 9 yrs., 10 mos. and 15 days)

**Age Calculation Explanation:** Since you cannot subtract 22 from 7 you need to borrow a months worth of days (30 days) from the month column so that you now subtract 22 from 37 (7+30) to equal 15 days. Likewise, you will need to borrow a year's worth of months (12) to add to the month column so that you can subtract 12 from 22 (10+12) to equal 10 months. Lastly, you will subtract 1994 from 2003 to establish that the child is 9 years, 10 months and 15 days old.

**Medications & Dosage:** *It is preferred for CIFASD testing that the child is **not** taking any **stimulant** medications on the day of testing; however, this is not an exclusionary criterion for participation.* Ask the child and then verify with a parent/caretaker the medications and dosages that the child is currently taking and be sure to indicate which the child has taken that day prior to your testing session. Circle whether or not the medications were already taken today. If not all listed were taken yet, circle those that were taken.

**Start Time, End Time & Total Time:** Write in the time that you start the session and the time that you end the session. Then calculate the total time in both hours and minutes and minutes only. Ex. Total Time = 5 hours 33 minutes = 333 minutes

**Session 2:** If for some reason all tests could not be completed in one session, please provide the information requested for the second session and be sure to recalculate the child's age for the new date of testing.

**Monthly Conversion Chart:**

Below is a chart that illustrates the decimal equivalents for the number of months. Each decimal is based on the simple equation of X (where X = the number of months) divided by 12 (the number of months in a year). For example, if the child's age is 9 years, 10 months and 15 days, the child is 9.833. You will need to verify the child's age in the decimal format on the CIFASD Access databases.

<b>MONTH CONVERSION CHART</b>		
<u># of Months</u>	=	<u>Decimal</u>
1	=	0.083
2	=	0.167
3	=	0.250
4	=	0.333
5	=	0.417
6	=	0.500
7	=	0.583
8	=	0.667
9	=	0.750
10	=	0.833
11	=	0.917



### **CIFASD Global IDs**

\*\*\*Please read this thoroughly and pass along this information to ALL personnel at your site working on the CIFASD project. This information applies to ALL components of the CIFASD project.\*\*\* This information was sent in an e-mail to all on the CIFASD Neurobehavioral Core ListServ on 1/18/06.

It is essential that everyone use ONLY Global IDs as the IDs for all CIFASD neurobehavioral testing, 3-D photos, dysmorphology exams and alcohol consumption inventories. The Global ID contains your site code (available on the website) which is a combination of 3 capital letters with no spaces in between (i.e. ABC not abc or A B C) and the number of the subject with no spaces or leading zeros\* (i.e. ABC1 not ABC 1 or ABC0001). Each subject is to have only one Global ID unique to them across all components of the CIFASD project.

If you've already uploaded data for any component and you have used more than one global ID for the same subject (i.e. ABC1 and ABC0001), please contact the informatics core (cifasdic@iu.edu).

\*There is one exception to this formatting and it is as follows: If you have already uploaded your CIFASD dysmorphology exams to the CIFASD Dysmorphology Access Database and have used Global IDs with leading zeroes (i.e. ABC0001), keep the Global IDs in this format for all other components.

## Edinburgh Handedness

Assign a value to each hand per item using the guidelines listed here:

In each column, indicate 0 (never), 1 (sometimes) or 2 (always). If the child never uses the non-preferred hand, enter 2 for the preferred hand and 0 for the non-preferred; if the child sometimes uses the non-preferred hand, enter 1 for the preferred and 0 for the non-preferred; and if the child uses hands interchangeably enter 1 and 1. If the child responds "I don't know" for an item, draw a dash (-) in the columns and do not include this item in the totals.

Use the following equation to calculate the Edinburgh Score:

$$\text{Edinburgh Score} = (\text{R Total} - \text{L Total}) \underline{\hspace{1cm}} / (\text{R Total} + \text{L Total}) \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$$

So, what does this score mean?

This test is essentially measuring the strength of dominance for the child's most preferred hand. Please remember that preferred does not always equal dominant on this task.

A score of one means the child is 100% **right**-hand dominant (they always use their right and never use their left for all of the items) and a score of negative one means the child is 100% **left**-hand dominant. A score of zero would indicate the child is ambidextrous based on the results of this questionnaire with an equal strength on both hands. **Do NOT modify this equation** for left-handed children. We will be able to recognize those children that prefer their left hand as their score will be negative.

Scores in between indicate the strength of the child's preferred handedness. For example, a sample score of .667 would indicate that this individual preferred their right hand to their left more often than not or a 67% strength of the right hand.

## Leiter-R Brief IQ

It should be noted that each response (card) is scored, not just the complete sequence. In other words, partial completion of a sequence is credited for most subtests.

Subtest Raw Scores: Count up the correct score responses (the number of circled card letters) on the response form and list the total on the response blank for that item. Note: For Figure Ground (FG), each card has its own 1 or 0 score blank as do portions of some of the other subtests. Award full credit for all non-administered items prior to the starting point for this child if the training item/start item receives full credit. Be mindful of the discontinue (stop rule) and remember that for the Leiter-R, it is the number of cumulative responses failed NOT consecutive. Check to be sure the correct starting point, reversal (if needed) and discontinue were followed by the examiner.

Leiter-R Brief IQ: Transfer the raw score totals for each subtest and use the Leiter-R Brief IQ calculation area on the bottom of the Leiter-R RP test packet page (see example below) to calculate the child's Leiter-R Brief IQ. Locate the correct table by finding the child's age and convert the raw score totals for each of the four subtests (FG, FC, SO and RP) to scaled scores by using the tables on pages A-13 to A-27 of the Leiter-R Examiner's Manual. Take the total of the scaled scores for these four subtests and use the table on page D-2 to convert this scaled score total to the appropriate IQ equivalent. Use pages K-1 & K-2 to determine the appropriate percentile rank for the standard score (which is the IQ). Use page E-15 to calculate the confidence interval. (Confidence interval example: If a child is 9 years old and has a Leiter-R Brief IQ score of 88, the confidence interval is 78 to 98.)

<b>Leiter-R Brief IQ:</b>	Raw	SS	
Figure Ground:	_____	_____	
Form Completion:	_____	_____	
Sequential Order:	_____	_____	
Repeated Patterns:	_____	_____	
*Brief IQ:	SS Total	_____	IQ _____ % _____ C.I.@95%_____

The following pages from the Leiter-R manual should be photocopied and placed in the order below following this cover page as they provide the normative data: A-13 to A-27, D-2, K-1 to K-2, E-15 and page 104.

**Table A-25**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 7 Years, 0 Months Through 7 Years, 2 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-8	-	0-8	0-19	0-3	0-4	-	-	0	-	1
2	9	-	9-10	20-22	4	5-6	-	-	1	-	2
3	10	-	11-12	23-24	5	7-8	-	-	2	-	3
4	11	0	13-14	25-26	6	9-10	-	-	-	-	4
5	12	1	15-16	27	7	11-12	-	-	3	-	5
6	13	2-3	17-18	28	8	13	-	-	-	-	6
7	14	4	19-20	29	9	14	-	-	4	-	7
8	15	5	21-22	30	10-12	15	-	-	-	-	8
9	16	6	23-24	-	13-18	16	-	-	5	-	9
10	17	7	25-26	31	19-23	17	-	-	6	-	10
11	18	8	27-28	32	24-27	18	-	-	-	-	11
12	19-20	9-10	29	33	28-30	19-20	-	-	7	-	12
13	21	11-12	30	34	31-32	21-22	-	-	8	-	13
14	22	13-14	31	35	33-34	23-24	-	-	-	-	14
15	23	15-17	32	-	35-38	25-26	-	-	9	-	15
16	24	18-20	33	-	39-41	27	-	-	10	-	16
17	25	21-23	34	-	42-44	-	-	-	11	-	17
18	26-27	24-26	35-36	-	45-47	-	-	-	12	-	18
19	28-31	27-38	-	-	-	-	-	-	13-26	-	19

**Table A-26**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 7 Years, 3 Months Through 7 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-9	-	0-8	0-22	0-4	0-6	-	-	0	-	1
2	10	-	9-10	23-24	5	7-8	-	-	1	-	2
3	11	-	11-12	25-26	6	9-10	-	-	2	-	3
4	12	0	13-14	27	7	11-12	-	-	-	-	4
5	13	1	15-16	28	8	13	-	-	3	-	5
6	14	2-3	17-18	29	9	14	-	-	-	-	6
7	15	4	19-20	30	10-12	15	-	-	4	-	7
8	16	5	21-22	-	13-18	16	-	-	-	-	8
9	17	6	23-24	31	19-23	17	-	-	5	-	9
10	18	7	25-26	32	24-27	18	-	-	6	-	10
11	19-20	8	27-28	33	28-30	19	-	-	-	-	11
12	21	9-10	29-30	34	31-32	20	-	-	7	-	12
13	22	11-12	31	-	33-34	21-22	-	-	8	-	13
14	23	13-14	32	35	35-36	23-24	-	-	9	-	14
15	24	15-17	33	-	37-38	25-26	-	-	-	-	15
16	25	18-20	34	-	39-41	27	-	-	10	-	16
17	26	21-23	35	-	42-44	-	-	-	11	-	17
18	27	24-26	36	-	45-47	-	-	-	12	-	18
19	28-31	27-38	-	-	-	-	-	-	13-26	-	19

**Table A-27**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 7 Years, 6 Months Through 7 Years, 8 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-9	-	0-8	0-22	0-4	0-6	-	-	0	-	1
2	10	-	9-10	23-24	5	7-8	-	-	1	-	2
3	11	-	11-12	25-26	6	9-10	-	-	2	-	3
4	12	0	13-14	27	7	11-12	-	-	-	-	4
5	13	1	15-16	28	8	13	-	-	3	-	5
6	14	2-3	17-18	29	9	14	-	-	-	-	6
7	15	4	19-20	30	10-12	15	-	-	4	-	7
8	16	5	21-22	-	13-18	16	-	-	-	-	8
9	17	6	23-24	31	19-23	17	-	-	5	-	9
10	18	7	25-26	32	24-27	18	-	-	6	-	10
11	19-20	8	27-28	33	28-30	19	-	-	-	-	11
12	21	9-10	29-30	34	31-32	20	-	-	7	-	12
13	22	11-12	31	-	33-34	21-22	-	-	8	-	13
14	23	13-14	32	35	35-36	23-24	-	-	9	-	14
15	24	15-17	33	-	37-38	25-26	-	-	-	-	15
16	25	18-20	34	-	39-41	27	-	-	10	-	16
17	26	21-23	35	-	42-44	-	-	-	11	-	17
18	27	24-26	36	-	45-47	-	-	-	12	-	18
19	28-31	27-38	-	-	-	-	-	-	13-26	-	19

**Table A-28**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 7 Years, 9 Months Through 7 Years, 11 Months

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

**Table A-29**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 0 Months Through 8 Years, 2 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-10	-	0-10	0-22	0-5	0-7	-	-	0-1	-	1
2	11	-	11-12	23-24	6	8-9	-	-	2	-	2
3	12	0	13-14	25-26	7	10-11	-	-	-	-	3
4	13	1	15-16	27	8-9	12-13	-	-	3	-	4
5	14	2-3	17-18	28	10-12	14	-	-	-	-	5
6	15	4-5	19-20	29	13-16	15	-	-	4	-	6
7	16	6	21-22	30	17-20	16	-	-	-	-	7
8	17	7	23-24	31	21-24	17	-	-	5	-	8
9	18	8	25-26	32	25-27	18	-	-	6	-	9
10	19-20	9	27-28	33	28-30	19	-	-	-	-	10
11	21	10-11	29-30	-	31-33	20	-	-	7	-	11
12	22	12-13	31	34	34-36	21-22	-	-	8	-	12
13	23	14-16	32	35	37-38	23	-	-	9	-	13
14	24-25	17-18	33	-	39-40	24-25	-	-	-	-	14
15	26	19-20	34	-	41-42	26	-	-	10	-	15
16	27	21-23	35	-	43-44	27	-	-	11	-	16
17	28	24-26	36	-	45-46	-	-	-	12	-	17
18	29-30	27-32	-	-	47	-	-	-	13-14	-	18
19	31	33-38	-	-	-	-	-	-	15-26	-	19

**Table A-30**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 3 Months Through 8 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	-	0-11	0-22	0-6	0-7	-	-	0-1	-	1
2	12	0	12-13	23-24	7	8-9	-	-	2	-	2
3	13	1	14-15	25-26	8-9	10-11	-	-	3	-	3
4	14	2-3	16-17	27	10-12	12-13	-	-	-	-	4
5	15	4-5	18-19	28	13-16	14	-	-	4	-	5
6	16	6	20-21	29	17-20	15	-	-	-	-	6
7	17	7	22-23	30	21-24	16	-	-	5	-	7
8	18	8	24-25	31	25-27	17	-	-	-	-	8
9	19	9	26-27	32	28-30	18	-	-	6	-	9
10	20-21	10-11	28-29	33	31-33	19-20	-	-	-	-	10
11	22	12-13	30-31	-	34-36	21	-	-	7	-	11
12	23	14-16	32	34	37-38	22	-	-	8	-	12
13	24-25	17-18	33	35	39-40	23	-	-	9	-	13
14	26	19-20	34	-	41-42	24-25	-	-	10	-	14
15	27	21-23	-	-	43-44	26	-	-	11	-	15
16	28	24-26	35	-	45	27	-	-	12	-	16
17	29	27-29	36	-	46	-	-	-	13	-	17
18	30	30-32	-	-	47	-	-	-	14	-	18
19	31	33-38	-	-	-	-	-	-	15-26	-	19

**Appendix A**

**Table A-31**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 6 Months Through 8 Years, 8 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	-	0-11	0-22	0-6	0-7	-	-	0-1	-	1
2	12	0	12-13	23-24	7	8-9	-	-	2	-	2
3	13	1	14-15	25-26	8-9	10-11	-	-	3	-	3
4	14	2-3	16-17	27	10-12	12-13	-	-	-	-	4
5	15	4-5	18-19	28	13-16	14	-	-	4	-	5
6	16	6	20-21	29	17-20	15	-	-	-	-	6
7	17	7	22-23	30	21-24	16	-	-	5	-	7
8	18	8	24-25	31	25-27	17	-	-	-	-	8
9	19	9	26-27	32	28-30	18	-	-	6	-	9
10	20-21	10-11	28-29	33	31-33	19-20	-	-	-	-	10
11	22	12-13	30-31	-	34-36	21	-	-	7	-	11
12	23	14-16	32	34	37-38	22	-	-	8	-	12
13	24-25	17-18	33	35	39-40	23	-	-	9	-	13
14	26	19-20	34	-	41-42	24-25	-	-	10	-	14
15	27	21-23	-	-	43-44	26	-	-	11	-	15
16	28	24-26	35	-	45	27	-	-	12	-	16
17	29	27-29	36	-	46	-	-	-	13	-	17
18	30	30-32	-	-	47	-	-	-	14	-	18
19	31	33-38	-	-	-	-	-	-	15-26	-	19

**Table A-32**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 9 Months Through 8 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	-	0-11	0-22	0-6	0-7	-	-	0-1	-	1
2	12	0-1	12-13	23-25	7-8	8-9	-	-	2	-	2
3	13	2	14-15	26-27	9	10-11	-	-	3	-	3
4	14	3	16-17	28	10-12	12-13	-	-	-	-	4
5	15	4-5	18-19	29	13-16	14	-	-	4	-	5
6	16	6	20-21	30	17-20	15	-	-	-	-	6
7	17	7	22-23	31	21-24	16	-	-	5	-	7
8	18	8	24-25	32	25-27	17	-	-	-	-	8
9	19	9-10	26-27	33	28-30	18	-	-	6	-	9
10	20-21	11	28-29	-	31-33	19-20	-	-	-	-	10
11	22	12-13	30-31	34	34-36	21	-	-	7	-	11
12	23	14-16	32	-	37-38	22	-	-	8	-	12
13	24-25	17-18	33	35	39-40	23	-	-	9	-	13
14	26	19-20	34	-	41-42	24-25	-	-	10	-	14
15	27	21-23	35	-	43-44	26	-	-	11-12	-	15
16	28	24-26	-	-	45	27	-	-	13	-	16
17	29	27-29	36	-	46	-	-	-	14	-	17
18	30	30-32	-	-	47	-	-	-	15	-	18
19	31	33-38	-	-	-	-	-	-	16-26	-	19

**Table A-33**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 0 Months Through 9 Years, 2 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	0-1	0-11	0-25	0-8	0-8	-	-	0-1	-	1
2	12	2	12-13	26-27	9	9-10	-	-	2	-	2
3	13	3	14-15	28	10-11	11-12	-	-	3	-	3
4	14	4	16-17	29	12-14	13	-	-	-	-	4
5	15-16	5-6	18-19	30	15-17	14	-	-	4	-	5
6	17	7	20-21	31	18-21	15	-	-	-	-	6
7	18	8	22-23	32	22-25	16	-	-	5	-	7
8	19	9-10	24-26	33	26-29	17	-	-	-	-	8
9	20-21	11	27-28	-	30-32	18-19	-	-	6	-	9
10	22	12-13	29-31	34	33-35	20-21	-	-	7	-	10
11	23	14-15	32	-	36-37	22	-	-	8	-	11
12	24-25	16-17	33	-	38-39	23	-	-	9	-	12
13	26	18-20	34	35	40-41	24	-	-	10	-	13
14	27	21-23	35	-	42-43	25-26	-	-	11-12	-	14
15	28	24-26	-	-	44	27	-	-	13	-	15
16	29	27-29	36	-	45	-	-	-	14	-	16
17	30	30-32	-	-	46	-	-	-	15	-	17
18	31	33-35	-	-	47	-	-	-	16	-	18
19	-	36-38	-	-	-	-	-	-	17-26	-	19

**Table A-34**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 3 Months Through 9 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	0-1	0-11	0-25	0-8	0-8	-	-	0-1	-	1
2	12	2	12-13	26-27	9	9-10	-	-	2	-	2
3	13	3	14-15	28	10-11	11-12	-	-	3	-	3
4	14	4	16-17	29	12-14	13	-	-	-	-	4
5	15-16	5-6	18-19	30	15-17	14	-	-	4	-	5
6	17	7	20-21	31	18-21	15	-	-	-	-	6
7	18	8	22-23	32	22-25	16	-	-	5	-	7
8	19	9-10	24-26	33	26-29	17	-	-	-	-	8
9	20-21	11	27-28	-	30-32	18-19	-	-	6	-	9
10	22	12-13	29-31	34	33-35	20-21	-	-	7	-	10
11	23	14-15	32	-	36-37	22	-	-	8	-	11
12	24-25	16-17	33	-	38-39	23	-	-	9	-	12
13	26	18-20	34	35	40-41	24	-	-	10	-	13
14	27	21-23	35	-	42-43	25-26	-	-	11-12	-	14
15	28	24-26	-	-	44	27	-	-	13	-	15
16	29	27-29	36	-	45	-	-	-	14	-	16
17	30	30-32	-	-	46	-	-	-	15	-	17
18	31	33-35	-	-	47	-	-	-	16	-	18
19	-	36-38	-	-	-	-	-	-	17-26	-	19



**Appendix A**

**Table A-35**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 6 Months Through 9 Years, 8 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	0-1	0-11	0-25	0-8	0-8	-	-	0-1	-	1
2	12	2	12-13	26-27	9	9-10	-	-	2	-	2
3	13	3	14-15	28	10-11	11-12	-	-	3	-	3
4	14	4	16-17	29	12-14	13	-	-	-	-	4
5	15-16	5-6	18-19	30	15-17	14	-	-	4	-	5
6	17	7	20-21	31	18-21	15	-	-	-	-	6
7	18	8	22-23	32	22-25	16	-	-	5	-	7
8	19	9-10	24-26	33	26-29	17	-	-	-	-	8
9	20-21	11	27-28	-	30-32	18-19	-	-	6	-	9
10	22	12-13	29-31	34	33-35	20-21	-	-	7	-	10
11	23	14-15	32	-	36-37	22	-	-	8	-	11
12	24-25	16-17	33	-	38-39	23	-	-	9	-	12
13	26	18-20	34	35	40-41	24	-	-	10	-	13
14	27	21-23	35	-	42-43	25-26	-	-	11-12	-	14
15	28	24-26	-	-	44	27	-	-	13	-	15
16	29	27-29	36	-	45	-	-	-	14	-	16
17	30	30-32	-	-	46	-	-	-	15	-	17
18	31	33-35	-	-	47	-	-	-	16	-	18
19	-	36-38	-	-	-	-	-	-	17-26	-	19

**Table A-36**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 9 Months Through 9 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-11	0-1	0-11	0-25	0-8	0-8	-	-	0-1	-	1
2	12	2	12-13	26-27	9	9-10	-	-	2	-	2
3	13	3	14-15	28	10-11	11-12	-	-	3	-	3
4	14	4	16-17	29	12-14	13	-	-	-	-	4
5	15-16	5-6	18-19	30	15-17	14	-	-	4	-	5
6	17	7	20-21	31	18-21	15	-	-	-	-	6
7	18	8	22-23	32	22-25	16	-	-	5	-	7
8	19	9-10	24-26	33	26-29	17	-	-	-	-	8
9	20-21	11	27-28	-	30-32	18-19	-	-	6	-	9
10	22	12-13	29-31	34	33-35	20-21	-	-	7	-	10
11	23	14-15	32	-	36-37	22	-	-	8	-	11
12	24-25	16-17	33	-	38-39	23	-	-	9	-	12
13	26	18-20	34	35	40-41	24	-	-	10	-	13
14	27	21-23	35	-	42-43	25-26	-	-	11-12	-	14
15	28	24-26	-	-	44	27	-	-	13	-	15
16	29	27-29	36	-	45	-	-	-	14	-	16
17	30	30-32	-	-	46	-	-	-	15	-	17
18	31	33-35	-	-	47	-	-	-	16	-	18
19	-	36-38	-	-	-	-	-	-	17-26	-	19

**Table A-37**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 0 Months Through 10 Years, 2 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-12	0-2	0-12	0-27	0-9	0-9	-	-	0-2	-	1
2	13	3	13-14	28	10	10-11	-	-	3	-	2
3	14	4	15-16	29	11-12	12-13	-	-	-	-	3
4	15-16	5-6	17-18	30	13-15	14	-	-	4	-	4
5	17	7	19-20	31	16-19	15	-	-	-	-	5
6	18	8	21-22	32	20-24	16	-	-	5	-	6
7	19	9	23-24	-	25-28	17	-	-	-	-	7
8	20	10	25-27	33	29-31	18	-	-	6	-	8
9	21-22	11-12	28-29	-	32-34	19-20	-	-	7	-	9
10	23	13	30-31	34	35-37	21	-	-	8	-	10
11	24-25	14-15	32	-	38-39	22-23	-	-	9	-	11
12	26	16-18	33	-	40-41	24	-	-	10	-	12
13	27	19-21	34	35	42-43	25	-	-	11-12	-	13
14	28	22-24	35	-	44	26	-	-	13	-	14
15	29	25-27	-	-	45	27	-	-	14	-	15
16	30	28-30	36	-	46	-	-	-	15	-	16
17	-	31-33	-	-	47	-	-	-	16	-	17
18	31	34-36	-	-	-	-	-	-	17	-	18
19	-	37-38	-	-	-	-	-	-	18-26	-	19

**Table A-38**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 3 Months Through 10 Years, 5 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-12	0-2	0-12	0-27	0-9	0-9	-	-	0-2	-	1
2	13	3	13-14	28	10	10-11	-	-	3	-	2
3	14	4	15-16	29	11-12	12-13	-	-	-	-	3
4	15-16	5-6	17-18	30	13-15	14	-	-	4	-	4
5	17	7	19-20	31	16-19	15	-	-	-	-	5
6	18	8	21-22	32	20-24	16	-	-	5	-	6
7	19	9	23-24	-	25-28	17	-	-	-	-	7
8	20	10	25-27	33	29-31	18	-	-	6	-	8
9	21-22	11-12	28-29	-	32-34	19-20	-	-	7	-	9
10	23	13	30-31	34	35-37	21	-	-	8	-	10
11	24-25	14-15	32	-	38-39	22-23	-	-	9	-	11
12	26	16-18	33	-	40-41	24	-	-	10	-	12
13	27	19-21	34	35	42-43	25	-	-	11-12	-	13
14	28	22-24	35	-	44	26	-	-	13	-	14
15	29	25-27	-	-	45	27	-	-	14	-	15
16	30	28-30	36	-	46	-	-	-	15	-	16
17	-	31-33	-	-	47	-	-	-	16	-	17
18	31	34-36	-	-	-	-	-	-	17	-	18
19	-	37-38	-	-	-	-	-	-	18-26	-	19

**Table A-39**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 6 Months Through 10 Years, 8 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-12	0-2	0-12	0-27	0-9	0-9	-	-	0-2	-	1
2	13	3	13-14	28	10	10-11	-	-	3	-	2
3	14-15	4	15-16	29	11-12	12-13	-	-	-	-	3
4	16	5-6	17-18	30	13-15	14	-	-	4	-	4
5	17	7	19-20	31	16-19	15	-	-	-	-	5
6	18	8	21-22	32	20-24	16	-	-	5	-	6
7	19	9	23-24	-	25-28	17	-	-	-	-	7
8	20	10	25-27	33	29-31	18	-	-	6	-	8
9	21-22	11-12	28-29	-	32-34	19-20	-	-	7	-	9
10	23	13	30-31	34	35-37	21	-	-	8	-	10
11	24-25	14-15	32	-	38-39	22-23	-	-	9	-	11
12	26	16-18	33	-	40-41	24	-	-	10	-	12
13	27	19-21	34	35	42-43	25	-	-	11-12	-	13
14	28	22-24	35	-	44	26	-	-	13	-	14
15	29	25-27	-	-	45	27	-	-	14	-	15
16	30	28-30	36	-	46	-	-	-	15	-	16
17	-	31-33	-	-	47	-	-	-	16	-	17
18	31	34-36	-	-	-	-	-	-	17	-	18
19	-	37-38	-	-	-	-	-	-	18-26	-	19

**Table A-40**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 9 Months Through 10 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-12	0-2	0-12	0-27	0-9	0-9	-	-	0-2	-	1
2	13-14	3-4	13-14	28	10-12	10-11	-	-	3	-	2
3	15-16	5	15-16	29	13-15	12-13	-	-	-	-	3
4	17	6	17-18	30	16-18	14	-	-	4	-	4
5	18	7	19-20	31	19-22	15	-	-	-	-	5
6	19	8	21-23	32	23-26	16	-	-	5	-	6
7	20	9-10	24-26	-	27-30	17	-	-	6	-	7
8	21	11	27-28	33	31-33	18-19	-	-	7	-	8
9	22-23	12-13	29-30	-	34-36	20	-	-	-	-	9
10	24-25	14-15	31-32	34	37-38	21	-	-	8	-	10
11	26	16	33	-	39-40	22-23	-	-	9	-	11
12	27	17-18	34	-	41	24	-	-	10	-	12
13	28	19-21	-	35	42-43	25	-	-	11-12	-	13
14	29	22-24	35	-	44	26	-	-	13	-	14
15	-	25-27	-	-	45	27	-	-	14	-	15
16	30	28-30	36	-	46	-	-	-	15	-	16
17	-	31-33	-	-	47	-	-	-	16-17	-	17
18	31	34-36	-	-	-	-	-	-	18	-	18
19	-	37-38	-	-	-	-	-	-	19-26	-	19

**Table A-41**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
Age 11 Years, 0 Months Through 11 Years, 5 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-14	0-4	0-14	-	0-12	0-10	-	-	0-2	0	1
2	15-16	5	15-16	-	13-15	11-12	-	-	3	-	2
3	17	6	17-18	-	16-18	13	-	-	4	-	3
4	18	7	19-20	-	19-22	14	-	-	-	1	4
5	19	8	21-23	-	23-26	15	-	-	5	2	5
6	20	9-10	24-26	-	27-30	16-17	-	-	6	3	6
7	21	11	27-28	-	31-33	18-19	-	-	7	4	7
8	22-23	12-13	29-30	-	34-36	20	-	-	-	5	8
9	24-25	14-15	31-32	-	37-38	21	-	-	8	6	9
10	26	16	33	-	39-40	22-23	-	-	9	7	10
11	27	17-18	34	-	41	24	-	-	10	8	11
12	28	19-20	-	-	42	25	-	-	11-12	9	12
13	29	21-23	35	-	43	26	-	-	13	10-11	13
14	-	24-26	-	-	44	-	-	-	14	12	14
15	30	27-29	36	-	45-46	27	-	-	15	13	15
16	-	30-32	-	-	47	-	-	-	16-17	14	16
17	31	33-34	-	-	-	-	-	-	18	15-16	17
18	-	35-36	-	-	-	-	-	-	19	17	18
19	-	37-38	-	-	-	-	-	-	20-26	18-20	19

**Table A-42**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
Age 11 Years, 6 Months Through 11 Years, 11 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-15	0-4	0-14	-	0-12	0-10	-	-	0-2	0	1
2	16	5	15-16	-	13-15	11-12	-	-	3	-	2
3	17	6	17-18	-	16-18	13	-	-	4	-	3
4	18	7	19-20	-	19-22	14	-	-	-	1	4
5	19	8	21-23	-	23-26	15	-	-	5	2	5
6	20	9-10	24-26	-	27-30	16-17	-	-	6	3	6
7	21	11	27-28	-	31-33	18-19	-	-	7	4	7
8	22-23	12-13	29-30	-	34-36	20	-	-	-	5	8
9	24-25	14-15	31-32	-	37-38	21	-	-	8	6	9
10	26	16	33	-	39-40	22-23	-	-	9	7	10
11	27	17-18	34	-	41	24	-	-	10	8	11
12	28	19-20	-	-	42	25	-	-	11-12	9	12
13	29	21-23	35	-	43	26	-	-	13	10-11	13
14	-	24-26	-	-	44	-	-	-	14	12	14
15	30	27-29	36	-	45-46	27	-	-	15	13	15
16	-	30-32	-	-	47	-	-	-	16-17	14	16
17	31	33-34	-	-	-	-	-	-	18	15-16	17
18	-	35-36	-	-	-	-	-	-	19	17	18
19	-	37-38	-	-	-	-	-	-	20-26	18-20	19

**Appendix A**

**Table A-43**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 12 Years, 0 Months Through 12 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-16	0-5	0-16	-	0-15	0-12	-	-	0-2	0	1
2	17	6	17-18	-	16-18	13	-	-	3	-	2
3	18	7	19-20	-	19-22	14	-	-	4	1	3
4	19	8	21-23	-	23-26	15	-	-	5	-	4
5	20	9	24-26	-	27-29	16-17	-	-	6	2	5
6	21	10	27-28	-	30-32	18-19	-	-	7	3	6
7	22-23	11-12	29-30	-	33-35	20	-	-	-	4-5	7
8	24-25	13-14	31-32	-	36-37	21	-	-	8	6	8
9	26	15	33	-	38-39	22-23	-	-	9	7	9
10	27	16-17	34	-	40	24	-	-	10	8	10
11	28	18-19	-	-	41	25	-	-	11-12	9	11
12	-	20-22	35	-	42	26	-	-	13	10-11	12
13	29	23-25	-	-	43-44	-	-	-	14	12	13
14	-	26-28	36	-	45	27	-	-	15	13	14
15	30	29-30	-	-	46	-	-	-	16-17	14	15
16	-	31-32	-	-	47	-	-	-	18	15	16
17	31	33-34	-	-	-	-	-	-	19	16	17
18	-	35-36	-	-	-	-	-	-	20	17	18
19	-	37-38	-	-	-	-	-	-	21-26	18-20	19

**Table A-44**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 12 Years, 6 Months Through 12 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-16	0-5	0-16	-	0-17	0-12	-	-	0-2	0	1
2	17	6	17-18	-	18	13-14	-	-	3	-	2
3	18	7	19-20	-	19-23	15	-	-	4	1	3
4	19	8	21-23	-	24-26	16	-	-	5	-	4
5	20	9	24-26	-	27-29	17	-	-	6	2	5
6	21	10	27-28	-	30-32	18-19	-	-	7	3	6
7	22-23	11-12	29-30	-	33-35	20	-	-	-	4-5	7
8	24-25	13-14	31-32	-	36-37	21	-	-	8	6	8
9	26	15	33	-	38-39	22-23	-	-	9	7	9
10	27	16-17	34	-	40	24	-	-	10	8-9	10
11	28	18-19	-	-	41	25	-	-	11-12	10	11
12	-	20-22	35	-	42	26	-	-	13	11	12
13	29	23-25	-	-	43-44	-	-	-	14	12	13
14	-	26-28	36	-	45	27	-	-	15	13	14
15	30	29-30	-	-	46	-	-	-	16-17	14	15
16	-	31-32	-	-	47	-	-	-	18	15	16
17	31	33-34	-	-	-	-	-	-	19	16	17
18	-	35-36	-	-	-	-	-	-	20	17	18
19	-	37-38	-	-	-	-	-	-	21-26	18-20	19

**Table A-45**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 13 Years, 0 Months Through 13 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-16	0-5	0-16	-	0-17	0-12	-	-	0-2	0	1
2	17	6	17-18	-	18	13-14	-	-	3	-	2
3	18	7	19-20	-	19-23	15	-	-	4	1	3
4	19	8	21-23	-	24-26	16	-	-	5	-	4
5	20	9	24-26	-	27-29	17	-	-	6	2	5
6	21	10	27-28	-	30-32	18-19	-	-	7	3	6
7	22-23	11-12	29-30	-	33-35	20	-	-	-	4-5	7
8	24-25	13-14	31-32	-	36-37	21	-	-	8	6	8
9	26	15	33	-	38-39	22-23	-	-	9	7	9
10	27	16-17	34	-	40	24	-	-	10	8-9	10
11	28	18-19	-	-	41	25	-	-	11-12	10	11
12	-	20-22	35	-	42	26	-	-	13	11	12
13	29	23-25	-	-	43-44	-	-	-	14	12	13
14	-	26-28	36	-	45	27	-	-	15	13	14
15	30	29-30	-	-	46	-	-	-	16-17	14	15
16	-	31-32	-	-	47	-	-	-	18	15	16
17	31	33-34	-	-	-	-	-	-	19	16	17
18	-	35-36	-	-	-	-	-	-	20	17	18
19	-	37-38	-	-	-	-	-	-	21-26	18-20	19

**Table A-46**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 13 Years, 6 Months Through 13 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-16	0-5	0-16	-	0-17	0-12	-	-	0-2	0	1
2	17	6	17-18	-	18-19	13-14	-	-	3	-	2
3	18	7	19-20	-	20-23	15	-	-	4	1	3
4	19	8	21-23	-	24-26	16	-	-	5	-	4
5	20	9	24-26	-	27-29	17	-	-	6	2	5
6	21	10	27-28	-	30-32	18-19	-	-	7	3	6
7	22-23	11-12	29-30	-	33-35	20	-	-	-	4-5	7
8	24-25	13-14	31-32	-	36-37	21	-	-	8	6	8
9	26	15-16	33	-	38-39	22-23	-	-	9	7	9
10	27	17-19	34	-	40	24	-	-	10	8-9	10
11	28	20-22	-	-	41	25	-	-	11-12	10	11
12	-	23-25	35	-	42	26	-	-	13	11	12
13	29	26-27	-	-	43-44	-	-	-	14	12	13
14	-	28-29	36	-	45	27	-	-	15	13	14
15	30	30-31	-	-	46	-	-	-	16-17	14	15
16	-	32	-	-	47	-	-	-	18	15	16
17	31	33-34	-	-	-	-	-	-	19	16	17
18	-	35-36	-	-	-	-	-	-	20	17	18
19	-	37-38	-	-	-	-	-	-	21-26	18-20	19



**Appendix A**

**Table A-47**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 14 Years, 0 Months Through 14 Years, 5 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-6	0-18	-	0-18	0-13	-	-	0-2	0	1
2	18	7	19-20	-	19-21	14-15	-	-	3	1	2
3	19	8	21-23	-	22-24	16	-	-	4	-	3
4	20	9	24-26	-	25-27	17	-	-	5	2	4
5	21	10	27-28	-	28-30	18-19	-	-	6	3	5
6	22	11-12	29-30	-	31-33	20	-	-	7	4	6
7	23-24	13-14	31-32	-	34-36	21	-	-	8	5	7
8	25-26	15	33	-	37-38	22-23	-	-	9	6	8
9	27	16-17	-	-	39-40	24	-	-	10	7-8	9
10	28	18-19	34	-	41	-	-	-	11-12	9	10
11	-	20-22	-	-	42	25	-	-	13	10-11	11
12	29	23-25	35	-	43	26	-	-	14	12	12
13	-	26-28	36	-	44	27	-	-	15	13	13
14	30	29-30	-	-	45	-	-	-	16	14	14
15	-	31-32	-	-	46-47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-26	19-20	19

**Table A-48**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 14 Years, 6 Months Through 14 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-6	0-18	-	0-19	0-13	-	-	0-2	0	1
2	18	7	19-20	-	20-21	14-15	-	-	3	1	2
3	19	8	21-23	-	22-24	16	-	-	4	-	3
4	20	9	24-26	-	25-27	17	-	-	5	2	4
5	21	10	27-28	-	28-30	18-19	-	-	6	3	5
6	22	11-12	29-30	-	31-33	20	-	-	7	4	6
7	23-24	13-14	31-32	-	34-36	21	-	-	8	5	7
8	25-26	15-16	33	-	37-38	22-23	-	-	9	6	8
9	27	17-19	-	-	39-40	24	-	-	10	7-8	9
10	28	20-22	34	-	41	-	-	-	11-12	9	10
11	-	23-25	-	-	42	25	-	-	13	10-11	11
12	29	26-27	35	-	43	26	-	-	14	12	12
13	-	28-29	36	-	44	27	-	-	15	13	13
14	30	30-31	-	-	45	-	-	-	16	14	14
15	-	32	-	-	46-47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-26	19-20	19

**Table A-49**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 0 Months Through 15 Years, 5 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-6	0-18	-	0-19	0-13	-	-	0-2	0	1
2	18	7	19-20	-	20-21	14-15	-	-	3	1	2
3	19	8	21-23	-	22-24	16	-	-	4	-	3
4	20	9	24-26	-	25-27	17	-	-	5	2	4
5	21	10	27-28	-	28-30	18-19	-	-	6	3	5
6	22	11-12	29-30	-	31-33	20	-	-	7	4	6
7	23-24	13-14	31-32	-	34-36	21	-	-	8	5	7
8	25-26	15-16	33	-	37-38	22-23	-	-	9	6	8
9	27	17-19	-	-	39-40	24	-	-	10	7-8	9
10	28	20-22	34	-	41	-	-	-	11-12	9	10
11	-	23-25	-	-	42	25	-	-	13	10-11	11
12	29	26-27	35	-	43	26	-	-	14	12	12
13	-	28-29	36	-	44	27	-	-	15	13	13
14	30	30-31	-	-	45	-	-	-	16	14	14
15	-	32	-	-	46-47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-26	19-20	19

**Table A-50**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 6 Months Through 15 Years, 11 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-7	0-19	-	0-20	0-14	-	-	0-3	0	1
2	18	8	20-21	-	21-22	15	-	-	4	1	2
3	19	9	22-23	-	23-25	16	-	-	5	-	3
4	20	10	24-26	-	26-28	17	-	-	6	2	4
5	21	11	27-28	-	29-31	18-19	-	-	7	3	5
6	22	12-13	29-30	-	32-34	20	-	-	8	4	6
7	23-24	14	31-32	-	35-36	21-22	-	-	9	5-6	7
8	25-26	15-16	33	-	37-38	23	-	-	10	7	8
9	27	17-19	-	-	39-40	24	-	-	11	8	9
10	28	20-22	34	-	41	-	-	-	12	9	10
11	-	23-25	-	-	42	25	-	-	13	10-11	11
12	29	26-27	35	-	43-44	26	-	-	14	12	12
13	-	28-29	36	-	45	27	-	-	15	13	13
14	30	30-31	-	-	46	-	-	-	16	14	14
15	-	32	-	-	47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-26	19-20	19



**Table A-51**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 16 Years, 0 Months Through 16 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-7	0-19	-	0-20	0-14	-	-	0-3	0	1
2	18	8	20-21	-	21-22	15	-	-	4	1	2
3	19	9	22-23	-	23-25	16	-	-	5	-	3
4	20	10	24-26	-	26-28	17	-	-	6	2	4
5	21	11	27-28	-	29-31	18-19	-	-	7	3	5
6	22	12-13	29-30	-	32-34	20	-	-	8	4	6
7	23-24	14	31-32	-	35-36	21-22	-	-	9	5-6	7
8	25-26	15-16	33	-	37-38	23	-	-	10	7	8
9	27	17-19	-	-	39-40	24	-	-	11	8	9
10	28	20-22	34	-	41	-	-	-	12	9	10
11	-	23-25	-	-	42	25	-	-	13	10-11	11
12	29	26-27	35	-	43-44	26	-	-	14	12	12
13	-	28-29	36	-	45	27	-	-	15	13	13
14	30	30-31	-	-	46	-	-	-	16	14	14
15	-	32	-	-	47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-25	19-20	19

**Table A-52**  
 Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
**Age 17 Years, 0 Months Through 17 Years, 11 Months**

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-7	0-19	-	0-20	0-14	-	-	0-3	0	1
2	18	8	20-21	-	21-22	15	-	-	4	1	2
3	19	9	22-23	-	23-25	16	-	-	5	-	3
4	20	10	24-26	-	26-28	17	-	-	6	2	4
5	21	11	27-29	-	29-31	18-19	-	-	7	3	5
6	22	12-13	30-31	-	32-34	20	-	-	8	4	6
7	23-24	14	32	-	35-36	21-22	-	-	9	5-6	7
8	25-26	15-16	33	-	37-38	23	-	-	10	7	8
9	27	17-19	-	-	39-40	24	-	-	11	8	9
10	28	20-22	34	-	41	-	-	-	12	9	10
11	-	23-25	-	-	42	25	-	-	13	10-11	11
12	29	26-27	35	-	43-44	26	-	-	14	12	12
13	-	28-29	36	-	45	27	-	-	15	13	13
14	30	30-31	-	-	46	-	-	-	16	14	14
15	-	32	-	-	47	-	-	-	17	15	15
16	31	33-34	-	-	-	-	-	-	18	16	16
17	-	35-36	-	-	-	-	-	-	19	17	17
18	-	37	-	-	-	-	-	-	20	18	18
19	-	38	-	-	-	-	-	-	21-25	19-20	19

**Table A-53**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
Age 18 Years, 0 Months Through 18 Years, 11 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-8	0-21	-	0-21	0-15	-	-	0-4	0	1
2	18	9	22-23	-	22	16	-	-	5	1	2
3	19	10	24-26	-	23-26	17	-	-	6	-	3
4	20-21	11	27-29	-	27-29	18-19	-	-	7	2	4
5	22	12	30-31	-	30-32	20	-	-	8	3-4	5
6	23-24	13	32	-	33-35	21	-	-	9	5	6
7	25	14-15	33	-	36-37	22	-	-	10	6	7
8	26-27	16-17	-	-	38-39	23	-	-	11	7	8
9	28	18-20	34	-	40-41	24	-	-	12	8-9	9
10	-	21-23	-	-	42	25	-	-	13	10	10
11	29	24-26	-	-	43	-	-	-	14	11	11
12	-	27-28	35	-	44	26	-	-	15	12	12
13	30	29-30	36	-	45	27	-	-	16	13	13
14	-	31-32	-	-	46	-	-	-	17	14	14
15	31	33-34	-	-	47	-	-	-	18	15	15
16	-	35-36	-	-	-	-	-	-	19	16	16
17	-	37	-	-	-	-	-	-	20	17	17
18	-	38	-	-	-	-	-	-	21	18	18
19	-	-	-	-	-	-	-	-	22-26	19-20	19

**Table A-54**  
Visualization & Reasoning - Conversion of Raw Scores to Scaled Scores  
Age 19 Years, 0 Months Through 19 Years, 11 Months

Scaled Score	Figure Ground	Design Analogies	Form Completion	Matching	Sequential Order	Repeated Patterns	Picture Context	Classification	Paper Folding	Figure Rotation	Scaled Score
1	0-17	0-8	0-21	-	0-21	0-15	-	-	0-4	0	1
2	18	9	22-23	-	22	16	-	-	5	1	2
3	19	10	24-26	-	23-26	17	-	-	6	-	3
4	20-21	11	27-30	-	27-29	18-19	-	-	7	2	4
5	22	12	31	-	30-32	20	-	-	8	3-4	5
6	23-24	13	32	-	33-35	21	-	-	9	5	6
7	25	14-15	33	-	36-37	22	-	-	10	6	7
8	26-27	16-17	-	-	38-39	23	-	-	11	7	8
9	28	18-20	34	-	40-41	24	-	-	12	8-9	9
10	-	21-23	-	-	42	25	-	-	13	10	10
11	29	24-26	-	-	43	-	-	-	14	11	11
12	-	27-28	35	-	44	26	-	-	15	12	12
13	30	29-30	36	-	45	27	-	-	16	13	13
14	-	31-32	-	-	46	-	-	-	17	14	14
15	31	33-34	-	-	47	-	-	-	18	15	15
16	-	35-36	-	-	-	-	-	-	19	16	16
17	-	37	-	-	-	-	-	-	20	17	17
18	-	38	-	-	-	-	-	-	21	18	18
19	-	-	-	-	-	-	-	-	22-26	19-20	19

Table K1

*Percentile Ranks, Scaled Scores, and Normal Curve Equivalents (NCEs) Corresponding to Composite Standardized Scores*

Standard. Score	Percentile Rank	Normal Curve Equivalent	Scaled Scores	Standard. Score	Percentile Rank	Normal Curve Equivalent	Scaled Scores
170				127	96	88	
169				126	96	87	
168				125	95	85	15
167				124	95	84	
166				123	94	82	
165				122	93	81	
164				121	92	79	
163				120	91	78	14
162				119	90	77	
161				118	88	75	
160				117	87	74	
159				116	86	72	
158				115	84	71	13
157				114	82	70	
156				113	81	68	
155				112	79	67	
154				111	77	65	
153				110	75	64	12
152				109	73	63	
151				108	70	61	
150				107	68	60	
149	>99.9			106	66	58	
148	99.9			105	63	57	11
147	99.9			104	61	56	
146	99.9		19	103	58	54	
145	99.9			102	55	53	
144	99.8			101	53	51	
143	99.8			100	50	50	10
142	99.7			99	47	49	
141	99.7			98	45	47	
140	99.6		18	97	42	46	
139	99.5			96	39	44	
138	99			95	37	43	9
137	99			94	34	42	
136	99	>99		93	32	40	
135	99	99	17	92	30	39	
134	99	98		91	27	37	
133	99	96		90	25	36	8
132	98	95		89	23	35	
131	98	94		88	21	33	
130	98	92	16	87	19	32	
129	97	91		86	18	30	
128	97	89		85	16	29	7
				84	14	28	
				83	13	26	

**Appendix D**

**Table D-2**  
IQ Equivalents of Sums of Scaled Scores

**Leiter-R - Brief IQ Screener - ALL AGES**

Sum of Scaled Scores	IQ	Sum of Scaled Scores	IQ	Sum of Scaled Scores	IQ	Sum of Scaled Scores	IQ
		21	68	41	102	61	139
		22	70	42	103	62	141
		23	71	43	105	63	143
4	36	24	73	44	107	64	145
5	38	25	74	45	109	65	147
6	40	26	76	46	111	66	149
7	42	27	77	47	113	67	151
8	44	28	79	48	115	68	153
9	46	29	80	49	117	69	155
10	48	30	82	50	119	70	157
11	50	31	83	51	121	71	159
12	52	32	85	52	123	72	161
13	54	33	87	53	124	73	163
14	56	34	89	54	126	74	165
15	58	35	91	55	127	75	167
16	60	36	93	56	129	76	169
17	62	37	95	57	131		
18	63	38	97	58	133		
19	65	39	98	59	135		
20	67	40	100	60	137		

Appendix K

Standard. Score	Percentile Rank	Normal Curve Equivalent	Scaled Scores
82	12	25	6
81	10	23	
80	9	22	
79	8	21	
78	7	19	
77	6	18	5
76	5	16	
75	5	15	
74	4	13	
73	4	12	
72	3	11	4
71	3	9	
70	2	8	
69	2	6	
68	2	5	
67	1	4	3
66	1	2	
65	1	1	
64	1	<1	
63	1		
62	1		2
61	0.5		
60	0.4		
59	0.3		
58	0.3		

Standard. Score	Percentile Rank	Normal Curve Equivalent	Scaled Scores
57	0.2		1
56	0.2		
55	0.1		
54	0.1		
53	0.1		
52	0.1		
51	<0.1		
50			
49			
48			
47			
46			
45			
44			
43			
42			
41			
40			
39			
38			
37			
36			
35			
34			
33			
32			
31			
30			

Table E3.1

Confidence Interval Magnitudes for Leiter-R IQ and Composite Scores

Age Group	Confidence Interval	Fluid Reasoning	Brief IQ Screener	Fundamental Visualization	Full Scale IQ	Spatial Visualization	Memory Screen	Associative Memory	Memory Span	Attention	Memory Process	Recognition Memory
2-5	.95	12	12	10	10	—	12	—	—	—	—	8
2-5	.90	9	9	7	7	—	9	—	—	—	—	7
2-5	.68	6	6	5	5	—	6	—	—	—	—	4
6-10	.95	10	10	—	10	—	16	14	12	14	12	12
6-10	.90	9	8	—	8	—	13	11	9	12	10	9
6-10	.68	5	5	—	5	—	8	7	6	7	6	6
11-20	.95	10	10	—	8	10	16	14	10	14	12	—
11-20	.90	9	9	—	7	8	13	12	9	11	9	—
11-20	.68	5	5	—	4	5	8	7	5	7	6	—

Note: To create a confidence interval around the observed score, add and then subtract the magnitude shown for the appropriate age group and score.

Cattell and Horn's (1966) fluid [Gf] factor (also identified by Carroll, 1993). Other subtests within the Leiter-R IQ appear related to Thurstone's primary mental construct "General Reasoning" or "R" and to the second-stratum factor (Gv, Broad Visualization) in Cattell and Horn and in Carroll's models. A slightly different, but similar, view of the factor composition of Leiter-R subtests has been provided by McGrew and Flanagan (1997).

The child's total nonverbal IQ score can be interpreted as evidence of the child's nonverbal cognitive abilities relative to typical children in the same age group. It provides information about the current status of the child and can be useful for program placement, intervention planning and research. The Leiter-R should not be used to predict a young child's future abilities unless there is overwhelming evidence of accurate prediction from multiple sources of information. Figure 7.2 presents descriptive classifications of various score levels on the Brief IQ Screener or Full-Scale IQ. The right-hand column of Figure 7.2 shows the percentile equivalents of the IQ ranges. The other columns in Figure 7.2 will be helpful in interpreting the other hierarchical levels of score interpretation on the Leiter-R.

Finally, as explained eloquently by Campbell (1996), due to the possible influence of socio-economic, historical, and environmental influences on intelligence levels, the Leiter-R IQ should NOT be interpreted as a measure of innate capacity or the maximum potential of the child. With environmental and educational stimulation, improvements in intel-

ligence may be possible. As Kaufman (1990) has shown with data from the Wechsler Adult Intelligence Scale-Revised (WAIS-R, Wechsler, 1981), Full Scale IQ appears to be strongly associated with years of schooling completed, thus emphasizing the role of environmental influence on global ability. The information from the Leiter-R, especially the Growth Scale Record Form, can be used to determine a child's current strengths and limitations on the subtests that compose the IQ Scores. This may be helpful in planning interventions, or curricula, by using the strengths to compensate for the weaknesses, or by focusing on areas which are not strengths. *However, the items in this test should never be made the focus of an intervention plan.* Interventions should employ related, but distinct, tasks for practicing cognitive abilities.

### Use and Interpretation of Growth Scores

For children who function at a low level of ability and any child who is expected to be retested on the Leiter-R, the Growth Scores provide an excellent source of information. The Growth Scores were designed using item-response theory (IRT, e.g., Hambleton, Swaminathan & Rogers, 1991; Lord, 1980; Rasch, 1980) so that small increments of growth (advancement along the intellectual-ability continuum, as evidenced by mastering new items upon retesting) could be measured. Growth between two testing occasions, as well

Figure 7.2

Descriptive Classification Labels for Leiter-R Nonverbal IQ Scores

IQ and Composite Scores	Subtest Scores	Category	Percentiles
130-170	17-19	Very High/Gifted	98-99
120-129	15-16	High	91-97
110-119	13-14	Above Average	75-90
90-109	8-12	Average	25-74
80-89	6-7	Below Average	9-24
70-79	4-5	Low	3-8
55-69	1-3	Very Low and Mild Delay	1-2
40-54	—	Moderate Delay	0.10
30-39	—	Severe Delay	0.04

## **Leiter-R Attention Sustained (AS)**

Use the form in the test packet along with the templates and the appropriate Leiter-R Examiner's Manual Appendices referenced to score this task.

Self-corrections are permitted and not counted as errors. Marks clearly targeting an item are counted as correct even if they are slightly off in their placement. Look in the test packet for notes the examiner may have made regarding self-corrections and unclear marks. Only count those answers crossed out within the specified time limit. If the examiner was unable to stop the child after the time limit or they missed the time limit, this should be noted in the test packet. The examiner should have a note as to how many marks should not be considered as they were outside the time limit allowed.

From the Leiter-R Examiner's Manual page 52: Score after all testing is completed. Answers are counted if it is clear the child was indicating a particular answer, even if motor performance on task is not precise. First, count the total number of marks on each page. Next, use scoring templates and count the total number correct. Then, subtract the total correct from the total marks to get total number of errors. Finally, subtract total number of errors from total number correct to get the adjusted correct raw score. NOTE: All three raw scores may be converted to scaled scores.

Use the age appropriate table in the Appendices to convert the child's raw scores to scaled scores. See the test packet (record) form for specific details.

The following pages from the Leiter-R manual should be photocopied and placed in the order below following this cover page as they provide the normative data: B-13 to B-27, C-13 to C-27 and H-3.



**Table B-25**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 7 Years, 0 Months Through 7 Years, 2 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0	0-4	0-4	NEG-26	-	-	0	0	0-2	0-2	1
2	1-2	5-6	5-6	27-31	-	0	1	1-2	3-4	3	2
3	3-4	7-8	7-8	32-36	-	1	-	3-4	5-6	4	3
4	5-7	9-10	9-10	37-41	0	2	2	5-6	7-8	5	4
5	8-10	11-12	11-12	42-46	1	3	-	7-8	9-10	6	5
6	11-13	13-14	13	47-51	2	4	3	9-10	11-12	7-8	6
7	14-16	15	14	52-56	3-4	5	-	11	13-14	9	7
8	17-19	16	15	57-61	5	6-8	4	12-13	15-16	10-11	8
9	20-21	17	16	62-66	6	9-17	-	14-15	17	12-13	9
10	22-23	18	17	67-72	7	18-25	5	16-17	18	14-16	10
11	24	19	18	73-78	8	26-29	-	18-19	19	17-19	11
12	25-26	-	-	79-84	9	30-31	6	20-21	20	20-23	12
13	27-28	20	19	85-90	10	32-33	7	22-23	-	24-29	13
14	29-30	21	20	91-95	11	34	8	24-25	21	30-37	14
15	31-32	22	21	96-100	12	35	9	26-27	22	38-44	15
16	33-34	23	22	101-105	13	36	10	28-29	23	45-49	16
17	35-36	-	23	106-110	14	37	11	30-31	24	50-52	17
18	37-38	24	24	111-115	15	38	12	32-33	25	53-55	18
19	39-46	25	25-28	116-217	16-21	39	13-20	34-42	-	56-65	19

**Table B-26**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 7 Years, 3 Months Through 7 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0	0-4	0-4	NEG-26	-	-	0	0	0-2	0-2	1
2	1-2	5-6	5-6	27-31	-	0	1	1-2	3-4	3	2
3	3-4	7-8	7-8	32-41	0	1-2	-	3-4	5-6	4	3
4	5-7	9-10	9-10	42-46	1	3	2	5-6	7-8	5	4
5	8-10	11-12	11-12	47-51	2	4	-	7-8	9-10	6	5
6	11-13	13-14	13	52-56	3-4	5	3	9-10	11-12	7-8	6
7	14-16	15	14	57-61	5	6-8	4	11	13-14	9-10	7
8	17-19	16	15	62-66	6	9-17	-	12-13	15-16	11-13	8
9	20-21	17	16	67-72	7	18-25	5	14-15	17	14-16	9
10	22-23	18	17	73-78	8	26-28	-	16-17	18	17-19	10
11	24	19	18	79-84	9	29-30	6	18-19	19	20-22	11
12	25-26	-	19	85-90	10	31	7	20-21	20	23-26	12
13	27-28	20	20	91-95	11	32-33	8	22-23	-	27-31	13
14	29-30	21	21	96-100	12	34	9	24-25	21	32-37	14
15	31-32	22	-	101-105	13	35	10	26-27	22	38-44	15
16	33-34	23	22	106-110	14	36	11	28-29	23	45-49	16
17	35-36	-	23	111-115	15	37	12	30-31	24	50-52	17
18	37-38	24	24	116-129	16	38	13	32-33	25	53-55	18
19	39-46	25	25-28	130-217	17-21	39	14-20	34-42	-	56-65	19

**Appendix B**

**Table B-27**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 7 Years, 6 Months Through 7 Years, 8 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0	0-4	0-4	NEG-26	-	-	0	0	0-2	0-2	1
2	1-2	5-6	5-7	27-36	-	0-1	1	1-2	3-5	3-4	2
3	3-4	7-8	8-9	37-41	0	2	-	3-4	6-7	5	3
4	5-7	9-10	10-11	42-46	1	3	2	5-6	8-9	6	4
5	8-10	11-12	12-13	47-51	2	4	3	7-8	10-11	7-8	5
6	11-13	13-14	14	52-56	3-4	5	-	9-10	12-13	9	6
7	14-16	15-16	15	57-61	5	6-8	4	11-12	14-15	10-11	7
8	17-19	17	16	62-67	6	9-20	-	13-14	16-17	12-13	8
9	20-22	18	17	68-73	7	21-25	5	15-16	18	14-16	9
10	23-24	19	18	74-79	8	26-29	-	17-18	19	17-19	10
11	25	-	-	80-85	9	30-31	6	19-20	-	20-23	11
12	26-27	20	19	86-91	10	32-33	7	21-22	20	24-29	12
13	28-29	21	20	92-98	11	34	8	23-24	-	30-36	13
14	30-31	22	21	99-104	12	35	9	25-26	21	37-42	14
15	32-33	-	22	105-109	13	36	10	27-28	22	43-47	15
16	34-35	23	23	110-114	14	37	11	29-30	23	48-51	16
17	36-37	-	24	115-119	15	38	12	31-32	24	52-54	17
18	38-39	24	25	120-134	16-17	-	13-14	33-34	25	55-57	18
19	40-46	25	26-28	135-217	18-21	39	15-20	35-42	-	58-65	19

**Table B-28**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 7 Years, 9 Months Through 7 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0	0-4	0-4	NEG-26	-	-	0	0	0-2	0-2	1
2	1-2	5-6	5-7	27-36	-	0-1	1	1-2	3-5	3-4	2
3	3-4	7-8	8-9	37-46	0-1	2	-	3-4	6-7	5	3
4	5-7	9-10	10-11	47-51	2	3	2	5-6	8-9	6	4
5	8-10	11-12	12-13	52-56	3	4	3	7-8	10-11	7-8	5
6	11-13	13-14	14	57-61	4	5	-	9-10	12-13	9	6
7	14-16	15-16	15	62-66	5	6-17	4	11-12	14-15	10-11	7
8	17-19	17	16	67-72	6	18-23	-	13-14	16-17	12-13	8
9	20-22	18	17	73-78	7	24-26	5	15-16	18	14-16	9
10	23-24	19	18	79-84	8	27-29	6	17-18	19	17-19	10
11	25	-	-	85-90	9	30-31	7	19-20	-	20-23	11
12	26-27	20	19	91-95	10	32-33	8	21-22	20	24-29	12
13	28-29	21	20	96-100	11	34	9	23-24	-	30-36	13
14	30-31	22	21	101-105	12	35	10	25-26	21	37-42	14
15	32-33	-	22	106-110	13	36	11	27-28	22	43-47	15
16	34-35	23	23	111-115	14	37	-	29-30	23	48-51	16
17	36-37	-	24	116-124	15	38	12	31-32	24	52-54	17
18	38-39	24	25	125-134	16-17	-	13-14	33-34	25	55-57	18
19	40-46	25	26-28	135-217	18-21	39	15-20	35-42	-	58-65	19

**Table B-29**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 0 Months Through 8 Years, 2 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-6	NEG-31	-	0	0	0-1	0-4	0-3	1
2	2	7-8	7-8	32-41	0	1-2	1	2-3	5-6	4	2
3	3-4	9-10	9-10	42-46	1	3	2	4-5	7-8	5	3
4	5-7	11-12	11-12	47-51	2	4	-	6-8	9-10	6	4
5	8-10	13-14	13	52-56	3-4	5	3	9-10	11-12	7-8	5
6	11-14	15	14	57-61	5	6-8	4	11	13-14	9-10	6
7	15-18	16	15	62-67	6	9-20	-	12-13	15-16	11-13	7
8	19-21	17	16	68-73	7	21-25	5	14-15	17	14-16	8
9	22-23	18	17	74-79	8	26-28	-	16-17	18	17-19	9
10	24	19	18	80-85	9	29-30	6	18-19	19	20-22	10
11	25-26	-	19	86-91	10	31	7	20-21	20	23-26	11
12	27-28	20	20	92-98	11	32-33	8	22-23	-	27-31	12
13	29-30	21	21	99-104	12	34	9	24-25	21	32-37	13
14	31-32	22	-	105-109	13	35	10	26-27	22	38-44	14
15	33-34	23	22	110-114	14	36	11	28-29	23	45-49	15
16	35-36	-	23	115-119	15	37	12	30-31	24	50-52	16
17	37-38	24	24	120-129	16	38	13	32-33	25	53-55	17
18	39-41	-	25-26	130-139	17-18	39	14-15	34-36	-	56-60	18
19	42-46	25	27-28	140-217	19-21	-	16-20	37-42	-	61-65	19

**Table B-30**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 3 Months Through 8 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-6	NEG-31	-	0	0	0-1	0-4	0-3	1
2	2	7-8	7-8	32-46	0-1	1-2	1	2-3	5-6	4	2
3	3-4	9-10	9-10	47-51	2	3	2	4-5	7-8	5	3
4	5-7	11-12	11-12	52-56	3	4	-	6-8	9-10	6	4
5	8-10	13-14	13	57-61	4	5	3	9-10	11-12	7-8	5
6	11-14	15	14	62-66	5	6-17	4	11	13-14	9-10	6
7	15-18	16	15	67-72	6	18-23	-	12-13	15-16	11-13	7
8	19-21	17	16	73-78	7	24-26	5	14-15	17	14-16	8
9	22-23	18	17	79-84	8	27-28	6	16-17	18	17-19	9
10	24	19	18	85-90	9	29-30	7	18-19	19	20-22	10
11	25-26	-	19	91-95	10	31	8	20-21	20	23-26	11
12	27-28	20	20	96-100	11	32-33	9	22-23	-	27-31	12
13	29-30	21	21	101-105	12	34	10	24-25	21	32-37	13
14	31-32	22	-	106-110	13	35	11	26-27	22	38-44	14
15	33-34	23	22	111-115	14	36	-	28-29	23	45-49	15
16	35-36	-	23	116-124	15	37	12	30-31	24	50-52	16
17	37-38	24	24	125-129	16	38	13	32-33	25	53-55	17
18	39-41	-	25-26	130-139	17-18	39	14-15	34-36	-	56-60	18
19	42-46	25	27-28	140-217	19-21	-	16-20	37-42	-	61-65	19

**Table B-31**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 6 Months Through 8 Years, 8 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-7	NEG-36	-	0-1	0	0-1	0-5	0-4	1
2	2	7-8	8-9	37-46	0-1	2	1	2-3	6-7	5	2
3	3-4	9-10	10-11	47-51	2	3	2	4-5	8-9	6	3
4	5-7	11-12	12-13	52-56	3	4	3	6-8	10-11	7-8	4
5	8-10	13-14	14	57-61	4	5	-	9-10	12-13	9	5
6	11-14	15-16	15	62-67	5	6-20	4	11-12	14-15	10-11	6
7	15-18	17	16	68-73	6	21-23	-	13-14	16-17	12-13	7
8	19-22	18	17	74-79	7	24-26	5	15-16	18	14-16	8
9	23-24	19	18	80-85	8	27-29	6	17-18	19	17-19	9
10	25	-	-	86-91	9	30-31	7	19-20	-	20-23	10
11	26-27	20	19	92-98	10	32-33	8	21-22	20	24-29	11
12	28-29	21	20	99-104	11	34	9	23-24	-	30-36	12
13	30-31	22	21	105-109	12	35	10	25-26	21	37-42	13
14	32-33	-	22	110-114	13	36	11	27-28	22	43-47	14
15	34-35	23	23	115-119	14	37	-	29-30	23	48-51	15
16	36-37	-	24	120-124	15	38	12	31-32	24	52-54	16
17	38-39	24	25	125-134	16-17	-	13-14	33-34	25	55-57	17
18	40-41	-	26	135-139	18	39	15	35-36	-	58-60	18
19	42-46	25	27-28	140-217	19-21	-	16-20	37-42	-	61-65	19

**Table B-32**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 9 Months Through 8 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-7	NEG-46	0-1	0-2	0	0-1	0-5	0-4	1
2	2	7-8	8-9	47-51	2	3	1	2-3	6-7	5	2
3	3-4	9-10	10-11	52-56	3	4	2	4-5	8-9	6	3
4	5-7	11-12	12-13	57-61	4	5	3	6-8	10-11	7-8	4
5	8-10	13-14	14	62-67	5	6-20	4	9-10	12-13	9-10	5
6	11-14	15-16	15	68-73	6	21-23	-	11-12	14-15	11-13	6
7	15-18	17	16	74-79	7	24-26	5	13-14	16-17	14-16	7
8	19-22	18	17	80-85	8	27-28	6	15-16	18	17-19	8
9	23-24	19	18	86-91	9	29-30	7	17-18	19	20-22	9
10	25	-	19	92-98	10	31	8	19-20	-	23-26	10
11	26-27	20	20	99-104	11	32-33	9	21-22	20	27-31	11
12	28-29	21	21	105-109	12	34	10	23-24	-	32-36	12
13	30-31	22	-	110-114	13	35	11	25-26	21	37-42	13
14	32-33	-	22	115-119	14	36	-	27-28	22	43-47	14
15	34-35	23	23	120-124	15	37	12	29-30	23	48-51	15
16	36-37	-	24	125-129	16	38	13	31-32	24	52-54	16
17	38-39	24	25	130-134	17	-	14	33-34	25	55-57	17
18	40-41	-	26	135-139	18	39	15	35-36	-	58-60	18
19	42-46	25	27-28	140-217	19-21	-	16-20	37-42	-	61-65	19

**Table B-33**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 9 Years, 0 Months Through 9 Years, 2 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-7	NEG-46	0-1	0-2	0	0-1	0-5	0-4	1
2	2	7-8	8-9	47-51	2	3	1	2-3	6-7	5	2
3	3-4	9-10	10-11	52-56	3	4	2	4-5	8-9	6	3
4	5-7	11-12	12-13	57-61	4	5	3	6-8	10-11	7-8	4
5	8-10	13-14	14	62-67	5	6-20	4	9-10	12-13	9-10	5
6	11-14	15-16	15	68-73	6	21-23	-	11-12	14-15	11-13	6
7	15-18	17	16	74-79	7	24-26	5	13-14	16-17	14-16	7
8	19-22	18	17	80-85	8	27-28	6	15-16	18	17-19	8
9	23-24	19	18	86-91	9	29-30	7	17-18	19	20-22	9
10	25	-	19	92-98	10	31	8	19-20	-	23-26	10
11	26-27	20	20	99-104	11	32-33	9	21-22	20	27-31	11
12	28-29	21	21	105-109	12	34	10	23-24	-	32-36	12
13	30-31	22	-	110-114	13	35	11	25-26	21	37-42	13
14	32-33	-	22	115-119	14	36	-	27-28	22	43-47	14
15	34-35	23	23	120-124	15	37	12	29-30	23	48-51	15
16	36-37	-	24	125-129	16	38	13	31-32	24	52-54	16
17	38-39	24	25	130-134	17	-	14	33-34	25	55-57	17
18	40-41	-	26	135-139	18	39	15	35-36	-	58-60	18
19	42-46	25	27-28	140-217	19-21	-	16-20	37-42	-	61-65	19

**Table B-34**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 9 Years, 3 Months Through 9 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-7	NEG-46	0-1	0-2	0	0-1	0-5	0-4	1
2	2	7-8	8-9	47-51	2	3	1	2-3	6-7	5	2
3	3-4	9-10	10-11	52-56	3	4	2	4-5	8-9	6	3
4	5-7	11-12	12-13	57-61	4	5	3	6-8	10-11	7-8	4
5	8-10	13-14	14	62-67	5	6-20	4	9-10	12-13	9-10	5
6	11-14	15-16	15	68-73	6	21-23	-	11-12	14-15	11-13	6
7	15-18	17	16	74-79	7	24-26	5	13-14	16-17	14-16	7
8	19-22	18	17	80-85	8	27-28	6	15-16	18	17-20	8
9	23-24	19	18	86-92	9	29-30	7	17-18	19	21-24	9
10	25	-	19	93-100	10	31	8	19-20	-	25-28	10
11	26-27	20	20	101-108	11	32-33	9	21-22	20	29-32	11
12	28-29	21	21	109-114	12	34	10	23-24	-	33-36	12
13	30-31	22	-	115-119	13	35	11	25-26	21	37-42	13
14	32-33	-	22	120-124	14	36	12	27-28	22	43-47	14
15	34-35	23	23	125-129	15	37	-	29-30	23	48-51	15
16	36-37	-	24	130-134	16	38	13	31-32	24	52-54	16
17	38-39	24	25	135-139	17	-	14	33-34	25	55-57	17
18	40-41	-	26	140-152	18	39	15	35-36	-	58-61	18
19	42-46	25	27-28	153-217	19-21	-	16-20	37-42	-	62-65	19



**Table B-35**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 9 Years, 6 Months Through 9 Years, 8 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-5	0-7	NEG-46	0-1	0-2	0	0-1	0-5	0-4	1
2	2	7-8	8-9	47-54	2-3	3-4	1	2-3	6-7	5-6	2
3	3-4	9-10	10-11	55-60	4	5	2	4-5	8-9	7	3
4	5-7	11-12	12-13	61-66	5	6-20	3	6-8	10-11	8-9	4
5	8-10	13-14	14-15	67-72	6	21-22	4	9-10	12-13	10-12	5
6	11-14	15-16	16	73-78	7	23-24	5	11-12	14-15	13-16	6
7	15-18	17	17	79-85	8	25-26	6	13-14	16-17	17-19	7
8	19-22	18	18	86-91	9	27-28	7	15-16	18	20-22	8
9	23-24	19	19	92-98	10	29-30	8	17-18	19	23-26	9
10	25-26	-	20	99-104	-	31	9	19-21	-	27-31	10
11	27-28	20	21	105-109	11	32-33	10	22-23	20	32-36	11
12	29-30	21	-	110-114	12	34	11	24-25	-	37-40	12
13	31-32	22	22	115-119	13	35	-	26-27	21	41-45	13
14	33-34	-	23	120-124	14	36	12	28-29	22	46-49	14
15	35-36	23	24	125-129	15	37	13	30-31	23	50-53	15
16	37-38	-	-	130-134	16	38	14	32-33	24	54-57	16
17	39-40	24	25	135-140	17	-	15	34-35	25	58-60	17
18	41-42	-	26	141-158	18	39	16	36-37	-	61-65	18
19	43-46	25	27-28	159-217	19-21	-	17-20	38-42	-	-	19

**Table B-36**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 9 Years, 9 Months Through 9 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-1	0-6	0-7	NEG-46	0-1	0-2	0	0-1	0-5	0-4	1
2	2	7-8	8-9	47-54	2-3	3-4	1	2-3	6-7	5-6	2
3	3-4	9-10	10-11	55-60	4	5	2	4-5	8-9	7	3
4	5-7	11-12	12-13	61-66	5	6-20	3	6-8	10-11	8-9	4
5	8-10	13-14	14-15	67-72	6	21-22	4	9-10	12-13	10-12	5
6	11-14	15-16	16	73-78	7	23-24	5	11-12	14-15	13-16	6
7	15-18	17	17	79-85	8	25-26	6	13-14	16-17	17-19	7
8	19-22	18	18	86-91	9	27-28	7	15-16	18	20-22	8
9	23-24	19	19	92-98	10	29-30	8	17-18	19	23-26	9
10	25-26	-	20	99-104	-	31	9	19-21	-	27-31	10
11	27-28	20	21	105-109	11	32-33	10	22-23	20	32-36	11
12	29-30	21	-	110-115	12	34	11	24-25	-	37-40	12
13	31-32	22	22	116-122	13	35	-	26-27	21	41-45	13
14	33-34	-	23	123-128	14	36	12	28-29	22	46-49	14
15	35-36	23	24	129-134	15	37	13	30-31	23	50-53	15
16	37-38	-	-	135-139	16	38	14	32-33	24	54-57	16
17	39-40	24	25	140-146	17	-	15	34-35	25	58-60	17
18	41-42	-	26	147-158	18	39	16	36-37	-	61-65	18
19	43-46	25	27-28	159-217	19-21	-	17-20	38-42	-	-	19

**Table B-37**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 0 Months Through 10 Years, 2 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	0-8	0-9	NEG-51	0-2	0-3	0-1	0-2	0-7	0-5	1
2	3	9-10	10-11	52-56	3	4	2	3-4	8-9	6	2
3	4-6	11-12	12-13	57-61	4	5	3	5-7	10-11	7-8	3
4	7-9	13-14	14	62-67	5	6-20	4	8-9	12-13	9-10	4
5	10-13	15-16	15	68-73	6	21-23	-	10-11	14-15	11-13	5
6	14-17	17	16	74-79	7	24-26	5	12-13	16-17	14-16	6
7	18-21	18	17	80-85	8	27-28	6	14-15	18	17-20	7
8	22-24	19	18	86-92	9	29-30	7	16-18	19	21-24	8
9	25	-	19	93-100	10	31	8	19-20	-	25-28	9
10	26-27	20	20	101-108	11	32-33	9	21-22	20	29-32	10
11	28-29	21	21	109-114	12	34	10	23-24	-	33-36	11
12	30-31	22	-	115-119	13	35	11	25-26	21	37-42	12
13	32-33	-	22	120-124	14	36	12	27-28	22	43-47	13
14	34-35	23	23	125-129	15	37	-	29-30	23	48-51	14
15	36-37	-	24	130-134	16	38	13	31-32	24	52-54	15
16	38-39	24	25	135-140	17	-	14	33-34	25	55-57	16
17	40-41	-	26	141-152	18	39	15	35-36	-	58-61	17
18	42-44	25	27	153-164	19	-	16-17	37-39	-	62-65	18
19	45-46	-	28	165-217	20-21	-	18-20	40-42	-	-	19

**Table B-38**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 3 Months Through 10 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	0-8	0-9	NEG-51	0-2	0-3	0-1	0-2	0-7	0-5	1
2	3	9-10	10-11	52-56	3	4	2	3-4	8-9	6	2
3	4-6	11-12	12-13	57-61	4	5	3	5-7	10-11	7-8	3
4	7-9	13-14	14	62-67	5	6-20	4	8-9	12-13	9-10	4
5	10-13	15-16	15	68-73	6	21-23	-	10-11	14-15	11-13	5
6	14-17	17	16	74-79	7	24-26	5	12-13	16-17	14-16	6
7	18-21	18	17	80-85	8	27-28	6	14-15	18	17-20	7
8	22-24	19	18	86-92	9	29-30	7	16-18	19	21-24	8
9	25	-	19	93-100	10	31	8	19-20	-	25-28	9
10	26-27	20	20	101-108	11	32-33	9	21-22	20	29-32	10
11	28-29	21	21	109-115	12	34	10	23-24	-	33-36	11
12	30-31	22	-	116-122	13	35	11	25-26	21	37-42	12
13	32-33	-	22	123-128	14	36	12	27-28	22	43-47	13
14	34-35	23	23	129-134	15	37	-	29-30	23	48-51	14
15	36-37	-	24	135-140	16	38	13	31-32	24	52-54	15
16	38-39	24	25	141-146	17	-	14	33-34	25	55-57	16
17	40-41	-	26	147-152	18	39	15	35-36	-	58-61	17
18	42-44	25	27	153-164	19	-	16-17	37-39	-	62-65	18
19	45-46	-	28	165-217	20-21	-	18-20	40-42	-	-	19

**Table B-39**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 6 Months Through 10 Years, 8 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	0-8	0-9	NEG-54	0-3	0-4	0-1	0-2	0-7	0-6	1
2	3	9-10	10-11	55-60	4	5	2	3-4	8-9	7	2
3	4-6	11-12	12-13	61-66	5	6-20	3	5-7	10-11	8-9	3
4	7-9	13-14	14-15	67-72	6	21-22	4	8-9	12-13	10-12	4
5	10-13	15-16	16	73-78	7	23-24	5	10-11	14-15	13-16	5
6	14-17	17	17	79-85	8	25-26	6	12-13	16-17	17-20	6
7	18-21	18	18	86-92	9	27-28	7	14-15	18	21-24	7
8	22-24	19	19	93-100	10	29-30	8	16-18	19	25-28	8
9	25-26	-	20	101-108	-	31	9	19-21	-	29-32	9
10	27-28	20	21	109-114	11	32-33	10	22-23	20	33-36	10
11	29-30	21	-	115-119	12	34	11	24-25	-	37-40	11
12	31-32	22	22	120-124	13	35	12	26-27	21	41-45	12
13	33-34	-	23	125-129	14	36	-	28-29	22	46-49	13
14	35-36	23	24	130-134	15	37	13	30-31	23	50-53	14
15	37-38	-	-	135-140	16	38	14	32-33	24	54-57	15
16	39-40	24	25	141-152	17	-	15	34-35	25	58-61	16
17	41-42	-	26	153-158	18	39	16	36-37	-	62-65	17
18	43-44	25	27	159-164	19	-	17	38-39	-	-	18
19	45-46	-	28	165-217	20-21	-	18-20	40-42	-	-	19

**Table B-40**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 10 Years, 9 Months Through 10 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	0-8	0-9	NEG-54	0-3	0-4	0-1	0-2	0-7	0-6	1
2	3	9-10	10-11	55-60	4	5	2	3-4	8-9	7	2
3	4-6	11-12	12-13	61-66	5	6-20	3	5-7	10-11	8-9	3
4	7-9	13-14	14-15	67-72	6	21-22	4	8-9	12-13	10-12	4
5	10-13	15-16	16	73-78	7	23-24	5	10-11	14-15	13-16	5
6	14-17	17	17	79-85	8	25-26	6	12-13	16-17	17-20	6
7	18-21	18	18	86-92	9	27-28	7	14-15	18	21-24	7
8	22-24	19	19	93-100	10	29-30	8	16-18	19	25-28	8
9	25-26	-	20	101-108	-	31	9	19-21	-	29-32	9
10	27-28	20	21	109-115	11	32-33	10	22-23	20	33-36	10
11	29-30	21	-	116-122	12	34	11	24-25	-	37-40	11
12	31-32	22	22	123-128	13	35	12	26-27	21	41-45	12
13	33-34	-	23	129-134	14	36	-	28-29	22	46-49	13
14	35-36	23	24	135-140	15	37	13	30-31	23	50-53	14
15	37-38	-	-	141-146	16	38	14	32-33	24	54-57	15
16	39-40	24	25	147-152	17	-	15	34-35	25	58-61	16
17	41-42	-	26	153-158	18	39	16	36-37	-	62-65	17
18	43-44	25	27	159-164	19	-	17	38-39	-	-	18
19	45-46	-	28	165-217	20-21	-	18-20	40-42	-	-	19



**Table B-41**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 11 Years, 0 Months Through 11 Years, 5 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	-	0-9	NEG-54	0-3	0-4	0-1	0-2	-	0-6	1
2	3	-	10-11	55-60	4	5	2	3-4	-	7	2
3	4-6	-	12-13	61-66	5	6-20	3	5-7	-	8-9	3
4	7-9	-	14-15	67-72	6	21-22	4	8-9	-	10-12	4
5	10-13	-	16	73-78	7	23-24	5	10-11	-	13-16	5
6	14-17	-	17	79-85	8	25-26	6	12-13	-	17-20	6
7	18-21	-	18	86-92	9	27-28	7	14-15	-	21-24	7
8	22-24	-	19	93-100	10	29-30	8	16-18	-	25-28	8
9	25-26	-	20	101-108	-	31	9	19-21	-	29-32	9
10	27-28	-	21	109-115	11	32-33	10	22-23	-	33-36	10
11	29-30	-	-	116-122	12	34	11	24-25	-	37-40	11
12	31-32	-	22	123-128	13	35	12	26-27	-	41-45	12
13	33-34	-	23	129-135	14	36	-	28-29	-	46-49	13
14	35-36	-	24	136-144	15	37	13	30-31	-	50-53	14
15	37-38	-	-	145-152	16	38	14	32-33	-	54-57	15
16	39-40	-	25	153-158	17	-	15	34-35	-	58-61	16
17	41-42	-	26	159-164	18	39	16	36-37	-	62-65	17
18	43-44	-	27	165-175	19	-	17	38-39	-	-	18
19	45-46	-	28	176-217	20-21	-	18-20	40-42	-	-	19

**Table B-42**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 11 Years, 6 Months Through 11 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	-	0-9	NEG-54	0-3	0-4	0-1	0-2	-	0-6	1
2	3	-	10-11	55-66	4	5-20	2	3-5	-	7-8	2
3	4-6	-	12-13	67-72	5	21-22	3	6-7	-	9-12	3
4	7-9	-	14-15	73-78	6	23-24	4	8-9	-	13-16	4
5	10-13	-	16	79-85	7	25-26	5	10-11	-	17-20	5
6	14-17	-	17	86-92	8	27-28	6	12-13	-	21-24	6
7	18-21	-	18	93-100	9	29	7	14-15	-	25-28	7
8	22-24	-	19-20	101-108	10	30-31	8	16-18	-	29-32	8
9	25-27	-	21	109-115	11	32	9	19-21	-	33-36	9
10	28-29	-	-	116-122	12	33	10	22-23	-	37-40	10
11	30-31	-	22	123-128	13	34	11	24-25	-	41-45	11
12	32-33	-	23	129-134	14	35	12	26-27	-	46-49	12
13	34-35	-	24	135-140	15	36	13	28-29	-	50-53	13
14	36-37	-	-	141-146	16	37	14	30-31	-	54-57	14
15	38-39	-	25	147-152	17	38	15	32-33	-	58-61	15
16	40-41	-	26	153-160	18	-	16	34-35	-	62-65	16
17	42-43	-	27	161-168	19	39	17	36-38	-	-	17
18	44-45	-	28	169-193	20	-	18-19	39-41	-	-	18
19	46	-	-	194-217	21	-	20	42	-	-	19

**Table B-43**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 12 Years, 0 Months Through 12 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-2	-	0-9	NEG-54	0-3	0-4	0-1	0-2	-	0-6	1
2	3	-	10-11	55-66	4	5-20	2	3-5	-	7-8	2
3	4-6	-	12-13	67-72	5	21-24	3	6-7	-	9-12	3
4	7-9	-	14-15	73-79	6	25	4	8-9	-	13-16	4
5	10-13	-	16	80-87	7	26	5	10-11	-	17-20	5
6	14-17	-	17	88-95	8	27-28	6	12-13	-	21-24	6
7	18-21	-	18	96-103	9	29	7	14-15	-	25-28	7
8	22-24	-	19-20	104-111	10	30-31	8	16-18	-	29-32	8
9	25-27	-	21	112-119	11	32	9	19-21	-	33-36	9
10	28-29	-	-	120-127	12	33	10	22-23	-	37-40	10
11	30-31	-	22	128-134	13	34	11	24-25	-	41-45	11
12	32-33	-	23	135-140	14	35	12	26-27	-	46-50	12
13	34-35	-	24	141-146	15	36	13	28-29	-	51-55	13
14	36-37	-	-	147-152	16	37	14	30-31	-	56-59	14
15	38-39	-	25	153-160	17	38	15	32-33	-	60-62	15
16	40-41	-	26	161-168	18	-	16	34-35	-	63-65	16
17	42-43	-	27	169-181	19	39	17	36-38	-	-	17
18	44-45	-	28	182-193	20	-	18-19	39-41	-	-	18
19	46	-	-	194-217	21	-	20	42	-	-	19

**Table B-44**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 12 Years, 6 Months Through 12 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-60	0-4	0-5	0-2	0-4	-	0-7	1
2	4-5	-	12-13	61-71	5	6-22	3	5-7	-	8-9	2
3	6-8	-	14-15	72-78	6	23-24	4	8-9	-	10-12	3
4	9-12	-	16	79-85	7	25-26	5	10-11	-	13-16	4
5	13-16	-	17	86-92	8	27	6	12-13	-	17-20	5
6	17-20	-	18	93-100	9	28	7	14-15	-	21-24	6
7	21-24	-	19	101-108	10	29-30	8	16-17	-	25-28	7
8	25-26	-	20	109-115	-	31	9	18-20	-	29-32	8
9	27-28	-	21	116-122	11	32-33	10	21-22	-	33-37	9
10	29-30	-	22	123-128	12	34	11	23-24	-	38-43	10
11	31-32	-	-	129-135	13	35	12	25-26	-	44-49	11
12	33-34	-	23	136-144	14	36	-	27-28	-	50-53	12
13	35-36	-	24	145-152	15	37	13	29-31	-	54-57	13
14	37-38	-	-	153-160	16	38	14	32-33	-	58-61	14
15	39-40	-	25	161-168	17	-	15	34-35	-	62-65	15
16	41-42	-	26	169-175	18	39	16-17	36-37	-	-	16
17	43-44	-	27	176-187	19	-	18	38-39	-	-	17
18	45-46	-	28	188-199	20-21	-	19-20	40-42	-	-	18
19	-	-	-	200-217	-	-	-	-	-	-	19

**Table B-45**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 13 Years, 0 Months Through 13 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-66	0-4	0-20	0-2	0-5	-	0-8	1
2	4-5	-	12-13	67-72	5	21-24	3	6-7	-	9-12	2
3	6-8	-	14-15	73-79	6	25	4	8-9	-	13-16	3
4	9-12	-	16	80-87	7	26	5	10-11	-	17-20	4
5	13-16	-	17	88-95	8	27-28	6	12-13	-	21-24	5
6	17-20	-	18	96-103	9	29	7	14-15	-	25-28	6
7	21-24	-	19-20	104-111	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	112-119	11	32	9	18-20	-	33-36	8
9	28-29	-	-	120-127	12	33	10	21-22	-	37-40	9
10	30-31	-	22	128-135	13	34	11	23-24	-	41-45	10
11	32-33	-	23	136-144	14	35	12	25-26	-	46-50	11
12	34-35	-	24	145-152	15	36	13	27-28	-	51-55	12
13	36-37	-	-	153-160	16	37	14	29-31	-	56-59	13
14	38-39	-	25	161-168	17	38	15	32-33	-	60-62	14
15	40-41	-	26	169-175	18	-	16	34-35	-	63-65	15
16	42-43	-	27	176-181	19	39	17	36-38	-	-	16
17	44-45	-	28	182-193	20	-	18-19	39-41	-	-	17
18	46	-	-	194-199	21	-	20	42	-	-	18
19	-	-	-	200-217	-	-	-	-	-	-	19

**Table B-46**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 13 Years, 6 Months Through 13 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-71	0-4	0-24	0-2	0-5	-	0-8	1
2	4-5	-	12-13	72-79	5	25	3	6-7	-	9-12	2
3	6-8	-	14-15	80-87	6	26	4	8-9	-	13-16	3
4	9-12	-	16	88-95	7	27	5	10-11	-	17-20	4
5	13-16	-	17	96-103	8	28	6	12-13	-	21-24	5
6	17-20	-	18	104-111	9	29	7	14-15	-	25-28	6
7	21-24	-	19-20	112-119	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	120-127	11	32	9	18-20	-	33-37	8
9	28-29	-	22	128-135	12	33	10	21-22	-	38-43	9
10	30-31	-	-	136-144	13	34	11	23-24	-	44-50	10
11	32-33	-	23	145-152	14	35	12	25-26	-	51-55	11
12	34-35	-	24	153-160	15	36	13	27-28	-	56-59	12
13	36-37	-	-	161-168	16	37	14	29-31	-	60-62	13
14	38-39	-	25	169-175	17	38	15	32-33	-	63-65	14
15	40-41	-	26	176-181	18	-	16-17	34-35	-	-	15
16	42-43	-	27	182-187	19	39	18	36-38	-	-	16
17	44-45	-	28	188-193	20	-	19	39-41	-	-	17
18	46	-	-	194-199	21	-	20	42	-	-	18
19	-	-	-	200-217	-	-	-	-	-	-	19

**Appendix B**

**Table B-47**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 14 Years, 0 Months Through 14 Years, 5 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-71	0-4	0-24	0-2	0-5	-	0-8	1
2	4-5	-	12-13	72-79	5	25	3	6-7	-	9-12	2
3	6-8	-	14-15	80-87	6	26	4	8-9	-	13-16	3
4	9-12	-	16	88-95	7	27	5	10-11	-	17-20	4
5	13-16	-	17	96-103	8	28	6	12-13	-	21-24	5
6	17-20	-	18	104-111	9	29	7	14-15	-	25-28	6
7	21-24	-	19-20	112-119	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	120-127	11	32	9	18-20	-	33-37	8
9	28-29	-	22	128-135	12	33	10	21-22	-	38-43	9
10	30-31	-	-	136-144	13	34	11	23-24	-	44-50	10
11	32-33	-	23	145-152	14	35	12	25-26	-	51-55	11
12	34-35	-	24	153-160	15	36	13	27-28	-	56-59	12
13	36-37	-	-	161-168	16	37	14	29-31	-	60-62	13
14	38-39	-	25	169-175	17	38	15	32-33	-	63-65	14
15	40-41	-	26	176-181	18	-	16-17	34-35	-	-	15
16	42-43	-	27	182-187	19	39	18	36-38	-	-	16
17	44-45	-	28	188-193	20	-	19	39-41	-	-	17
18	46	-	-	194-199	21	-	20	42	-	-	18
19	-	-	-	200-217	-	-	-	-	-	-	19

**Table B-48**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 14 Years, 6 Months Through 14 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-71	0-4	0-24	0-2	0-5	-	0-8	1
2	4-5	-	12-13	72-79	5	25	3	6-7	-	9-12	2
3	6-8	-	14-15	80-87	6	26	4	8-9	-	13-16	3
4	9-12	-	16	88-95	7	27	5	10-11	-	17-20	4
5	13-16	-	17	96-103	8	28	6	12-13	-	21-24	5
6	17-20	-	18	104-111	9	29	7	14-15	-	25-28	6
7	21-24	-	19-20	112-119	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	120-127	11	32	9	18-20	-	33-37	8
9	28-29	-	22	128-135	12	33	10	21-22	-	38-43	9
10	30-31	-	-	136-144	13	34	11	23-24	-	44-50	10
11	32-33	-	23	145-152	14	35	12	25-26	-	51-55	11
12	34-35	-	24	153-160	15	36	13	27-28	-	56-59	12
13	36-37	-	-	161-168	16	37	14	29-31	-	60-62	13
14	38-39	-	25	169-175	17	38	15	32-33	-	63-65	14
15	40-41	-	26	176-181	18	-	16-17	34-35	-	-	15
16	42-43	-	27	182-187	19	39	18	36-38	-	-	16
17	44-45	-	28	188-193	20	-	19	39-41	-	-	17
18	46	-	-	194-199	21	-	20	42	-	-	18
19	-	-	-	200-217	-	-	-	-	-	-	19

**Table B-49**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 0 Months Through 15 Years, 5 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-71	0-4	0-24	0-2	0-5	-	0-8	1
2	4-6	-	12-14	72-84	5	25	3	6-7	-	9-12	2
3	7-9	-	15-16	85-92	6	26	4	8-9	-	13-16	3
4	10-13	-	17	93-100	7	27	5	10-11	-	17-20	4
5	14-17	-	18	101-108	8	28	6	12-13	-	21-24	5
6	18-21	-	19	109-116	9	29	7	14-15	-	25-28	6
7	22-24	-	20	117-124	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	125-132	11	32	9	18-20	-	33-37	8
9	28-29	-	22	133-140	12	33	10	21-22	-	38-43	9
10	30-31	-	23	141-148	13	34	11	23-24	-	44-50	10
11	32-33	-	-	149-158	14	35	12	25-26	-	51-55	11
12	34-35	-	24	159-166	15	36	13	27-28	-	56-59	12
13	36-37	-	25	167-173	16	37	14	29-31	-	60-62	13
14	38-39	-	-	174-180	17	38	15	32-33	-	63-65	14
15	40-41	-	26	181-186	18	-	16-17	34-35	-	-	15
16	42-43	-	27	187-192	19	39	18	36-38	-	-	16
17	44-45	-	28	193-198	20	-	19	39-41	-	-	17
18	46	-	-	199-204	21	-	20	42	-	-	18
19	-	-	-	205-217	-	-	-	-	-	-	19

**Table B-50**  
 Attention & Memory - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 6 Months Through 15 Years, 11 Months

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-3	-	0-11	NEG-71	0-4	0-24	0-2	0-5	-	0-8	1
2	4-6	-	12-14	72-84	5	25	3	6-7	-	9-12	2
3	7-9	-	15-16	85-92	6	26	4	8-9	-	13-16	3
4	10-13	-	17	93-100	7	27	5	10-11	-	17-20	4
5	14-17	-	18	101-108	8	28	6	12-13	-	21-24	5
6	18-21	-	19	109-116	9	29	7	14-15	-	25-28	6
7	22-24	-	20	117-124	10	30-31	8	16-17	-	29-32	7
8	25-27	-	21	125-132	11	32	9	18-20	-	33-37	8
9	28-29	-	22	133-140	12	33	10	21-22	-	38-43	9
10	30-31	-	23	141-148	13	34	11	23-24	-	44-50	10
11	32-33	-	-	149-158	14	35	12	25-26	-	51-55	11
12	34-35	-	24	159-166	15	36	13	27-28	-	56-59	12
13	36-37	-	25	167-173	16	37	14	29-31	-	60-62	13
14	38-39	-	-	174-180	17	38	15	32-33	-	63-65	14
15	40-41	-	26	181-186	18	-	16-17	34-35	-	-	15
16	42-43	-	27	187-192	19	39	18	36-38	-	-	16
17	44-45	-	28	193-198	20	-	19	39-41	-	-	17
18	46	-	-	199-204	21	-	20	42	-	-	18
19	-	-	-	205-217	-	-	-	-	-	-	19

**Appendix B**

**Table B-51**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 16 Years, 0 Months Through 16 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-5	-	0-13	NEG-79	0-5	0-25	0-3	0-6	-	0-8	1
2	6-8	-	14-15	80-87	6	26	4	7-8	-	9-12	2
3	9-12	-	16	88-95	7	27	5	9-10	-	13-16	3
4	13-16	-	17	96-103	8	28	6	11-12	-	17-20	4
5	17-20	-	18	104-111	9	29	7	13-14	-	21-24	5
6	21-24	-	19-20	112-119	10	30-31	8	15-16	-	25-28	6
7	25-27	-	21	120-127	11	32	9	17-19	-	29-32	7
8	28-29	-	22	128-135	12	33	10	20-21	-	33-37	8
9	30	-	-	136-144	13	34	11	22-23	-	38-43	9
10	31-32	-	23	145-152	14	35	12	24-25	-	44-50	10
11	33-34	-	24	153-160	15	36	13	26-27	-	51-55	11
12	35-36	-	-	161-168	-	37	14	28-30	-	56-59	12
13	37	-	25	169-175	16	38	15	31-32	-	60-62	13
14	38-39	-	26	176-181	17	-	16-17	33-35	-	63-65	14
15	40-41	-	27	182-187	18	39	18	36-38	-	-	15
16	42-43	-	28	188-193	19	-	19	39-41	-	-	16
17	44-45	-	-	194-199	20	-	20	42	-	-	17
18	46	-	-	200-210	21	-	-	-	-	-	18
19	-	-	-	211-217	-	-	-	-	-	-	19

**Table B-52**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 17 Years, 0 Months Through 17 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-6	-	0-14	NEG-84	0-5	0-25	0-3	0-6	-	0-8	1
2	7-9	-	15-16	85-92	6	26	4	7-8	-	9-12	2
3	10-13	-	17	93-100	7	27	5	9-10	-	13-16	3
4	14-17	-	18	101-108	8	28	6	11-12	-	17-20	4
5	18-21	-	19	109-116	9	29	7	13-14	-	21-24	5
6	22-24	-	20	117-124	10	30-31	8	15-16	-	25-28	6
7	25-27	-	21	125-132	11	32	9	17-19	-	29-32	7
8	28-29	-	22	133-140	12	33	10	20-21	-	33-37	8
9	30	-	23	141-148	13	34	11	22-23	-	38-43	9
10	31-32	-	-	149-158	14	35	12	24-25	-	44-50	10
11	33-34	-	24	159-166	15	36	13	26-27	-	51-55	11
12	35-36	-	25	167-173	-	37	14	28-30	-	56-59	12
13	37	-	-	174-180	16	38	15	31-32	-	60-62	13
14	38-39	-	26	181-186	17	-	16-17	33-35	-	63-65	14
15	40-41	-	27	187-192	18	39	18	36-38	-	-	15
16	42-43	-	28	193-198	19	-	19	39-41	-	-	16
17	44-45	-	-	199-204	20	-	20	42	-	-	17
18	46	-	-	205-210	21	-	-	-	-	-	18
19	-	-	-	211-217	-	-	-	-	-	-	19



**Table B-53**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 18 Years, 0 Months Through 18 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-6	-	0-14	NEG-84	0-5	0-25	0-3	0-6	-	0-8	1
2	7-9	-	15-16	85-92	6	26	4	7-8	-	9-12	2
3	10-13	-	17	93-100	7	27	5	9-10	-	13-16	3
4	14-17	-	18	101-108	8	28	6	11-12	-	17-20	4
5	18-21	-	19	109-116	9	29	7	13-14	-	21-24	5
6	22-24	-	20	117-124	10	30-31	8	15-16	-	25-28	6
7	25-27	-	21	125-132	11	32	9	17-19	-	29-32	7
8	28-29	-	22	133-140	12	33	10	20-21	-	33-37	8
9	30	-	23	141-148	13	34	11	22-23	-	38-43	9
10	31-32	-	-	149-158	14	35	12	24-25	-	44-50	10
11	33-34	-	24	159-166	15	36	13	26-27	-	51-55	11
12	35-36	-	25	167-173	-	37	14	28-30	-	56-59	12
13	37	-	-	174-180	16	38	15	31-32	-	60-62	13
14	38-39	-	26	181-186	17	-	16-17	33-35	-	63-65	14
15	40-41	-	27	187-192	18	39	18	36-38	-	-	15
16	42-43	-	28	193-198	19	-	19	39-41	-	-	16
17	44-45	-	-	199-204	20	-	20	42	-	-	17
18	46	-	-	205-210	21	-	-	-	-	-	18
19	-	-	-	211-217	-	-	-	-	-	-	19

**Table B-54**  
**Attention & Memory - Conversion of Raw Scores to Scaled Scores**  
**Age 19 Years, 0 Months Through 19 Years, 11 Months**

Scaled Score	Associated Pairs	Immediate Recognit.	Forward Memory	Attention Sustained	Reverse Memory	Visual Coding	Spatial Memory	Delayed Pairs	Delayed Recognit.	Attention Divided	Scaled Score
1	0-6	-	0-16	NEG-92	0-5	0-25	0-3	0-8	-	0-8	1
2	7-9	-	17	93-100	6	26	4	7-8	-	9-12	2
3	10-13	-	18	101-108	7	27	5	9-10	-	13-16	3
4	14-17	-	19	109-116	8	28	6	11-12	-	17-20	4
5	18-21	-	-	117-124	9	29	7	13-14	-	21-24	5
6	22-24	-	20	125-132	10	30-31	8	15-16	-	25-28	6
7	25-27	-	21	133-140	11	32	9	17-19	-	29-32	7
8	28-29	-	22-23	141-148	12	33	10	20-21	-	33-37	8
9	30	-	-	149-158	13	34	11	22-23	-	38-43	9
10	31-32	-	-	159-166	14	35	12	24-25	-	44-50	10
11	33-34	-	24-25	167-173	15	36	13	26-27	-	51-55	11
12	35-36	-	-	174-180	-	37	14	28-30	-	56-59	12
13	37	-	-	181-186	16	38	15	31-32	-	60-62	13
14	38-39	-	26	187-192	17	-	16-17	33-35	-	63-65	14
15	40-41	-	27	193-198	18	39	18	36-38	-	-	15
16	42-43	-	28	199-204	19	-	19	39-41	-	-	16
17	44-45	-	-	205-210	20	-	20	42	-	-	17
18	46	-	-	-	21	-	-	-	-	-	18
19	-	-	-	211-217	-	-	-	-	-	-	19



**Table C1.25**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 7 Years, 0 Months Through 7 Years, 2 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-2	-	0-2	-	-	0-29	116-217	0	1
2	3	-	3	-	-	30-34	69-115	1-2	2
3	4	0	4	0	-	35-39	23-68	3-5	3
4	5	1	5	1	-	40-44	13-22	6-9	4
5	6	2	6	2	-	45-49	8-12	10-13	5
6	7	3	7	3	-	50-54	5-7	14-16	6
7	8	4	-	4	-	55-59	3-4	17-20	7
8	9	5	8	-	0	60-64	2	21-23	8
9	10	6	9	5	-	65-69	-	24-27	9
10	11	7	10	6	1	70-75	1	28-31	10
11	-	8	11	7	-	76-80	-	32-36	11
12	12	9	12	8	2	81-85	0	37-41	12
13	-	10	-	9	-	86-90	-	42-47	13
14	13	11	13	10	3	91-95	-	48-53	14
15	-	12	-	11	4	96-101	-	54-59	15
16	-	13	-	12	5	102-106	-	60-64	16
17	-	14	-	13	6	107-111	-	65-69	17
18	-	15	-	14	7	112-116	-	70-73	18
19	-	16-19	-	15-19	8-9	117-217	-	74	19

**Table C1.26**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 7 Years, 3 Months Through 7 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-2	-	0-2	-	-	0-29	116-217	0	1
2	3	-	3	-	-	30-34	69-115	1-2	2
3	4	0	4	0	-	35-44	23-68	3-6	3
4	5	1	5	1	-	45-49	13-22	7-10	4
5	6	2	6	2	-	50-54	8-12	11-14	5
6	7	3	7	3	-	55-59	5-7	15-18	6
7	8	4	-	4	-	60-64	3-4	19-22	7
8	9	5	8	-	0	65-69	2	23-26	8
9	10	6	9	5	-	70-75	-	27-30	9
10	11	7	10	6	1	76-80	1	31-34	10
11	-	8	11	7	-	81-85	-	35-39	11
12	12	9	12	8	2	86-90	0	40-44	12
13	-	10	-	9	3	91-95	-	45-49	13
14	13	11	13	10-11	4	96-100	-	50-54	14
15	-	12	-	12	5	101-105	-	55-59	15
16	-	13	-	13	6	106-110	-	60-64	16
17	-	14	-	14	7	111-115	-	65-69	17
18	-	15	-	15	8	116-131	-	70-73	18
19	-	16-19	-	16-19	9	132-217	-	74	19

Table C1.27

Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
Age 7 Years, 6 Months Through 7 Years, 8 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-2	-	0-2	-	-	0-29	116-217	0	1
2	3	-	3	-	-	30-39	69-115	1-5	2
3	4	0	4	0	-	40-44	23-68	6-9	3
4	5	1	5	1	-	45-49	13-22	10-13	4
5	6	2	6	2	-	50-54	8-12	14-16	5
6	7	3	7	3	-	55-59	5-7	17-20	6
7	8	4	8	4	0	60-64	3-4	21-23	7
8	9	5	9	5	-	65-69	2	24-27	8
9	10	6	-	6	1	70-75	-	28-31	9
10	11	7	10	7	-	76-81	1	32-36	10
11	-	8-9	11	8	2	82-88	-	37-41	11
12	12	10	12	9	-	89-95	0	42-47	12
13	-	11	-	10	3	96-100	-	48-53	13
14	13	12	13	11	4	101-105	-	54-58	14
15	-	13	-	12	5	106-110	-	59-62	15
16	-	14	-	13	6	111-115	-	63-66	16
17	-	15	-	14	7	116-121	-	67-70	17
18	-	16	-	15-16	8-9	122-136	-	71-73	18
19	-	17-19	-	17-19	-	137-217	-	74	19

Table C1.28

Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
Age 7 Years, 9 Months Through 7 Years, 11 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-2	-	0-2	-	-	0-29	116-217	0	1
2	3	-	3	-	-	30-39	69-115	1-5	2
3	4	0	4	0	-	40-45	23-68	6-9	3
4	5	1	5	1	-	46-51	13-22	10-13	4
5	6	2	6	2	-	52-57	8-12	14-16	5
6	7	3	7	3	-	58-63	5-7	17-20	6
7	8	4	8	4	0	64-69	3-4	21-23	7
8	9	5	9	5	-	70-75	2	24-27	8
9	10	6	-	6	1	76-80	-	28-31	9
10	11	7	10	7	-	81-85	1	32-36	10
11	-	8-9	11	8	2	86-90	-	37-41	11
12	12	10	12	9	-	91-95	0	42-47	12
13	-	11	-	10	3	96-101	-	48-53	13
14	13	12	13	11	4	102-106	-	54-58	14
15	-	13	-	12	5	107-111	-	59-62	15
16	-	14	-	13	6	112-116	-	63-66	16
17	-	15	-	14	7	117-126	-	67-70	17
18	-	16	-	15-16	8-9	127-136	-	71-73	18
19	-	17-19	-	17-19	-	137-217	-	74	19

**Table C1.29**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 0 Months Through 8 Years, 2 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-34	96-217	0-2	1
2	4	-	4	-	-	35-44	57-95	3-6	2
3	5	0	5	0	-	45-49	20-56	7-10	3
4	6	1	6	1	-	50-54	11-19	11-14	4
5	7	2	7	2	-	55-59	6-10	15-18	5
6	8	3	-	3	-	60-64	4-5	19-22	6
7	9	4-5	8	4	0	65-69	3	23-26	7
8	10	6	9	5	-	70-75	2	27-30	8
9	-	7	10	6	1	76-81	-	31-34	9
10	11	8	11	7	-	82-88	1	35-39	10
11	-	9	12	8	2	89-95	-	40-44	11
12	12	10	-	9	3	96-100	0	45-49	12
13	-	11	13	10-11	4	101-105	-	50-54	13
14	13	12	-	12	5	106-110	-	55-59	14
15	-	13	-	13	6	111-115	-	60-64	15
16	-	14	-	14	7	116-121	-	65-69	16
17	-	15	-	15	8	122-131	-	70-73	17
18	-	16-17	-	16-17	9	132-141	-	74	18
19	-	18-19	-	18-19	-	142-217	-	-	19

**Table C1.30**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 8 Years, 3 Months Through 8 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-34	96-217	0-2	1
2	4	-	4	-	-	35-45	57-95	3-6	2
3	5	0	5	0	-	46-51	20-56	7-10	3
4	6	1	6	1	-	52-57	11-19	11-14	4
5	7	2	7	2	-	58-63	6-10	15-18	5
6	8	3	-	3	-	64-69	4-5	19-22	6
7	9	4-5	8	4	0	70-75	3	23-26	7
8	10	6	9	5	-	76-80	2	27-30	8
9	-	7	10	6	1	81-85	-	31-34	9
10	11	8	11	7	-	86-90	1	35-39	10
11	-	9	12	8	2	91-95	-	40-44	11
12	12	10	-	9	3	96-101	0	45-49	12
13	-	11	13	10-11	4	102-106	-	50-54	13
14	13	12	-	12	5	107-111	-	55-59	14
15	-	13	-	13	6	112-116	-	60-64	15
16	-	14	-	14	7	117-126	-	65-69	16
17	-	15	-	15	8	127-131	-	70-73	17
18	-	16-17	-	16-17	9	132-141	-	74	18
19	-	18-19	-	18-19	-	142-217	-	-	19

Table C1.31

Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 6 Months Through 8 Years, 8 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-39	96-217	0-5	1
2	4	-	4	-	-	40-45	57-95	6-9	2
3	5	0	5	0	-	46-51	20-56	10-13	3
4	6	1	6	1	-	52-57	11-19	14-16	4
5	7	2	7	2	-	58-63	6-10	17-20	5
6	8	3	8	3	0	64-69	4-5	21-23	6
7	9	4-5	9	4-5	-	70-75	3	24-27	7
8	10	6	-	6	1	76-81	2	28-31	8
9	-	7	10	7	-	82-88	-	32-36	9
10	11	8-9	11	8	2	89-95	1	37-41	10
11	-	10	12	9	-	96-101	-	42-47	11
12	12	11	-	10	3	102-106	0	48-53	12
13	-	12	13	11	4	107-111	-	54-58	13
14	13	13	-	12	5	112-116	-	59-62	14
15	-	14	-	13	6	117-121	-	63-66	15
16	-	15	-	14	7	122-126	-	67-70	16
17	-	16	-	15-16	8-9	127-136	-	71-73	17
18	-	17	-	17	-	137-141	-	74	18
19	-	18-19	-	18-19	-	142-217	-	-	19

Table C1.32

Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 8 Years, 9 Months Through 8 Years, 11 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-45	96-217	0-6	1
2	4	-	4	-	-	46-51	57-95	7-10	2
3	5	0	5	0	-	52-57	20-56	11-14	3
4	6	1	6	1	-	58-63	11-19	15-18	4
5	7	2	7	2	-	64-69	6-10	19-22	5
6	8	3	8	3	0	70-75	4-5	23-26	6
7	9	4-5	9	4-5	-	76-81	3	27-30	7
8	10	6	-	6	1	82-88	2	31-34	8
9	-	7	10	7	-	89-95	-	35-39	9
10	11	8-9	11	8	2	96-101	1	40-44	10
11	-	10	12	9	3	102-106	-	45-49	11
12	12	11	-	10-11	4	107-111	0	50-54	12
13	-	12	13	12	5	112-116	-	55-58	13
14	13	13	-	13	6	117-121	-	59-62	14
15	-	14	-	14	7	122-126	-	63-66	15
16	-	15	-	15	8	127-131	-	67-70	16
17	-	16	-	16	9	132-136	-	71-73	17
18	-	17	-	17	-	137-141	-	74	18
19	-	18-19	-	18-19	-	142-217	-	-	19

**Table C1.33**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
Age 9 Years, 0 Months Through 9 Years, 2 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-45	96-217	0-6	1
2	4	-	4	-	-	46-51	57-95	7-10	2
3	5	0	5	0	-	52-57	20-56	11-14	3
4	6	1	6	1	-	58-63	11-19	15-18	4
5	7	2	7	2	-	64-69	6-10	19-22	5
6	8	3	8	3	0	70-75	4-5	23-26	6
7	9	4-5	9	4-5	-	76-81	3	27-30	7
8	10	6	-	6	1	82-88	2	31-34	8
9	-	7	10	7	-	89-95	-	35-39	9
10	11	8-9	11	8	2	96-101	1	40-44	10
11	-	10	12	9	3	102-106	-	45-49	11
12	12	11	-	10-11	4	107-111	0	50-54	12
13	-	12	13	12	5	112-116	-	55-58	13
14	13	13	-	13	6	117-121	-	59-62	14
15	-	14	-	14	7	122-126	-	63-66	15
16	-	15	-	15	8	127-131	-	67-70	16
17	-	16	-	16	9	132-136	-	71-73	17
18	-	17	-	17	-	137-141	-	74	18
19	-	18-19	-	18-19	-	142-217	-	-	19

**Table C1.34**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
Age 9 Years, 3 Months Through 9 Years, 5 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-45	96-217	0-6	1
2	4	-	4	-	-	46-51	57-95	7-10	2
3	5	0	5	0	-	52-57	20-56	11-14	3
4	6	1	6	1	-	58-63	11-19	15-18	4
5	7	2	7	2	-	64-69	6-10	19-22	5
6	8	3	8	3	0	70-75	4-5	23-26	6
7	9	4-5	9	4-5	-	76-81	3	27-30	7
8	10	6	-	6	1	82-88	2	31-34	8
9	-	7	10	7	-	89-95	-	35-39	9
10	11	8-9	11	8	2	96-102	1	40-44	10
11	-	10	12	9	3	103-109	-	45-49	11
12	12	11	-	10-11	4	110-116	0	50-54	12
13	-	12	13	12	5	117-121	-	55-58	13
14	13	13	-	13	6	122-126	-	59-62	14
15	-	14	-	14	7	127-131	-	63-66	15
16	-	15	-	15	8	132-136	-	67-70	16
17	-	16	-	16	9	137-141	-	71-73	17
18	-	17	-	17	-	142-154	-	74	18
19	-	18-19	-	18-19	-	155-217	-	-	19

**Table C1.35**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 6 Months Through 9 Years, 8 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-45	96-217	0-6	1
2	4	-	4	-	-	46-57	57-95	7-10	2
3	5	0	5	0	-	58-63	20-56	11-14	3
4	6	1	6	1	-	64-69	11-19	15-18	4
5	7	2	7	2	-	70-75	6-10	19-22	5
6	8	3	8	3	0	76-81	4-5	23-26	6
7	9	4-5	9	4-5	-	82-88	3	27-31	7
8	10	6	-	6	1	89-95	2	32-36	8
9	-	7	10	7	-	96-101	-	37-40	9
10	11	8-9	11	8	2	102-106	1	41-45	10
11	-	10-11	12	9	3	107-111	-	46-50	11
12	12	12	-	10-11	4	112-116	0	51-55	12
13	-	13	13	12	5	117-121	-	56-60	13
14	13	14	-	13	6	122-126	-	61-64	14
15	-	15	-	14	7	127-131	-	65-68	15
16	-	16	-	15-16	8	132-136	-	69-71	16
17	-	17	-	17	9	137-142	-	72-73	17
18	-	18	-	18	-	143-160	-	74	18
19	-	19	-	19	-	161-217	-	-	19

**Table C1.36**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 9 Years, 9 Months Through 9 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-3	-	0-3	-	-	0-45	96-217	0-6	1
2	4	-	4	-	-	46-57	57-95	7-10	2
3	5	0	5	0	-	58-63	20-56	11-14	3
4	6	1	6	1	-	64-69	11-19	15-18	4
5	7	2	7	2	-	70-75	6-10	19-22	5
6	8	3	8	3	0	76-81	4-5	23-26	6
7	9	4-5	9	4-5	-	82-88	3	27-31	7
8	10	6	-	6	1	89-95	2	32-36	8
9	-	7	10	7	-	96-101	-	37-40	9
10	11	8-9	11	8	2	102-106	1	41-45	10
11	-	10-11	12	9	3	107-111	-	46-50	11
12	12	12	-	10-11	4	112-116	0	51-55	12
13	-	13	13	12	5	117-123	-	56-60	13
14	13	14	-	13	6	124-130	-	61-64	14
15	-	15	-	14	7	131-136	-	65-68	15
16	-	16	-	15-16	8	137-141	-	69-71	16
17	-	17	-	17	9	142-148	-	72-73	17
18	-	18	-	18	-	149-160	-	74	18
19	-	19	-	19	-	161-217	-	-	19



**Appendix C**

**Table C1.37**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 0 Months Through 10 Years, 2 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten. Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-51	76-217	0-7	1
2	5	0	4	-	-	52-57	46-75	8-12	2
3	6	1	5	0	-	58-63	17-45	13-16	3
4	7	2	6	1	-	64-69	9-16	17-21	4
5	8	3	7	2	0	70-75	4-8	22-26	5
6	9	4-5	8	3	-	76-81	3	27-30	6
7	10	6	9	4-5	1	82-88	2	31-34	7
8	-	7	10	6	-	89-95	-	35-39	8
9	11	8-9	11	7-8	2	96-102	-	40-44	9
10	-	10	12	9	3	103-109	1	45-49	10
11	12	11	-	10-11	4	110-116	-	50-54	11
12	-	12	-	12	5	117-121	0	55-58	12
13	13	13	13	13	6	122-126	-	59-62	13
14	-	14	-	14	7	127-131	-	63-66	14
15	-	15	-	15	8	132-136	-	67-70	15
16	-	16	-	16	9	137-142	-	71-73	16
17	-	17	-	17	-	143-154	-	74	17
18	-	18-19	-	18-19	-	155-166	-	-	18
19	-	-	-	-	-	167-217	-	-	19

**Table C1.38**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 3 Months Through 10 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten. Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-51	76-217	0-7	1
2	5	0	4	-	-	52-57	46-75	8-12	2
3	6	1	5	0	-	58-63	17-45	13-16	3
4	7	2	6	1	-	64-69	9-16	17-21	4
5	8	3	7	2	0	70-75	4-8	22-26	5
6	9	4-5	8	3	-	76-81	3	27-30	6
7	10	6	9	4-5	1	82-88	2	31-34	7
8	-	7	10	6	-	89-95	-	35-39	8
9	11	8-9	11	7-8	2	96-102	-	40-44	9
10	-	10	12	9	3	103-109	1	45-49	10
11	12	11	-	10-11	4	110-116	-	50-54	11
12	-	12	-	12	5	117-123	0	55-58	12
13	13	13	13	13	6	124-130	-	59-62	13
14	-	14	-	14	7	131-136	-	63-66	14
15	-	15	-	15	8	137-142	-	67-70	15
16	-	16	-	16	9	143-148	-	71-73	16
17	-	17	-	17	-	149-154	-	74	17
18	-	18-19	-	18-19	-	155-166	-	-	18
19	-	-	-	-	-	167-217	-	-	19



**Appendix C**

**Table C1.39**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 6 Months Through 10 Years, 8 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-57	76-217	0-7	1
2	5	0	4	-	-	58-63	46-75	8-12	2
3	6	1	5	0	-	64-69	17-45	13-16	3
4	7	2	6	1	-	70-75	9-16	17-21	4
5	8	3	7	2	0	76-81	4-8	22-26	5
6	9	4-5	8	3	-	82-88	3	27-31	6
7	10	6	9	4-5	1	89-95	2	32-36	7
8	-	7	10	6	-	96-102	-	37-40	8
9	11	8-9	11	7-8	2	103-109	-	41-45	9
10	-	10-11	12	9	3	110-116	1	46-50	10
11	12	12	-	10-11	4	117-121	-	51-55	11
12	-	13	-	12	5	122-126	0	56-60	12
13	13	14	13	13	6	127-131	-	61-64	13
14	-	15	-	14	7	132-136	-	65-68	14
15	-	16	-	15-16	8	137-142	-	69-71	15
16	-	17	-	17	9	143-154	-	72-73	16
17	-	18	-	18	-	155-160	-	74	17
18	-	19	-	19	-	161-166	-	-	18
19	-	-	-	-	-	167-217	-	-	19

**Table C1.40**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 10 Years, 9 Months Through 10 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-57	76-217	0-7	1
2	5	0	4	-	-	58-63	46-75	8-12	2
3	6	1	5	0	-	64-69	17-45	13-16	3
4	7	2	6	1	-	70-75	9-16	17-21	4
5	8	3	7	2	0	76-81	4-8	22-26	5
6	9	4-5	8	3	-	82-88	3	27-31	6
7	10	6	9	4-5	1	89-95	2	32-36	7
8	-	7	10	6	-	96-102	-	37-40	8
9	11	8-9	11	7-8	2	103-109	-	41-45	9
10	-	10-11	12	9	3	110-116	1	46-50	10
11	12	12	-	10-11	4	117-123	-	51-55	11
12	-	13	-	12	5	124-130	0	56-60	12
13	13	14	13	13	6	131-136	-	61-64	13
14	-	15	-	14	7	137-142	-	65-68	14
15	-	16	-	15-16	8	143-148	-	69-71	15
16	-	17	-	17	9	149-154	-	72-73	16
17	-	18	-	18	-	155-160	-	74	17
18	-	19	-	19	-	161-166	-	-	18
19	-	-	-	-	-	167-217	-	-	19

**Appendix C**

**Table C1.41**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 11 Years, 0 Months Through 11 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten. Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-57	76-217	0-7	1
2	5	0	4	-	-	58-63	46-75	8-12	2
3	6	1	5	0	-	64-69	17-45	13-16	3
4	7	2	6	1	-	70-75	9-16	17-21	4
5	8	3	7	2	0	76-81	4-8	22-26	5
6	9	4-5	8	3	-	82-88	3	27-31	6
7	10	6	9	4-5	1	89-95	2	32-36	7
8	-	7	10	6	-	96-102	-	37-40	8
9	11	8-9	11	7-8	2	103-109	-	41-45	9
10	-	10-11	12	9	3	110-116	1	46-50	10
11	12	12	-	10-11	4	117-123	-	51-55	11
12	-	13	-	12	5	124-130	0	56-60	12
13	13	14	13	13	6	131-137	-	61-64	13
14	-	15	-	14	7	138-145	-	65-68	14
15	-	16	-	15-16	8	146-153	-	69-71	15
16	-	17	-	17	9	154-160	-	72-73	16
17	-	18	-	18	-	161-166	-	74	17
18	-	19	-	19	-	167-177	-	-	18
19	-	-	-	-	-	178-217	-	-	19

**Table C1.42**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 11 Years, 6 Months Through 11 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten. Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-57	76-217	0-7	1
2	5-6	0	4	-	-	58-69	46-75	8-12	2
3	7	1	5	0	-	70-75	17-45	13-16	3
4	8	2	6	1	-	76-81	9-16	17-23	4
5	9	3	7	2	0	82-88	4-8	24-30	5
6	-	4-5	8	3	-	89-95	3	31-35	6
7	10	6	9	4-5	1	96-102	2	36-40	7
8	-	7	10	6	-	103-109	-	41-45	8
9	11	8-9	11	7-8	2	110-116	-	46-50	9
10	-	10-11	12	9	3	117-123	1	51-55	10
11	12	12	-	10-11	4	124-130	-	56-60	11
12	-	13	-	12	5	131-136	0	61-64	12
13	13	14	13	13	6	137-142	-	65-68	13
14	-	15	-	14	7	143-148	-	69-71	14
15	-	16	-	15-16	8	149-154	-	72-73	15
16	-	17	-	17	9	155-161	-	74	16
17	-	18	-	18	-	162-169	-	-	17
18	-	19	-	19	-	170-201	-	-	18
19	-	-	-	-	-	202-217	-	-	19

**Table C1.43**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 12 Years, 0 Months Through 12 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-4	-	0-3	-	-	0-57	76-217	0-7	1
2	5-6	0	4	-	-	58-69	46-75	8-12	2
3	7	1	5	0	-	70-75	17-45	13-16	3
4	8	2	6	1	-	76-81	9-16	17-23	4
5	9	3	7	2	0	82-89	4-8	24-30	5
6	-	4-5	8	3	-	90-97	3	31-35	6
7	10	6	9	4-5	1	98-105	2	36-40	7
8	-	7	10	6	-	106-113	-	41-45	8
9	11	8-9	11	7-8	2	114-121	-	46-50	9
10	-	10-11	12	9	3	122-129	1	51-55	10
11	12	12	-	10-11	4	130-136	-	56-60	11
12	-	13	-	12	5	137-142	0	61-64	12
13	13	14	13	13	6	143-148	-	65-68	13
14	-	15	-	14	7	149-154	-	69-71	14
15	-	16	-	15-16	8	155-161	-	72-73	15
16	-	17	-	17	9	162-169	-	74	16
17	-	18	-	18	-	170-185	-	-	17
18	-	19	-	19	-	186-201	-	-	18
19	-	-	-	-	-	202-217	-	-	19

**Table C1.44**  
Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 12 Years, 6 Months Through 12 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-5	0	0-4	-	-	0-63	56-217	0-9	1
2	6	1	5	0	-	64-73	35-55	10-16	2
3	7	2	6	1	-	74-81	15-34	17-21	3
4	8	3	7	2	0	82-88	8-14	22-26	4
5	9	4-5	8	3	-	89-95	3-7	27-31	5
6	10	6	9	4-5	1	96-102	2	32-36	6
7	-	7	10	6	-	103-109	-	37-40	7
8	11	8-9	11	7-8	2	110-116	-	41-46	8
9	-	10-11	12	9	3	117-123	1	47-51	9
10	12	12	-	10	4	124-130	-	52-56	10
11	-	13	-	11	5	131-137	-	57-61	11
12	13	14	-	12-13	6	139-145	0	62-65	12
13	-	15	13	14	7	146-153	-	66-68	13
14	-	16	-	15-16	8	154-161	-	69-71	14
15	-	17	-	17	9	162-169	-	72-73	15
16	-	18	-	18	-	170-177	-	74	16
17	-	19	-	19	-	178-193	-	-	17
18	-	-	-	-	-	194-209	-	-	18
19	-	-	-	-	-	210-217	-	-	19

**Appendix C**

**Table C1.45**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 13 Years, 0 Months Through 13 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-69	56-217	0-9	1
2	7	1	5	0	-	70-75	35-55	10-16	2
3	8	2	6	1	-	76-81	15-34	17-23	3
4	9	3	7	2	0	82-89	8-14	24-30	4
5	-	4-5	8	3	-	90-97	3-7	31-35	5
6	10	6	9	4-5	1	98-105	2	36-40	6
7	-	7	10	6	-	106-113	-	41-45	7
8	11	8-9	11	7-8	2	114-121	-	46-50	8
9	-	10-11	12	9	3	122-129	1	51-55	9
10	12	12	-	10	4	130-137	-	56-60	10
11	-	13	-	11	5	138-145	-	61-64	11
12	13	14	-	12-13	6	146-153	0	65-68	12
13	-	15	13	14	7	154-161	-	69-71	13
14	-	16	-	15-16	8	162-169	-	72-78	14
15	-	17	-	17	9	170-177	-	74	15
16	-	18	-	18	-	178-185	-	-	16
17	-	19	-	19	-	186-201	-	-	17
18	-	-	-	-	-	202-209	-	-	18
19	-	-	-	-	-	210-217	-	-	19

**Table C1.46**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 13 Years, 6 Months Through 13 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-73	56-217	0-9	1
2	7	1	5	0	-	74-81	35-55	10-16	2
3	8	2	6	1	-	82-89	15-34	17-23	3
4	9	3	7	2	0	90-97	8-14	24-30	4
5	-	4-5	8	3	-	98-105	3-7	31-35	5
6	10	6	9	4-5	1	106-113	2	36-40	6
7	-	7	10	6	-	114-121	-	41-46	7
8	11	8-9	11	7-8	2	122-129	-	47-51	8
9	-	10-11	12	9	3	130-137	1	52-56	9
10	12	12	-	10	4	138-145	-	57-61	10
11	-	13	-	11	5	146-153	-	62-65	11
12	13	14	-	12-13	6	154-161	0	66-68	12
13	-	15	13	14	7	162-169	-	69-71	13
14	-	16	-	15-16	8	170-177	-	72-73	14
15	-	17	-	17	9	178-185	-	74	15
16	-	18	-	18	-	186-193	-	-	16
17	-	19	-	19	-	194-201	-	-	17
18	-	-	-	-	-	202-209	-	-	18
19	-	-	-	-	-	210-217	-	-	19

**Appendix C**

**Table C1.47**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 14 Years, 0 Months Through 14 Years, 5 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-73	56-217	0-9	1
2	7	1	5	0	-	74-81	35-55	10-16	2
3	8	2	6	1	-	82-89	15-34	17-23	3
4	9	3	7	2	0	90-97	8-14	24-30	4
5	-	4-5	8	3	-	98-105	3-7	31-35	5
6	10	6	9	4-5	1	106-113	2	36-40	6
7	-	7	10	6	-	114-121	-	41-46	7
8	11	8-9	11	7-8	2	122-129	-	47-51	8
9	-	10-11	12	9	3	130-137	1	52-56	9
10	12	12	-	10	4	138-145	-	57-61	10
11	-	13	-	11	5	146-153	-	62-65	11
12	13	14	-	12-13	6	154-161	0	66-68	12
13	-	15	13	14	7	162-169	-	69-71	13
14	-	16	-	15-16	8	170-177	-	72-73	14
15	-	17	-	17	9	178-185	-	74	15
16	-	18	-	18	-	186-193	-	-	16
17	-	19	-	19	-	194-201	-	-	17
18	-	-	-	-	-	202-209	-	-	18
19	-	-	-	-	-	210-217	-	-	19

**Table C1.48**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 14 Years, 6 Months Through 14 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-73	56-217	0-9	1
2	7	1	5	0	-	74-81	35-55	10-16	2
3	8	2	6	1	-	82-89	15-34	17-23	3
4	9	3	7	2	0	90-97	8-14	24-30	4
5	-	4-5	8	3	-	98-105	3-7	31-35	5
6	10	6	9	4-5	1	106-113	2	36-40	6
7	-	7	10	6	-	114-121	-	41-46	7
8	11	8-9	11	7-8	2	122-129	-	47-51	8
9	-	10-11	12	9	3	130-137	1	52-56	9
10	12	12	-	10	4	138-145	-	57-61	10
11	-	13	-	11	5	146-153	-	62-65	11
12	13	14	-	12-13	6	154-161	0	66-68	12
13	-	15	13	14	7	162-169	-	69-71	13
14	-	16	-	15-16	8	170-177	-	72-73	14
15	-	17	-	17	9	178-185	-	74	15
16	-	18	-	18	-	186-193	-	-	16
17	-	19	-	19	-	194-201	-	-	17
18	-	-	-	-	-	202-209	-	-	18
19	-	-	-	-	-	210-217	-	-	19

**Appendix C**

**Table C1.49**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 0 Months Through 15 Years, 5 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-73	56-217	0-9	1
2	7	1	5	0	-	74-89	35-55	10-16	2
3	8	2	6	1	-	90-97	15-34	17-23	3
4	9	3	7	2	0	98-105	8-14	24-30	4
5	-	4-5	8	3	-	106-113	3-7	31-35	5
6	10	6	9	4-5	1	114-121	2	36-40	6
7	-	7	10	6	-	122-129	-	41-46	7
8	11	8-9	11	7-8	2	130-137	-	47-51	8
9	-	10-11	12	9	3	138-145	1	52-56	9
10	12	12	-	10	4	146-152	-	57-61	10
11	-	13	-	11	5	153-160	-	62-65	11
12	13	14	-	12-13	6	161-168	0	66-68	12
13	-	15	13	14	7	169-176	-	69-71	13
14	-	16	-	15-16	8	177-184	-	72-73	14
15	-	17	-	17	9	185-192	-	74	15
16	-	18	-	18	-	193-200	-	-	16
17	-	19	-	19	-	201-208	-	-	17
18	-	-	-	-	-	209-216	-	-	18
19	-	-	-	-	-	217	-	-	19

**Table C1.50**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 15 Years, 6 Months Through 15 Years, 11 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-6	0	0-4	-	-	0-73	56-217	0-9	1
2	7	1	5	0	-	74-89	35-55	10-16	2
3	8	2	6	1	-	90-97	15-34	17-23	3
4	9	3	7	2	0	98-105	8-14	24-30	4
5	-	4-5	8	3	-	106-113	3-7	31-35	5
6	10	6	9	4-5	1	114-121	2	36-40	6
7	-	7	10	6	-	122-129	-	41-46	7
8	11	8-9	11	7-8	2	130-137	-	47-51	8
9	-	10-11	12	9	3	138-145	1	52-56	9
10	12	12	-	10	4	146-152	-	57-61	10
11	-	13	-	11	5	153-160	-	62-65	11
12	13	14	-	12-13	6	161-168	0	66-68	12
13	-	15	13	14	7	169-176	-	69-71	13
14	-	16	-	15-16	8	177-184	-	72-73	14
15	-	17	-	17	9	185-192	-	74	15
16	-	18	-	18	-	193-200	-	-	16
17	-	19	-	19	-	201-208	-	-	17
18	-	-	-	-	-	209-216	-	-	18
19	-	-	-	-	-	217	-	-	19



**Appendix C**

**Table C1.51**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 16 Years, 0 Months Through 16 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-7	0-1	0-5	0	-	0-81	37-217	0-10	1
2	8	2	6	1	-	82-89	25-36	11-18	2
3	9	3	7	2	0	90-97	13-24	19-26	3
4	-	4-5	8	3	-	98-105	7-12	27-34	4
5	10	6	9	4	1	106-113	3-6	35-40	5
6	-	7	10	5	-	114-121	2	41-46	6
7	11	8-9	11	6	2	122-129	-	47-51	7
8	-	10-11	-	7-8	3	130-137	-	52-56	8
9	12	12	12	9-10	4	138-145	1	57-61	9
10	-	13	-	11	5	146-153	-	62-65	10
11	-	14	-	12-13	6	154-161	-	66-68	11
12	13	15	-	14	7	162-169	0	69-70	12
13	-	16	13	15-16	8	170-177	-	71-72	13
14	-	17	-	17	9	178-185	-	73	14
15	-	18	-	18	-	186-193	-	74	15
16	-	19	-	19	-	194-201	-	-	16
17	-	-	-	-	-	202-209	-	-	17
18	-	-	-	-	-	210-217	-	-	18
19	-	-	-	-	-	-	-	-	19

**Table C1.52**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
**Age 17 Years, 0 Months Through 17 Years, 11 Months**

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-7	0-1	0-5	0	-	0-89	37-217	0-10	1
2	8	2	6	1	-	90-97	25-36	11-18	2
3	9	3	7	2	0	98-105	13-24	19-26	3
4	-	4-5	8	3	-	106-113	7-12	27-34	4
5	10	6	9	4	1	114-121	3-6	35-40	5
6	-	7	10	5	-	122-129	2	41-46	6
7	11	8-9	11	6	2	130-137	-	47-51	7
8	-	10-11	-	7-8	3	138-145	-	52-56	8
9	12	12	12	9-10	4	146-152	1	57-61	9
10	-	13	-	11	5	153-160	-	62-65	10
11	-	14	-	12-13	6	161-168	-	66-68	11
12	13	15	-	14	7	169-176	0	69-70	12
13	-	16	13	15-16	8	177-184	-	71-72	13
14	-	17	-	17	9	185-192	-	73	14
15	-	18	-	18	-	193-200	-	74	15
16	-	19	-	19	-	201-208	-	-	16
17	-	-	-	-	-	209-216	-	-	17
18	-	-	-	-	-	217	-	-	18
19	-	-	-	-	-	-	-	-	19



**Table C1.53**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 18 Years, 0 Months Through 18 Years, 11 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-7	0-1	0-5	0	-	0-89	37-217	0-10	1
2	8	2	6	1	-	90-97	25-36	11-18	2
3	9	3	7	2	0	98-105	13-24	19-26	3
4	-	4-5	8	3	-	106-113	7-12	27-34	4
5	10	6	9	4	1	114-121	3-6	35-40	5
6	-	7	10	5	-	122-129	2	41-46	6
7	11	8-9	11	6	2	130-137	-	47-51	7
8	-	10-11	-	7-8	3	138-145	-	52-56	8
9	12	12	12	9-10	4	146-152	1	57-61	9
10	-	13	-	11	5	153-160	-	62-65	10
11	-	14	-	12-13	6	161-168	-	66-68	11
12	13	15	-	14	7	169-176	0	69-70	12
13	-	16	13	15-16	8	177-184	-	71-72	13
14	-	17	-	17	9	185-192	-	73	14
15	-	18	-	18	-	193-200	-	74	15
16	-	19	-	19	-	201-208	-	-	16
17	-	-	-	-	-	209-216	-	-	17
18	-	-	-	-	-	217	-	-	18
19	-	-	-	-	-	-	-	-	19

**Table C1.54**  
 Special Attention & Memory Diagnostic Scales - Conversion of Raw Scores to Scaled Scores  
 Age 19 Years, 0 Months Through 19 Years, 11 Months

Scaled Score	Assoc. Pairs Familiar	Assoc. Pairs Random	Delayed Pairs Familiar	Delayed Pairs Random	Visual Coding Upper Range	Atten.Sustain. Total Correct	Atten.Sustain. Total Errors	Atten, Divided Pictures	Scaled Score
1	0-7	0-1	0-5	0	-	0-97	37-217	0-10	1
2	8	2	6	1	-	98-105	25-36	11-18	2
3	9	3	7	2	0	106-113	13-24	19-26	3
4	-	4-5	8	3	-	114-121	7-12	27-34	4
5	10	6	9	4	1	122-129	3-6	35-40	5
6	-	7	10	5	-	130-137	2	41-46	6
7	11	8-9	11	6	2	138-145	-	47-51	7
8	-	10-11	-	7-8	3	146-152	-	52-56	8
9	12	12	12	9-10	4	153-160	1	57-61	9
10	-	13	-	11	5	161-168	-	62-65	10
11	-	14	-	12-13	6	169-176	-	66-68	11
12	13	15	-	14	7	177-184	0	69-70	12
13	-	16	13	15-16	8	185-192	-	71-72	13
14	-	17	-	17	9	193-200	-	73	14
15	-	18	-	18	-	201-208	-	74	15
16	-	19	-	19	-	209-216	-	-	16
17	-	-	-	-	-	-	-	-	17
18	-	-	-	-	-	217	-	-	18
19	-	-	-	-	-	-	-	-	19

Table H3:

Quadrant Scores for the Attention Sustained Subtest — Booklet C, Part 4 — Ages 6–20

Ages 6–20:

BOOKLET C, Part 4 Only

N = 347

UPPER LEFT QUADRANT		
Value	Percent	Cumulative Percent
0	2.6	2.6
1	2.6	5.2
2	6.6	11.8
3	9.2	21.0
4	12.4	33.4
5	11.5	45.0
6	8.9	53.9
7	10.7	64.6
8	9.8	74.4
9	7.5	81.8
10	7.2	89.0
11	7.2	96.3
12	2.0	98.3
13	1.7	100.0
Mean	6.228	
Median	6.000	

UPPER RIGHT QUADRANT		
Value	Percent	Cumulative Percent
0	15.0	15.0
1	3.7	18.7
2	4.0	22.8
3	3.5	26.2
4	7.8	34.0
5	6.1	40.1
6	7.5	47.6
7	7.8	55.3
8	8.9	64.3
9	11.5	75.8
10	7.5	83.3
11	7.2	90.5
12	6.1	96.5
13	3.5	100.0
Mean	6.300	
Median	7.000	

LOWER LEFT QUADRANT		
Value	Percent	Cumulative Percent
0	9.5	9.5
1	6.6	16.1
2	7.2	23.3
3	6.9	30.3
4	8.6	38.9
5	8.1	47.0
6	9.5	56.2
7	10.1	66.6
8	9.2	75.8
9	8.1	83.9
10	7.5	91.4
11	3.7	95.1
12	2.9	98.0
13	2.0	100.0
Mean	5.677	
Median	6.000	

LOWER RIGHT QUADRANT		
Value	Percent	Cumulative Percent
0	17.9	17.9
1	6.6	24.5
2	10.1	34.6
3	11.2	45.8
4	8.9	54.8
5	12.4	67.1
6	9.2	76.4
7	9.8	86.2
8	4.3	90.5
9	3.7	94.2
10	2.3	96.5
11	1.2	97.7
12	1.7	99.4
13	.3	100.0
Mean	4.144	
Median	4.000	

## Grooved Pegboard Test

Raw Score: Time in seconds to complete the first 2 rows (for children 8) or all 5 rows (for children 9). Time for each hand is recorded and scored separately. All children regardless of age are administered all rows. If the time discontinue was met (300 seconds or 5 minutes) use 300 as the child's raw score.

Note: If the time is written in minutes and seconds be sure to transfer it into seconds only. For example, if the total time is written as 1:17, this would convert to 77 seconds. 1 minute = 60 seconds.

Calculating the Z-Score: Use the age and sex appropriate means and standard deviations on the table provided on the next page to calculate the z-score for each hand separately. Use the raw score (see definition above) as the total time for each hand.

Z-Score = Total Time minus the Age Mean divided by the Standard Deviation.

Note: **Do NOT modify this equation.** Negative Z-scores on this task (the child performing in less time than the age mean) demonstrate performance in the Average to Superior range whereas positive z-scores on this task (the child performing in more time than the age mean) demonstrate performance in the Average to Well Below Average range. For example, if a 9 year-old boy has a raw score of 65 seconds on his DH, his Z-score would be -0.974. Even though his score is negative, he is still performing in the High Average range.

Again, it is essential that all sites follow the equation below so that we may combine our data for analysis:

Z-Score = Total Time minus the Age Mean divided by the Standard Deviation.

Example: 10 year-old male

D.H.	77	Non-DH:	96
Age Mean:	83.00		90.00
Age S.D.:	36.50		28.90
Z-Score:	-0.164		0.208

Note: Dominant on the norms table does not mean a default of right hand. Use the Dominant Hand norms for the dominant hand for both right and left-handed children.

Time/Row: Calculate the time per row by subtracting the previous row total time from the current row. For example, if the total time for Row 3 is 34 and the total time for row 2 is 23, then the time per row for row 3 equals 34 minus 23 which is 11. The time per row for row 1 will always be the total time for row 1.

# Grooved Pegboard Norms

Age	Male					Female			
	Dominant		Non-Dominant			Dominant		Non-Dominant	
	Mean	SD	Mean	SD		Mean	SD	Mean	SD
5	70.00	33.90	75.00	38.10	2	66.00	32.30	73.00	36.80
6	58.00	26.10	64.00	33.90	ROWS	63.00	31.20	65.00	30.10
7	48.00	24.60	51.00	22.00		53.00	24.80	58.00	19.90
8	38.00	9.02	41.00	14.60		38.00	10.40	47.00	26.80
9	84.00	19.50	92.00	23.80		90.00	54.00	96.00	50.60
10	83.00	36.50	90.00	28.90		84.00	18.10	92.00	24.40
11	76.00	18.10	86.00	31.00	ALL	79.00	17.00	92.00	24.80
12	78.00	24.40	85.00	32.20	ROWS	80.00	19.50	87.00	21.60
13	78.00	40.50	81.00	23.80		81.00	52.60	84.00	42.40
14	79.00	25.20	86.00	44.50		77.00	54.30	78.00	17.60
15-19	66.05	10.40	70.50	11.10		66.05	10.40	70.50	11.10

## Pictorial Depression Scale

**Raw Score:** The tester will circle the number that corresponds to child's response for each pair of statements. Sum both columns separately by adding up the values listed in the circled responses for each column. Check to make sure the tester administered each item by making sure either zero or one are circled for each pair of statements.

**PDS Score:** Use the following equation to calculate the PDS score. Circle all total scores > 10.

PDS Score = (Total L + Total R) \_\_\_\_\_ X 2 = \_\_\_\_\_ Total Score

Scoring per Dr. Mary O'Connor: To make the scores comparable to the Child Depression Inventory (CDI; Kovacs, 1992), you will need to add up the number of items and multiply by 2. Any score >10 should be considered significant in a young child, but remember that we have not established age norms for the cutoff point so you only have our study to fall back on for validity. We did find a correlation of .83 with the CDI using a group of hospitalized inpatients who were eight years of age or older. We also found that using a cut off score of > 10, the PDS distinguished between depression and non-depression (based on DSM-IV criteria) in 87% of a sample of child inpatients (O'Connor & Paley, submitted).

## Progressive Planning Test (PPT)

### Maximum Constrained Condition:

Mean Latency (1<sup>st</sup> Trials ONLY): Add up the latency times for the **administered 1<sup>st</sup> trials** ONLY (both successful and unsuccessful) and divide by the total number of cards administered. (Note: It is easy to do this by circling all of the 1<sup>st</sup> trial latency times in pencil on the test packet form.)

Mean Total Time (Successful Trials ONLY): Calculate the mean total time only for **administered** trials that were **solved**. (Note: It is easy to do this by drawing a box around all of the successful trial total times in pencil on the test packet form.)

**Reminder:** The variables involving time are only calculated from those cards that the child actually attempted. Cards that were not administered that the child may be receiving points for (ex. Cards 1 and 2) are not considered for these **time** variables.

Total Rules Broken: Sum of the number of Rule 1(Ru1) and Rule 2 (Ru2) violations for all trials. Each rule violation is counted, there is no maximum per trial or card.

Card Trial Scores: If a child solves a card on any of the three trials, circle the score corresponding to that trial in the Score column of the test packet form. If the child fails a card on trial 3 assign a value of zero to that item. **Discontinue** is met after 2 consecutive failed cards (6 consecutive failed trials). Award full credit (5 pts. each) to previous cards 1 and 2 not administered if card 3 was solved on any of the three trials. If a reversal was needed due to a failure of card 3, circle the appropriate scores for cards 1 and 2 as appropriate. Similarly, full credit may be awarded to card 1 if any trial of card 2 is successful.

1<sup>st</sup> Trial Score (Bold Only!): Sum of the circled bolded scores (including the scores for cards not administered). This sum is the total of the point values awarded to those cards in which the child got the initial attempt (1<sup>st</sup> trial) correct.

Total Score (All Trials): Sum of all circled responses (including the scores for cards not administered).

### Additional variables (as of 1/10/06):

- Number of cards (#1 - 12) solved on the 1st trial. \* (Max. = 12)
- Number of cards (#1 - 12) solved on any of the three trials allowed per card. \* (Max. = 12)
- Number of cards #1 - 4 solved (on any trial). \* (Max. = 4)
- Number of cards #5 - 8 solved (on any trial). (Max. = 4)

\*All of the above counts follow the assumption that if card 3 is completed successfully on any trial, then cards 1 and 2 are counted as if they were solved on the 1st trial. If a reversal was needed due to a failure of card 3, count the trials for cards 1 and 2 as appropriate given the reversal administration.

**Minimum Constrained Condition:**

Mean Latency: Calculate the mean latency time for all cards.

Mean Total Time: Calculate the mean total completion time for all successfully completed cards. Do not included failed card attempts in this calculation.

Pass/Fail Total: Sum of pass/fail scores for cards 5 - 10. Even though a child cannot get stuck on the Minimally Constrained Condition, they still may not stack their beads in the proper order.

Total Rules Broken: Sum of the number of Rule 1 (Ru1) violations.

Total X Equations: Sum of all x-equation calculation scores for cards 5 - 10. Max. = 51.

Note: Only 1 trial is allowed per item, but all problems (5 – 10) are administered.

**PPT Min. CC Scoring Examples:**

If the child had 14 moves on card #5, what would his score be? The line on the Test Packet should read [numbers in brackets are numbers I'd be writing]:  $X = \text{Number of moves} [14] - 6 = [8]$  Score =  $6 - X [8] = [-2]$ . His score for PPT Min. CC card #5 would be a negative 2 and in calculating his X Equations Total Score for all cards, you would take 2 points away. A child making MORE than the necessary moves (the constant) on the Minimally Constrained Conditions will receive a lower score. The maximum score for the Min. CC cards #5-10 is 51, but the minimum score could possibly be below zero for a child making excessive moves on all cards.

The only time on the Min. CC that a negative number isn't allowed is for the X variable. As noted on the Test Packet form, the following is how to score cards for children who perform LESS moves than the constant: \*Constants used in the above scores represent the minimal number of moves involved in solving a specific problem under the minimally constrained condition. If the number of moves is less than the constant in a given problem (this is possible only if the subject used the strategy they learned in the two rules condition), assign a value of 0 to X. In other words, children do not receive bonus points for employing the two rules strategy to solve a problem under the minimally constrained condition.

For example, if on card #7 the child solved it in 8 moves, what would her score be? The Test Packet line for this card should read:  $X = \text{Number of moves} [8] - 10 = [-2]$  As an X variable is not allowed to be negative, correct this to zero in the next part like so: Score =  $10 - X [0] = [10]$ . Simply put, the maximum score for any card on the Min. CC is the value of the constant.



**PPT Maximum Constrained Conditions (2 Rules) Solutions**

Card #3: Y2/O3/B3/Y3

Card #4: Y2/O2/B3/O3/Y3

Card #5: Y3/O2/Y2/B3/Y3/O3

Card #6: G3/Y2/G2/O3/B3/G3/Y3

Card #7: G3/Y2/O2/G2/B3/G3/O3/Y3

Card #8: G3/Y3/O2/Y2/G2/B3/G3/Y3/O3

Card #9: G2/Y3/G3/O2/G2/Y2/B3/Y3/G3/O3

Card #10: R2/G3/R3/Y3/O2/Y2/R2/G2/B3/G3/R3/Y3/O3

Card #11: R2/G2/Y3/G3/R3/O2/R2/G2/Y2/B3/Y3/G3/R3/O3

Card #12: R3/G2/R2/Y3/R3/G3/O2/G2/R2/Y2/B3/Y3/R3/G3/O3

NOTE: There are additional moves that can be made within these solution sequences that do not spoil the child's attempt rendering them stuck. For example, if on card #3 the child's first move is Y3 instead of Y2 this is not necessarily a failure. They still have an opportunity to move it to peg 2 before placing the orange bead. Use caution to make sure the unlisted move the child had made is actually incorrect and not just extra.

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When scoring the PPT, be sure to use these solutions to verify that trials the tester circled as solved were completed in the proper order. You can also verify the minimally constrained conditions trails by working from right to left and ensuring that the beads were stacked on peg 3 in the proper order.

### Finger Localization

Please place these symbols to the immediate left of the test item where appropriate:

X = Incorrect Final Response [NOTE: Initial errors can also be final errors if only one response is given.]

I = Inversion Error = Responses where the child responded on the correct fingers, but in the reversed order on the final response. (i.e. Target response = 2-3 and child responded 3-2 – so the correct fingers, but the inverted order.)

Use the FL Scoring sheet (see example below) to record totals for each column.

**NOTE:** Some children receive the L hand first so please make sure you are in the correct column.

**KEY:** UC=Uncrossed C=Crossed L=Left R=Right T=Total (R&L Combined)

# Final Errors (X) = Total number of final responses that were incorrect.

[NOTE: It is possible for # Final Errors to be greater than the # Initial Errors if the child first responds correctly and then changes to an incorrect response.]

# Initial Errors = Total number of initial responses on the correct hand that were incorrect.

[NOTE: Initial errors can also be final errors if only one response is given.]

# >1 Response = Total number of responses in which the child changed their response.

[NOTE: The max. per item is one as this is not a tally of the number of changes.]

# Incorrect Hand (\*) = Total number of responses in which the child responded on the wrong hand either on the first or final response. [NOTE: The max. per item is one even if they responded on the wrong hand on 1<sup>st</sup> and final responses.]

# Inversion Errors = Total number inversion error final responses.

A.	UC R	UC L	UC T	C R	C L	C T
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
B.						
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
C.						
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
# Inversion Errors						

## Finger Localization (continued)

FL Scoring examples:

FL examples for Condition C Uncrossed Right (I just selected one column randomly for the purpose of these examples.) :

Target/Touched Fingers Uncrossed Right: 3-4

Child's response: 4-3 (1st response) / 3-4 (final response) on the Right hand

Scoring:

# Final Errors (X) = 0

# Initial Errors = 1

# >1 Response = 1

# Incorrect Hand (\*)= 0

# Inversion Errors = 0 (Inversions are only tallied for final responses that are incorrect.)

Target/Touched Fingers Uncrossed Right: 3-4

Child's response: \*4-3 (1st response) on the Left hand

Scoring:

# Final Errors (X) = 1

# Initial Errors = 1

# >1 Response = 0

# Incorrect Hand (\*)= 1 (Child responded on the incorrect hand at first as indicated by the \*. An asterisks should be placed in front of all items in which the child responds initially on the wrong hand. DO NOT record the fingers in which the child responds on the wrong hand as such responses are not to be scored for anything other than # incorrect hand.

# Inversion Errors = 1

Target/Touched Fingers Uncrossed Right: 3-4

Child's response: 2-3 on the Right hand

Scoring:

# Final Errors (X) = 1

# Initial Errors = 1

# >1 Response = 0

# Incorrect Hand (\*)= 0

# Inversion Errors = 0

Target/Touched Fingers Uncrossed Right: 3-4

Child's response: 3-4 (1st response) / 3-2 (final response) on the Right hand

Scoring:

# Final Errors (X) = 1

# Initial Errors = 0

# >1 Response = 1

# Incorrect Hand (\*)= 0

# Inversion Errors = 0

## **D-KEFS Verbal Fluency**

Use the CIFASD test packet form, the D-KEFS Record Form and the D-KEFS Examiner's Manual pages 58-73 and 242-255 to score this test.

Circle all words that are errors regardless of type.

Do not include those words that the child says, but then later self corrects. Cross them out with a line on the test packet form.

### Raw Scores:

For each letter/category, add up the total number of correct words (total number and for each 15" interval), total number of repetitions and set loss words, and the total number of words (correct and incorrect) the child gave.

For switching, add up the number of correct switches to obtain Total Switching Accuracy. It is helpful to draw a dash (similar to a minus sign) with pencil on the test packet form to indicate correct switches. For example, apple – table.

See the D-KEFS Manual pages for specifics on scoring information (pages 64-71) and use the D-KEFS Verbal Fluency Record Form for scoring calculations (e.g. converting raw scores to scaled scores).

Note: There is a typo in the D-KEFS Examiner's Manual on page 63. On the last variable on this page in figure 4.4 they are demonstrating how to calculate the Percent Switching Accuracy for Category Switching. The Total Responses Condition 3 Only should be 14 not 15 and therefore, the resulting Percent Raw Score is 71.4 and Scaled Score is 8.

### Scoring Tips:

Furniture: Cabinet (China, File or just Cabinet), Mattress, and Trunk are all scored as correct.

Boys' Names: If it is unclear as to whether or not the name a child listed is a first or last name, give them the benefit of the doubt unless there is a string of last names.

Ex. If the child says "Keith, Edwards, John", give them the benefit of the doubt that they meant Edward.

## Trial 2

Introduce the category by saying,

Now tell me as many boys' names **[girls' names]** as you can. You will have 60 seconds before I tell you to stop. Ready? Begin.

Start timing. Record the examinee's responses as described for Trial 1. At the end of 60 seconds, say,

Stop.

## Condition 3: Category Switching

Use the following prompts during the Category Switching condition:

- ◆ If the examinee fails to make a response after any 15-second interval, say, Keep going. Provide this prompt only once for the Switching condition.
- ◆ The first time an examinee generates three consecutive words that are not members of one of the two designated categories, say, The categories you are to switch between are \_\_\_\_\_ and \_\_\_\_\_. Provide this prompt only once for the Switching condition.

Keep the stopwatch running while providing prompts.

*Note: If you are administering the Alternate Form of this test, substitute the categories that appear in brackets in the following instructions (say "musical instruments," not "pieces of musical instruments").*

Say,

Now we are going to do something a little different. I want you to switch back and forth between saying as many fruits **[vegetables]** and as many pieces of furniture **[musical instruments]** as you can. It doesn't matter what letter they start with. You will have 60 seconds before I tell you to stop. So you would say a fruit **[vegetable]**, then a piece of furniture **[musical instrument]**, then a fruit **[vegetable]**, then a piece of furniture **[musical instrument]**, and so on. You can start with either a fruit **[vegetable]** or a piece of furniture **[musical instrument]**. Do you have any questions? Ready? Begin.

Start timing. As before, record the examinee's responses in the appropriate 15-second interval sections. At the end of 60 seconds, say,

Stop.

## Recording

### Condition 1: Letter Fluency

For each trial, record all responses verbatim for each 15-second interval. To obtain scores for each letter trial, sum the following variables across all four 15-second intervals: correct responses, set-loss errors, and repetition errors. To obtain the total raw score for Letter

Fluency, sum the total correct responses for each trial. To obtain the optional interval totals, sum the total correct responses for each 15-second interval *across* trials and enter the total in the appropriate box at the far right (e.g., the box labeled "1"-15" F + A + S Correct Responses"). Also enter the total number of correct and incorrect responses generated on all three letter trials. Figure 4.1 illustrates these steps.

**D-KEFS Verbal Fluency Test**  
Condition 1: Letter Fluency

	<b>F</b>	<b>A</b>	<b>S</b>	
First Interval: 1-15 Seconds	fat favity famous fatuous <div style="text-align: right;">1"-15" 4</div>	amalgam anagram avstere aesop <div style="text-align: right;">1"-15" 3</div>	sable sat saturate slick satire sanctuary <div style="text-align: right;">1"-15" 6</div>	1"-15" F + A + S Correct Responses 13
Second Interval: 16-30 Seconds	filthy fever fetid furry festive <div style="text-align: right;">16"-30" 5</div>	agrarian aggrandize agatha antagonize aggravate ask <div style="text-align: right;">16"-30" 5</div>	sanctimonious seismograph size sandy sandfill <div style="text-align: right;">16"-30" 5</div>	16"-30" F + A + S Correct Responses 15
Third Interval: 31-45 Seconds	friend fantastic faster <div style="text-align: right;">31"-45" 3</div>	Andover assiduous accumulate accumulative <div style="text-align: right;">31"-45" 3</div>	sundown separate <div style="text-align: right;">31"-45" 2</div>	31"-45" F + A + S Correct Responses 8
Fourth Interval: 46-60 Seconds	future fad fastest <div style="text-align: right;">46"-60" 3</div>	additive anagram -R antidote <div style="text-align: right;">46"-60" 2</div>	silly sarcastic such slurp <div style="text-align: right;">46"-60" 4</div>	46"-60" F + A + S Correct Responses 9
	<b>F</b> Total Correct Responses Total Self-Loss Errors Total Repetition Errors	<b>A</b> Total Correct Responses Total Self-Loss Errors Total Repetition Errors	<b>S</b> Total Correct Responses Total Self-Loss Errors Total Repetition Errors	1"-60" F + A + S Correct Responses Letter Fluency: Total Correct Raw Score
	15 0 0	13 3 1	17 0 0	45
	Letter Fluency: Total Responses* 49			

Figure 4.1. Example of Recording Scores for the Letter Fluency Condition of the D-KEFS Verbal Fluency Test for a 72-Year-Old Examinee

## Condition 2: Category Fluency

For each trial, record all responses verbatim for each 15-second interval. To obtain scores for each category trial, sum the following variables across all four 15-second intervals: correct responses, set-loss errors, and repetition errors. To obtain the total raw score for Category Fluency, sum the total correct responses for each trial. To obtain the optional interval totals, sum the total correct responses for each 15-second interval *across* trials and enter the total in the appropriate box at the far right. Also enter the total number of correct and incorrect responses generated on both trials. Figure 4.2 illustrates these steps.

**D-KEFS Verbal Fluency Test (continued)**  
Condition 2: Category Fluency

		<b>Animals</b>	<b>Boys' Names</b>		
First Interval: 1-15 Seconds	cat dog moose raven robin horse skunk tiger	1'-15" 8	Adam Aron Allen Anthony Bill Bob	1'-15" 6	1'-15" Animals + Boys' Names Correct Responses 14
Second Interval: 16-30 Seconds	elephant duck deer leopard alligator crocodile ostrich	16'-30" 7	Bradley Buster Clive Cory Casper	16'-30" 5	16'-30" Animals + Boys' Names Correct Responses 12
Third Interval: 31-45 Seconds	whale salmon cow bull	31'-45" 4	Chuck Dan Danny Dawson Edward	31'-45" 5	31'-45" Animals + Boys' Names Correct Responses 9
Fourth Interval: 46-60 Seconds	calf goat frog lizard <del>cow</del> -R <del>robin</del> -R	46'-60" 4	Ed Ernest Ernie Frank George Ob Gilbert	46'-60" 7	46'-60" Animals + Boys' Names Correct Responses 11
		Animals Total Correct Responses 25			1'-60" Animals + Boys' Names Correct Responses 46
		Total Set-Loss Errors 0			Category Fluency Total Correct Raw Score
		Total Repetition Errors 2	Boys' Names Total Correct Responses 25	Total Set-Loss Errors 0	Total Repetition Errors 0
		Category Fluency: Total Responses (Correct + Incorrect)		48	

Figure 4.2. Example of Recording Scores for the Category Fluency Condition of the D-KEFS Verbal Fluency Test for a 72-Year-Old Examinee



### Condition 3: Category Switching

Record all responses verbatim for each 15-second interval. To obtain total scores for the trial, sum the following variables across all four 15-second intervals: the number of accurate switches (record in the Total Switching Accuracy box), the number of correct responses for each category independent of switching accuracy, set-loss errors, repetition errors, and the number of correct and incorrect responses. To obtain the total raw score for Category Switching, sum the total number of correct responses for the two categories. To obtain the optional interval totals, enter the total correct responses for each 15-second interval in the appropriate boxes at the far right. Figure 4.3 illustrates these steps.

**D-KEFS Verbal Fluency Test (continued)**  
Condition 3: Category Switching

**Fruits / Furniture**

First Interval: 1-15 Seconds	apple / ottoman plum / chair orange / sofa	1'-15" <b>Fruits</b> + <b>Furniture</b> Correct Responses* <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="6"/>
Second Interval: 16-30 Seconds	pineapple / bed watermelon / footstool	16'-30" <b>Fruits</b> + <b>Furniture</b> Correct Responses* <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="4"/>
Third Interval: 31-45 Seconds	skunk / motorcycle dining room table	31'-45" <b>Fruits</b> + <b>Furniture</b> Correct Responses* <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="1"/>
Fourth Interval: 46-60 Seconds	salamander	46'-60" <b>Fruits</b> + <b>Furniture</b> Correct Responses* <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="0"/>
<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="9"/> <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="5"/> + <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="6"/> = <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="11"/> Category Switching Total Correct Responses* Raw Score		<input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="5"/> Total Set-Loss Errors <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="0"/> Total Repetition Errors
*Correct responses are summed independent of switching accuracy.		
Category Switching Total Responses (Correct + Incorrect)** <input style="width: 40px; height: 20px; border: 1px solid black;" type="text" value="14"/>		

Figure 4.3. Example of Recording Scores for the Switching Condition of the D-KEFS Verbal Fluency Test for a 72-Year-Old Examinee

## Summary of Scores

For the primary and optional measures of the D-KEFS Verbal Fluency Test, use the conversion tables in Appendix B. For the primary measures of each condition, enter the total correct responses; for total switching accuracy, enter the number of correct switches. Convert these raw scores to scaled scores. For the contrast measures, enter the scaled scores for each condition in the appropriate boxes and subtract. Convert these scaled-score differences to new contrast scaled scores.

For the optional measures, enter the totals for each 15-second interval of each condition and sum these to obtain the total raw score for that interval. For the error measures, separately sum the set-loss errors across all three conditions. To obtain total repetition errors, sum the total repetitions across all three conditions. To obtain the percent set-loss errors raw score, divide the total number of set-loss errors across all three conditions (raw score) by the total number of correct and incorrect responses across all three conditions. Multiply that result by 100. To derive the percent repetition errors raw score, divide the total number of repetition errors across all three conditions by the total number of correct and incorrect responses across all three conditions. Multiply that result by 100. For Condition 3 only, compute the percent switching accuracy score by adding 1 to the total Switching accuracy raw score and dividing this sum by the total number of correct and incorrect responses for Condition 3 only. Multiply this result by 100. All of the raw scores for these optional measures are converted to scaled scores. Figure 4.4 illustrates these steps.

## Scoring

### Condition 1: Letter Fluency

The primary measure derived for the Letter Fluency condition is the number of correct words generated within each 60-second trial. A correct response is a word that (a) meets the criteria of the condition (specifically, starts with the designated letter and is not the name of a person, place, or number) and (b) is not a repetition within that trial. The number of correct responses is scored for each of the four 15-second intervals and for the entire 60 seconds of a trial.

Although most responses generated by examinees are easy to classify as correct or incorrect, some responses present special, ambiguous scoring problems (e.g., the response *sandy* generated during the *S* trial is correct if used as an adjective but incorrect if used as a person's name). For this reason, specific guidelines were established for scoring the most common ambiguous responses given by children and adults in the D-KEFS normative sample. The general approach for developing these guidelines was to give the benefit of the doubt to the examinee and to reward "close-call" responses as correct. This general approach reflects the intention to reward evidence of higher-level cognitive skills rather than penalizing examinees for a lack of precision in expressing those skills.

## D-KEFS Verbal Fluency Test: Summary of Scores

### Primary Measures

<b>Condition 1: Letter Fluency Total Correct</b> $45 \rightarrow 13$ Raw Score    Scaled Score	<b>Condition 2: Category Fluency Total Correct</b> $46 \rightarrow 15$ Raw Score    Scaled Score	<b>Condition 3: Category Switching Total Correct Responses</b> $11 \rightarrow 9$ Raw Score    Scaled Score	<b>Condition 3: Category Switching Total Switching Accuracy</b> $9 \rightarrow 8$ Raw Score    Scaled Score
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### Primary Contrast Measures

<b>Letter Fluency vs. Category Fluency*</b>				<b>Category Switching vs. Category Fluency*</b>			
Letter Fluency: Total Correct	Category Fluency: Total Correct	Scaled-Score Difference	Contrast Scaled Score*	Category Switching: Total Correct Responses	Category Fluency: Total Correct	Scaled-Score Difference	Contrast Scaled Score*
13	15	-2	8	9	15	-6	4
Scaled Score	Scaled Score			Scaled Score	Scaled Score		

\* A low or high contrast scaled score may reflect different cognitive problems; see examiner's manual.

### Optional Measures: Conditions 1-3 Combined

	Condition 1: Letter Fluency Raw Score	+	Condition 2: Category Fluency Raw Score	+	Condition 3: Category Switching Raw Score	=	Total Raw Score	Scaled Score
First Interval (1"-15"): Total Correct	13		14		6		33	10
Second Interval (16"-30"): Total Correct	15		12		4		31	16
Third Interval (31"-45"): Total Correct	8		9		1		18	12
Fourth Interval (46"-60"): Total Correct	9		11		0		20	14
Set-Loss Errors	3		0		3		6	5
Repetition Errors	1		2		0		3	10
Total Responses (Correct + Incorrect)*	49		48		14		111	

\* Note: Some repetition errors are coded also as set-loss errors; each double-coded error counts as only one response for the total responses measure.

<b>Percent Set-Loss Errors</b>				<b>Percent Repetition Errors</b>			
Total Set-Loss Errors	Total Responses*	Percent Raw Score	Scaled Score	Total Repetition Errors	Total Responses*	Percent Raw Score	Scaled Score
6	111	5.4	5	3	111	2.7	11
Raw Score	Raw Score			Raw Score	Raw Score		

Category Switching:  
Percent Switching Accuracy  
(Condition 3 Only)

$$\left[ \frac{9}{9+1} \right] \div \left[ \frac{15}{15+14} \right] \times 100 = \frac{66.6}{71.4} \rightarrow 78$$

manual error

Figure 4.4. Example of Computing Summary Scores for the D-KEFS Verbal Fluency Test for a 72-Year-Old Examinee

## Guidelines for Scoring Correct Responses

- ◆ Correct responses are words that (a) start with the target letter; (b) are not names of people or places or numbers; (c) are not grammatical variants of a word previously given on that trial (e.g., *fast, faster*); and (d) are not repetitions within that trial.
- ◆ In most cases, if a word can be either a common noun *or* the name of a person or place (e.g., *sandy, frank*), then the response is considered a common word and scored as correct. On the other hand, if the ambiguous word is given along with other words that are clearly the names of people or places, the response is scored as incorrect. For example, for the *S* trial, if an examinee says, "Sally, *Sandy*, Sarah," the word *sandy* in this context would be considered the name of a person and scored as an error (see the discussion on incorrect responses).
- ◆ If a word can be either a common word or a number (e.g., *for*), it is scored as a common word unless (a) it is given along with other numbers (e.g., "four, five"), or (b) the examinee specifically clarifies that the response is a number.
- ◆ Contractions (e.g., *aren't, haven't, hasn't*) are counted as correct if the first letter is correct for a particular trial. If an examinee says both the root word of a contraction and the contraction (e.g., "are" and then "aren't" or "aren't" and then "are"), both are scored as correct.
- ◆ Compound words (e.g., *air mail*) are scored as correct but only as one response. If a response includes multiple compound words in which one of the words is the same (e.g., "apple, applesauce, apple juice, apple pie"), all are counted as correct.
- ◆ Slang words (e.g., *ain't*) and swear words that start with the correct letter are scored as correct responses. However, expletives should be noted clinically.
- ◆ Some proper nouns are not names of people or places (e.g., months or days of the week). These proper nouns are counted as correct because the test instructions specifically exclude only those proper nouns that are names of people or places. The names of some months may be confused with names of people (e.g., *April*). If such a word is given along with the names of other months (e.g., "April, August"), it is scored as correct. On the other hand, if such a word is said along with other names of people (e.g., "April, Annie"), it is scored as incorrect. If such a word is given in isolation (i.e., no other months or names of people are given), the response is scored as correct.



## Guidelines for Scoring Incorrect Responses

Incorrect responses are categorized into two general types: set-loss and repetition errors.

### Set-Loss Errors

A set-loss error is a response that violates any of the criterion rules of the condition.

- ◆ Words that start with a letter other than the letter designated for the trial (e.g., *apple* in the *F* trial) are incorrect responses. If a word starts with a wrong letter but has the same target sound (e.g., *phone* in the *F* condition), it is also scored as a set-loss error; however, such responses should be noted clinically.
- ◆ Words that start with the target letter but are unambiguous names of people or places or numbers are scored as set-loss errors.
- ◆ Grammatical variants of a word (e.g., *fast*, *faster*, *fastest*) are counted as set-loss errors if they do not substantially change the meaning of the root word. Thus, in the example, *fast* is scored as correct, but *faster* and *fastest* are scored as set-loss errors. Grammatical variants of a word that are formed by changing the tense of a verb (e.g., *fool*, *fooled*; *sing*, *sang*) or the number of a noun (*apple*, *apples*) are scored as set-loss errors. However, if the addition or deletion of a suffix substantially changes the meaning of the root word in some way (e.g., *sing*, *singer* or *fool*, *foolish*), then these pairs of responses should be considered as semantic variants (not grammatical variants) and both scored as correct.
- ◆ Unambiguous number responses are scored as set-loss errors regardless of whether they are cardinal numbers (e.g., *five*) or ordinal numbers (e.g., *fifth*). Words like *primary* or *secondary* are not considered numbers because they also have nonnumerical meanings and, thus, are considered correct.
- ◆ Non-words that start with the target letter are scored as set-loss errors. If it is unclear whether a response that starts with the target letter is a word or non-word, score it as a correct response.

### Repetition Errors

A repetition error is any response that is repeated within the 60 seconds of a trial.

- ◆ If an examinee repeats a correct response, the first occurrence counts as a correct response and the second occurrence is scored only as a repetition error. If an examinee repeats a word that is a set-loss error, the repeated response is scored as **both** a set-loss error and a repetition error.
- ◆ Repetitions of a response must be **identical** to the initial response. If an examinee gives a correct response and then a grammatical variant of that response (e.g., "snake, snakes" in the *S* trial), the second word is **not** scored as a repetition error because it is a grammatical variant of a previously given word and, thus, is a set-loss error. In other words, repetitions must be **exactly** the same as the initial response, even in terms of grammatical properties (e.g., plurality).

- ◆ If a repeated word has at least two meanings (e.g., *fall, fall*) or two words are pronounced the same (e.g., *see, sea*), the second response is scored as a repetition error unless (a) the examinee clarifies one of the same-sounding words (e.g., says, "as in season" for the second *fall*), (b) the examinee spells one of the words (e.g., "s-e-a"), or (c) the context of the response clearly reflects a different word (e.g., "see...sailboat, saltwater, sea"). The rationale for this guideline is that almost all words have two or more meanings, and, thus, repetition errors can rarely be scored without this guideline. The examinee must clarify only one of the two repeated words for both to be counted as correct (the assumption here is that the examinee would not have clarified one word unless he or she was aware that it was different from an earlier word).

## Condition 2: Category Fluency

The primary measure derived for the Category Fluency condition is the number of correct words generated within each 60-second trial. A correct response is a word that (a) meets the criteria of the condition (specifically, is a member of the target category) and (b) is not a repetition within that trial. The number of correct responses is scored for each of the four 15-second intervals and for the entire 60 seconds of a trial.

### General Guidelines for Scoring Correct Responses

- ◆ Correct responses in the Category Fluency condition are words that (a) are members of the target category for the trial, (b) are not grammatical variants of a word previously given on that trial (e.g., *cat, cats*), and (c) are not repetitions of words within that trial.
- ◆ Synonyms (e.g., *dog, canine* or *jacket, coat*), are all scored as correct.
- ◆ For a word that has multiple meanings and one of its meanings fits the target category, it is scored as correct (e.g., *bat* is a correct response for the *Animals* category). This guideline applies even if the relevant meaning of a word is of lower frequency than other meanings of the same word (e.g., *bat* used as an animal has a lower frequency than *bat* used as baseball equipment but is still counted as correct for the *Animals* category).
- ◆ A response is correct if it is a *specific member* of the target category or if it is a subordinate category that can be used to denote a specific member (e.g., *fish* for the *Animals* category).
- ◆ Words that represent the same ordinate level as the target category (e.g., *animal* given for the *Animals* trial) are incorrect. Words that are superordinate to the target category also are incorrect. For instance, *living things* is superordinate to *Animals* because it also encompasses nonanimal living things (i.e., plants), and thus *living things* is incorrect.
- ◆ Adjectives given either alone or with the name of the target category are incorrect (e.g., *carnivorous* or *carnivorous animal* would both be incorrect). Adjectives used to denote different attributes of the same category member are incorrect (e.g., for the *Vegetables* trial, if the examinee says, "onion, big onion, little onion," the first

response is correct, but the second and third responses are incorrect because they simply refer to different attributes of the same member). However, if the addition of an adjective results in a new member of the category (e.g., *onion*, *green onion*, *yellow onion*), then all of those words are scored as correct.

### Specific Guidelines for *Animals* (Standard Form)

- ◆ Two or more names of different types or breeds of an animal (“collie, rottweiler, boxer” or “goldfish, trout, salmon”) are all scored as correct.
- ◆ Names that represent the genders of the same type of animal (e.g., *cow*, *bull* or *hen*, *rooster*) are both counted as correct.
- ◆ Words that refer to the same animal at different developmental stages (*kitten*, *cat* or *foal*, *colt*, *horse*) are all counted as correct.

### Specific Guidelines for *Clothing* (Alternate Form)

- ◆ Items typically sold in a clothing store or the clothing department of a department store are considered clothing (e.g., scarf, gloves).
- ◆ Jewelry items (e.g., earrings, necklace), which are typically sold in jewelry stores, are *not* considered clothing and are scored as incorrect (i.e., as set-loss errors).
- ◆ Cloth (e.g., wool, fleece, cotton) typically is not sold in bulk form in clothing stores and, thus, when given in isolation are counted as incorrect (i.e., as set-loss errors).
- ◆ The same type of clothing item made of different material (e.g., wool sweater, cotton sweater) refer to different members of the category and are all scored as correct.
- ◆ Different but related members of an article of clothing (e.g., dress shirt, undershirt, T-shirt) are all counted as correct.

### Specific Guidelines for *Boys' Names* (Standard Form) and *Girls' Names* (Alternate Form)

- ◆ Many names are used for both boys and girls (e.g., Chris, Pat, Sandy). These types of names are correct for either category
- ◆ Many names are unusual (e.g., Keilana, Dawayin) and are vague in terms of gender. The examinee is given the benefit of the doubt, and such names are counted as correct.
- ◆ Variations of the same or similar name (e.g., Catherine, Kate, Kathy or William, Bill, Billy) are all counted as correct.
- ◆ Nicknames (e.g., BJ, Junior) are all counted as correct. If the examiner is unsure that a word is a nickname, the examinee is given the benefit of doubt and the response is scored as correct.
- ◆ Language variations of the same name (John, Juan) are all scored as correct.



## Guidelines for Scoring Incorrect Responses

Incorrect responses are categorized into two general types: set-loss and repetition errors.

### **Set-Loss Errors**

A set-loss error is a response that violates any criterion rule of the condition.

- ◆ Words that do not belong to the target category (e.g., the response “fur” given for the *Animals* trial) are set-loss errors.
- ◆ Grammatical variants of a word (e.g., *cat*, *cats*) are counted as set-loss errors if they do not substantially change the meaning of the root word. Thus, in the example, *cat* is scored as correct, but *cats* is scored as a set-loss error.
- ◆ Words that are ordinate (e.g., *animal*) or superordinate (e.g., *living things*) to the target category are set-loss errors.

### **Repetition Errors**

A repetition error is any response that is repeated within the 60 seconds of a trial.

- ◆ If an examinee repeats a correct response, the first occurrence is scored as correct and the second occurrence is scored only as a repetition error. If an examinee repeats a word that is a set-loss error, the repeated response is scored as **both** a set-loss error and a repetition error.
- ◆ Repetitions of a response must be *identical* to the initial response. If an examinee gives a correct response and then a grammatical variant of that response (e.g., “dog, dogs” in the *Animals* trial), the second word is not scored as a repetition error because it is a variant of a previously given word and is a set-loss error. In other words, repetitions must be *exactly* the same as the initial response, even in terms of grammatical properties (e.g., plurality).

## **Condition 3: Category Switching**

### General Guidelines for Scoring Correct Responses

Two types of correct-response scores are derived for the Category Switching condition: total correct responses score and total switching accuracy score.

- ◆ For the total correct-responses score, the correct responses from each of the two target categories are summed together, regardless of whether or not the examinee accurately followed the switching rule. For the Standard Form, a scaled score is derived for the combined number of *fruits* given, independent of switching accuracy, and the number of *furniture items* given, independent of the switching accuracy. For the Alternate Form, a scaled score is derived for the combined number of *vegetables* given, independent of switching accuracy, and the number of *musical instruments* given, independent of the switching accuracy.

- ◆ For the total switching accuracy score, the correct across-category switches are summed. For the Standard Form, the total switching accuracy raw score is the total number of times the examinee gives a *fruit* response followed immediately by a *furniture* response, or vice versa. For the Alternate Form, the total switching accuracy raw score is the total number of times the examinee gives a *vegetable* response followed immediately by a *musical instrument* response, or vice versa. For a switch to be scored as correct, the examinee must have given consecutive words, first from one target category, then from the other target category. A switch is considered correct even if a word from a target category is a repetition error or a grammatical variant error (e.g., singular and plural forms). For example, if an examinee says "Apple, bed, orange, bed," the repeated word, *bed*, is scored as a repetition error, but the *switch* from *orange* to *bed* is still counted as a correct across-category switch. If the examinee switches from a target-category word to a non-target-category word, or vice versa (e.g., "apple, pills" or "pills, apple," where *pills* belongs to a nontarget category), these switches are not counted as correct. Similarly, consecutive within-category responses (e.g., "apples, oranges") are not counted as correct switches.

### Specific Guidelines for *Fruits* (Standard Form) or *Vegetables* (Alternate Form)

- ◆ Some words may technically belong to one category but are commonly believed to belong to the other category (e.g., tomatoes and avocados are often considered vegetables but they are technically fruits). These types of words are counted as correct for either category. The rationale for this rule is that many people were taught, for instance, that a tomato is a vegetable, and their category-fluency performance should not be penalized because of this previously learned categorization.
- ◆ Related members of the *Fruits* or *Vegetables* category are scored as correct because people commonly use these terms to refer to specific members of these categories. For instance, all of the following responses would be scored as correct: "melon, cantaloupe, watermelon"; "berry, blueberry, strawberry"; "onion, red onion, green onion."

### Specific Guidelines for *Furniture* (Standard Form)

- ◆ Related members of the same piece of furniture (e.g., table, end table, dining table) are all counted as correct.
- ◆ Items that are commonly sold in a furniture store (e.g., lamps, rugs, beds) are considered furniture and are scored as correct.
- ◆ Items that are more commonly sold in a store other than a furniture store (e.g., computers, televisions, VCRs, phones, blankets, refrigerators, ovens) are *not* considered furniture and are scored as incorrect.

### Specific Guidelines for *Musical Instruments* (Alternate Form)

- ◆ Related members on the same musical instrument (violin, fiddle, Stradivarius) are all counted as correct.
- ◆ Musical instruments that can also be toys (kazoo, harmonica) are considered correct.
- ◆ Musical instruments that are from other cultures (e.g., djembe, bagpipe, sitar) are considered correct.

### Examples of Scoring Correct Responses and Correct Switches

Two types of correct responses are scored for the Category Switching condition: (a) the number of initial correct words from each category, independent of switching accuracy, and (b) the number of accurate switches between categories. The following examples illustrate how these correct responses are scored. In these examples, the symbol ~ is used to denote accurate switches.

Example 1: **“Apple, ~ desk, ~ banana”**

Number Correct Fruits	2
Number Correct Furniture	1
Number Accurate Switches	2

Example 2: **“Apple, bananas, ~ desk, sofa”**

Number Correct Fruits	2
Number Correct Furniture	2
Number Accurate Switches	1

Example 3: **“Apple, ~ desk, sofa, ~ orange”**

Number Correct Fruits	2
Number Correct Furniture	2
Number Accurate Switches	2

### Guidelines for Scoring Incorrect Responses

Incorrect responses are categorized into two general types: set-loss and repetition errors.

#### Set-Loss Errors

A set-loss error is a response that violates any criterion rule in terms of individual-word generation.

- ◆ Words that do *not* belong to either target category (e.g., *coffee* given for the target switching categories, *Fruits/Furniture*) are set-loss errors.
- ◆ Grammatical variants of a given word (e.g., *apple, apples*) are counted as set-loss errors if they do not substantially change the meaning of the root word.

- ◆ Responses that are ordinate or superordinate to either target category (e.g., *fruit* or *food*, respectively, for the *Fruits* trial) are set-loss errors.

## Repetition Errors

A repetition error is any response that is repeated within the 60 seconds of a trial.

- ◆ If an examinee repeats a correct response, the first occurrence is scored as a correct response and the second occurrence is scored only as a repetition error. If an examinee repeats a word that is a set-loss error, the repeated response is scored as *both* a set-loss error and a repetition error.
- ◆ Repetitions of a response must be *identical* to the initial response.

## Examples of Scoring Correct Responses, Correct Switches, and Errors

The following examples illustrate how the two types of correct-response measures and the two types of errors are scored. In these examples, the symbol ~ is used to denote accurate switches.

Example 1: “**Apple, ~ desk, sofa, ~ apple**”

Number Correct Fruits	1
Number Correct Furniture	2
Number Accurate Switches	2
Repetition Errors	1 (the second occurrence of <i>apple</i> )

Example 2: “**Apple, dog, banana, cat, apple, dog**”

Number Correct Fruits	2
Number Correct Furniture	0
Number Accurate Switches	0
Set-Loss Errors	4 ( <i>dog, cat, apples, dog</i> ; <i>apples</i> is a grammatical variant of <i>apple</i> )
Repetition Errors	1 (the second occurrence of <i>dog</i> )

## Normed Variables

### Primary Measures

#### Total-Correct Scores

The primary scoring measure for each of the three conditions of the D-KEFS Verbal Fluency Test is the number of correct responses generated by the examinee, summed across the different trials within each condition (e.g., the three letter trials of the Letter Fluency condition). For Condition 3: Category Switching, two total-correct scores are derived: (a) the total number of correct responses for both target categories summed

together, independent of switching accuracy; and (b) the total number of accurate switches from one target category to the other. The raw scores for these four measures are converted to scaled scores corrected for each of the 16 age groups (see Appendix B or J). Table 4.1 summarizes these measures.

Table 4.1. Primary (Total-Correct) Measures for the D-KEFS Verbal Fluency Test

Variable	Raw Score Computation	Norming Method	Corrected For
Condition 1: Letter Fluency Total Correct	Number Correct Responses Summed Across Three Letter Trials	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 2: Category Fluency Total Correct	Number Correct Responses Summed Across Two Category Trials	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 3: Category Switching Total Correct Responses <sup>a</sup>	Number Correct Individual Responses Summed Across Two Category Trials	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 3: Category Switching Total Switching Accuracy <sup>b</sup>	Number Correct Switches	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups

<sup>a</sup> This measure reflects the total number of correct responses generated for the two target categories summed together, *independent of switching accuracy*.

<sup>b</sup> This measure quantifies the number of correct switches from one target category to the other target category, *independent of whether the individual items are accurate, repeated, or variant responses*.

## Contrast Measures

Some examinees may exhibit disproportionate impairment in Letter Fluency relative to Category Fluency, or vice versa (see the discussion on clinical interpretation). In addition, some individuals may have greater difficulty on Category Switching than on Category Fluency. For these reasons, two contrast scores that directly quantify these comparisons are computed for the D-KEFS Verbal Fluency Test. The scaled-score differences for these contrast measures are converted to new scaled scores corrected for the total sample (see Appendix B or J). Table 4.2 summarizes these contrast measures.

Table 4.2. Contrast Measures for the D-KEFS Verbal Fluency Test

Contrast Measure	Raw Score Computation	Norming Method	Corrected For
Letter Fluency vs. Category Fluency	Condition 1 Scaled Score Minus Condition 2 Scaled Score	Contrast Scaled Score ( $M = 10$ ; $SD = 3$ )	Total Sample
Category Switching vs. Category Fluency	Condition 3 Scaled Score Minus Condition 2 Scaled Score	Contrast Scaled Score ( $M = 10$ ; $SD = 3$ )	Total Sample

## Optional Measures

The D-KEFS Verbal Fluency Test is composed of three conditions, with a total of six individual trials: three letter-fluency trials, two category-fluency trials, and one switching trial. Several process measures are derived and are summed across the three conditions (six trials) of the test:

- ◆ Total number of correct responses generated during each of the 15-second intervals (first 15 seconds, second 15 seconds, etc.), summed across Conditions 1–3
- ◆ Total number of set-loss errors, summed across Conditions 1–3
- ◆ Total number of repetition errors, summed across Conditions 1–3
- ◆ Percentage of set-loss errors relative to the total number of responses (correct and incorrect) summed across Conditions 1–3
- ◆ Percentage of repetition errors relative to the total number of responses (correct and incorrect) summed across Conditions 1–3

In addition, for Condition 3 only, the percentage of accurate switches relative to the total number of responses (correct and incorrect) on that condition is computed.

The raw scores for seven of the optional measures are converted to scaled scores corrected for each of the 16 age groups; for total set-loss errors, scores were corrected for the total sample, and for total repetition errors, scores were corrected for 9 modified age groups (see Appendix B). Table 4.3 summarizes these measures.

Table 4.3. Optional Process Measures for the D-KEFS Verbal Fluency Test

Variable	Conditions	Raw Score Computation	Norming Method	Corrected For
First Interval: Total Correct	Conditions 1–3	Total Number Correct Responses in 0–15 Second Interval	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Second Interval: Total Correct	Conditions 1–3	Total Number Correct Responses in 16–30 Second Interval	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Third Interval: Total Correct	Conditions 1–3	Total Number Correct Responses in 31–45 Second Interval	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Fourth Interval: Total Correct	Conditions 1–3	Total Number Correct Responses in 46–60 Second Interval	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Set-Loss Errors	Conditions 1–3	Total Number Set-Loss Errors	Scaled Score ( $M = 10$ ; $SD = 3$ )	Total Sample
Repetition Errors	Conditions 1–3	Total Number Repetition Errors	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 9 Age Groups
Percent Set-Loss Errors	Conditions 1–3	$\frac{\text{Number Set-Loss Errors}}{\text{Number Total Responses}^a} \times 100$	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Percent Repetition Errors	Conditions 1–3	$\frac{\text{Number Repetition Errors}}{\text{Number Total Responses}^a} \times 100$	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Percent Switching Accuracy	Condition 3 Only	$\frac{\text{Number Correct Switches} + 1}{\text{Number Total Responses on Condition 3}^b} \times 100$	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups

<sup>a</sup> The total number of responses includes both correct and incorrect responses. *Note.* Some repetition errors are also coded as set-loss errors; each double-coded error counts as only one response for the total responses measure.

<sup>b</sup> The total number of responses in Condition 3 (Category Switching) includes (a) correct responses regardless of switching accuracy and (b) incorrect responses (do not simply sum set-loss and repetition errors because some errors are double-coded).



Table B.1. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 1-Letter Fluency Total Correct

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	--	0	0	0-2	0-3	0-5	0-6	0-8	0-8	0-8	0-10	0-10	0-8	0-7	0-6	0-3	1			
2	0	1	1-2	3-5	4-6	6-8	7-9	9-11	9-11	9-11	11-13	11-13	9-11	8-10	7-9	4-6	2			
3	1	2-4	3-5	6-8	7-9	9-11	10-12	12-14	12-14	12-15	14-17	14-17	12-15	11-14	10-13	7-10	3			
4	2-3	5-6	6-7	9-10	10-11	12-13	13-15	15-16	15-17	16-18	18-20	18-20	16-18	15-17	14-16	11-13	4			
5	4-5	7-8	8-10	11-13	12-14	14-16	16-18	17-19	18-20	19-21	21-23	21-23	19-21	18-20	17-19	14-16	5			
6	6-8	9-11	11-13	14-16	15-17	17-19	19-21	20-22	21-23	22-25	24-27	24-27	22-25	21-24	20-23	17-20	6			
7	9-10	12-13	14-15	17-18	18-20	20-22	22-23	23-25	24-26	26-28	28-30	28-30	26-28	25-27	24-26	21-23	7			
8	11-12	14-15	16-18	19-21	21-23	23-25	24-26	26-28	27-29	29-31	31-33	31-33	29-31	28-30	27-29	24-26	8			
9	13-15	16-18	19-21	22-24	24-26	26-28	27-29	29-31	30-32	32-35	34-37	34-37	32-35	31-34	30-33	27-30	9			
10	16-17	19-20	22-23	25-26	27-28	29-30	30-32	32-33	33-35	36-38	38-40	38-40	36-38	35-37	34-36	31-33	10			
11	18-19	21-22	24-26	27-29	29-31	31-33	33-35	34-36	36-38	39-41	41-43	41-43	39-41	38-40	37-39	34-36	11			
12	20-22	23-25	27-29	30-32	32-34	34-36	36-38	37-39	39-41	42-45	44-47	44-47	42-45	41-44	40-43	37-40	12			
13	23-24	26-27	30-31	33-34	35-37	37-39	39-40	40-42	42-44	46-48	48-50	48-50	46-48	45-47	44-46	41-43	13			
14	25-26	28-29	32-34	35-37	38-40	40-42	41-43	43-45	45-47	49-51	51-53	51-53	49-51	48-50	47-49	44-46	14			
15	27-29	30-32	35-37	38-40	41-43	43-45	44-46	46-48	48-50	52-55	54-57	54-57	52-55	51-54	50-53	47-50	15			
16	30-31	33-34	38-39	41-42	44-45	46-47	47-49	49-50	51-53	56-58	58-60	58-60	56-58	55-57	54-56	51-53	16			
17	32-33	35-36	40-42	43-45	46-48	48-50	50-52	51-53	54-56	59-61	61-63	61-63	59-61	58-60	57-59	54-56	17			
18	34-37	37-39	43-45	46-48	49-51	51-53	53-55	54-56	57-59	62-65	64-67	64-67	62-65	61-64	60-63	57-60	18			
19	>37	>39	>45	>48	>51	>53	>55	>56	>59	>65	>67	>67	>65	>64	>63	>60	19			



Table B.2. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 2-Category Fluency Total Correct

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	0-1	0-3	0-6	0-8	0-10	0-12	0-13	0-14	0-15	0-17	0-18	0-18	0-16	0-13	0-11	0-8	1			
2	2-4	4-6	7-9	9-11	11-13	13-14	14-16	15-17	16-18	18-19	19-21	19-21	17-19	14-16	12-14	9-11	2			
3	5-6	7-8	10-11	12-13	14-15	15-17	17-18	18-19	19-20	20-22	22-23	22-23	20-21	17-18	15-16	12-13	3			
4	7-9	9-11	12-14	14-16	16-18	18-19	19-21	20-22	21-23	23-24	24-26	24-26	22-24	19-21	17-19	14-16	4			
5	10-11	12-13	15-16	17-18	19-20	20-22	22-23	23-24	24-25	25-27	27-28	27-28	25-26	22-23	20-21	17-18	5			
6	12-14	14-16	17-19	19-21	21-23	23-24	24-26	25-27	26-28	28-29	29-31	29-31	27-29	24-26	22-24	19-21	6			
7	15-16	17-18	20-21	22-23	24-25	25-27	27-28	28-29	29-30	30-31	32-33	32-33	30-31	27-28	25-26	22-23	7			
8	17-19	19-21	22-24	24-26	26-28	28-29	29-31	30-32	31-33	32-34	34-36	34-36	32-34	29-31	27-29	24-26	8			
9	20-21	22-23	25-26	27-28	29-30	30-32	32-33	33-34	34-35	35-36	37-38	37-38	35-36	32-33	30-31	27-28	9			
10	22-24	24-26	27-29	29-31	31-33	33-34	34-36	35-37	36-38	37-39	39-41	39-41	37-39	34-36	32-34	29-31	10			
11	25-26	27-28	30-31	32-33	34-35	35-37	37-38	38-39	39-40	40-41	42-43	42-43	40-41	37-38	35-36	32-33	11			
12	27-30	29-31	32-34	34-36	36-38	38-39	39-41	40-42	41-43	42-44	44-46	44-46	42-44	39-41	37-39	34-36	12			
13	31-32	32-33	35-36	37-38	39-40	40-41	42-43	43-45	44-45	45-46	47-48	47-48	45-46	42-43	40-41	37-38	13			
14	33-34	34-36	37-39	39-41	41-43	42-44	44-46	46-47	46-48	47-49	49-51	49-51	47-49	44-46	42-44	39-41	14			
15	35-37	37-39	40-41	42-43	44-45	45-46	47-48	48-50	49-50	50-51	52-53	52-53	50-51	47-48	45-46	42-43	15			
16	38-39	40-41	42-44	44-46	46-48	47-49	49-51	51-52	51-53	52-54	54-56	54-56	52-54	49-51	47-49	44-46	16			
17	40-42	42-44	45-46	47-48	49-50	50-51	52-53	53-55	54-55	55-56	57-58	57-58	55-56	52-53	50-51	47-48	17			
18	43-44	45-46	47-49	49-51	51-53	52-54	54-56	56-57	56-58	57-59	59-61	59-61	57-59	54-56	52-54	49-51	18			
19	>44	>46	>49	>51	>53	>54	>56	>57	>58	>59	>61	>61	>59	>56	>54	>51	19			

Table B.3. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 3—Category Switching Total Correct Responses

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	>100		
1	0	0-1	0-2	0-3	0-3	0-4	0-4	0-5	0-5	0-6	0-6	0-6	0-6	0-5	0-4	0-3	1			
2	1	2	3	4	4	5	5	6	6	7	7	7	7	6	5	4	2			
3	2	3	4	5	5	6	6	7	7	8	8	8	8	7	6	5	3			
4	3	4	5	6	6	7	7	8	8	9	9	9	9	8	7	6	4			
5	4	5	6	7	7	8	8	9	9	10	10	10	10	9	8	7	5			
6	5	6	7	8	8	9	9	10	10	11	11	11	11	10	9	8	6			
7	6	7	8	9	9	10	10	11	11	12	12	12	12	11	10	9	7			
8	7	8	9	10	10	11	11	12	12	13	13	13	13	12	11	10	8			
9	8	9	10	11	11	12	12	13	13	14	14	14	14	13	12	11	9			
10	9	10	11	12	12	13	13	14	14	15	15	15	15	14	13	12	10			
11	10	11	12	13	13	14	14	15	15	16	16	16	16	15	14	13	11			
12	11	12	13	14	14	15	15	16	16	17	17	17	17	16	15	14	12			
13	12	13	14	15	15	16	16	17	17	18	18	18	18	17	16	15	13			
14	13	14	15	16	16	17	17	18	18	19	19	19	19	18	17	16	14			
15	14	15	16	17	17	18	18	19	19	20	20	20	20	19	18	17	15			
16	15	16	17	18	18	19	19	20	20	21	21	21	21	20	19	18	16			
17	16	17	18	19	19	20	20	21	21	22	22	22	22	21	20	19	17			
18	17	18	19	20	20	21	21	22	22	23	23	23	23	22	21	20	18			
19	18	19	20	21	21	22	22	23	23	24	24	24	24	23	22	21	19			
	>15	>15	>16	>17	>18	>18	>19	>19	>20	>20	>21	>21	>21	>20	>19	>17	19			

Table B.4. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 3-Category Switching Total Switching Accuracy

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>17			
1	—	—	0	0	0	0-1	0-1	0-2	0-2	0-3	0-3	0-3	0-3	0-2	0-2	0	0	1		
2	—	0	—	1	1	2	2	3	3	4	4	4	4	3	3	1	1	2		
3	0	—	1	2	2	3	3	4	4	5	5	5	5	4	4	2	2	3		
4	—	1	2	3	3	4	4	5	5	6	6	6	6	5	5	3	3	4		
5	1	2	3	4	4	5	5	6	6	7	7	7	7	6	6	4	4	5		
6	2	3	4	5	5	6	6	7	7	8	8	8	8	7	7	5	5	6		
7	3	4	5	6	6	7	7	8	8	9	9	9	9	8	8	6	6	7		
8	4	5	6	7	7	8	8	9	9	10	10	10	10	9	9	7	7	8		
9	5	6	7	8	8	9	9	10	10	11	11	11	11	10	10	8	8	9		
10	6	7	8	9	9	10	10	11	11	12	12	12	12	11	11	9	9	10		
11	7	8	9	10	10	11	11	12	12	13	13	13	13	12	12	10	10	11		
12	8	9	10	11	11	12	12	13	13	14	14	14	14	13	13	11	11	12		
13	9	10	11	12	12	13	13	14	14	15	15	15	15	14	14	12	12	13		
14	10	11	12	13	13	14	14	15	15	16	16	16	16	15	15	13	13	14		
15	11	12	13	14	14	15	15	16	16	17	17	17	17	16	16	14	14	15		
16	12	13	14	15	15	16	16	17	17	18	18	18	18	17	17	15	15	16		
17	13	14	15	16	16	17	17	18	18	19	19	19	19	18	18	16	16	17		
18	14	15	16	17	17	18	18	19	19	20	20	20	20	19	19	17	17	18		
19	>14	>15	>16	>16	>17	>18	>18	>19	>19	>20	>20	>20	>20	>19	>19	>17	>17	19		

Table B.5. Scaled-Score Equivalents of Scaled-Score Differences by All Age Groups: Contrast Measures

Scaled Score	Letter Fluency vs. Category Fluency	Category Switching vs. Category Fluency	Scaled Score
1	<-7	<-9	1
2	-	-9	2
3	-7	-8 - -7	3
4	-6	-6	4
5	-5	-5	5
6	-4	-4	6
7	-3	-3	7
8	-2	-2	8
9	-1	-1	9
10	0	0	10
11	1	1	11
12	2	2	12
13	3	3	13
14	4	4	14
15	5	5	15
16	6	6	16
17	-	7	17
18	7	8-9	18
19	>7	>9	19

Table B.6. Scaled-Score Equivalents of Raw Scores by Each Age Group: First Interval Total Correct

Scaled Score	Age Group																		Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89			
1	0-5	0-8	0-10	0-10	0-11	0-12	0-14	0-15	0-15	0-17	0-18	0-18	0-18	0-16	0-15	0-14	0-12	1	
2	6-7	9-10	11-12	11-13	12-13	13-14	15-16	16-17	16-17	18-19	19-20	19-20	19-20	17-18	16-17	15-16	13-14	2	
3	8-9	11-12	13-14	14-16	14-16	15-16	17-18	18-19	18-19	20-21	21-22	21-22	21-22	19-20	18-19	17-18	15-16	3	
4	10	13	15	17	17	17-18	19-20	20-21	20-22	22-23	23-25	23-25	23-25	21-23	20-21	19-20	17-18	4	
5	11-12	14-15	16-17	18-19	18-19	19-20	21-22	22-23	23-24	24-25	26-27	26-27	26-27	24-25	22-23	21-22	19-20	5	
6	13-14	16-17	18-19	20-21	20-21	21-22	23-24	24-25	25-26	26-27	28-29	28-29	28-29	26-27	24-25	23-24	21-22	6	
7	15-16	18-19	20-21	22-23	22-23	23-24	25-26	26-27	27-28	28-30	30-31	30-31	30-31	28-29	26-28	25-27	23-25	7	
8	17-18	20-21	22-23	24-25	24-25	25-26	27-28	28-29	29-30	31-32	32-33	32-33	32-33	30-31	29-31	28-29	26-27	8	
9	19-20	22-23	24-25	26-27	26-27	27-28	29-30	30-31	31-32	33-34	34-35	34-35	34-35	32-33	30-31	28-29	26-27	9	
10	21	24	26	28	28-29	29-30	31-32	32-33	33-34	35-36	36-38	36-38	36-38	34-36	34-35	32-33	30-31	10	
11	22-23	25-26	27-28	29-30	30-31	31-32	33-34	34-35	35-36	37-38	39-40	39-40	39-40	37-38	36-37	34-35	32-33	11	
12	24-25	27-28	29-30	31-32	32-33	33-34	35-36	36-37	37-38	39-40	41-42	41-42	41-42	39-40	38-39	36-37	34-35	12	
13	26-27	29-30	31-32	33-34	34-35	35-36	37-38	38-39	39-40	41-43	43-44	43-44	43-44	41-42	40-42	38-40	36-38	13	
14	28-29	31-32	33-34	35-36	36-37	37-38	39-40	40-41	41-42	44-45	45-46	45-46	45-46	43-44	43-44	41-42	39-40	14	
15	30-31	33-34	35-36	37-38	38-39	39-40	41-42	42-43	43-44	46-47	47-48	47-48	47-48	45-46	45-46	43-44	41-42	15	
16	32	35	37	39	40-41	41-42	43-44	44-45	45-46	48-49	49-51	49-51	49-51	47-49	47-48	45-46	43-44	16	
17	33-34	36-37	38-39	40-41	42-43	43-44	45-46	46-47	47-48	50-51	52-53	52-53	52-53	50-51	49-50	47-48	45-46	17	
18	35-36	38-39	40-41	42-43	44-45	45-46	47-48	48-49	49-50	52-53	54-55	54-55	54-55	52-53	51-52	49-50	47-48	18	
19	>36	>39	>41	>43	>45	>46	>48	>49	>50	>53	>55	>55	>55	>53	>52	>50	>48	19	

Table B.7. Scaled-Score Equivalents of Raw Scores by Each Age Group: Second Interval Total Correct

Scaled Score	Age Group											Scaled Score						
	8	9	10	11	12	13	14	15	16-19	20-29	30-39		40-49	50-59	60-69	70-79	80-89	
1	0	0-1	0-1	0-3	0-4	0-4	0-5	0-5	0-6	0-6	0-7	0-7	0-7	0-5	0-4	0-4	0-1	1
2	1	2	2-3	4	5	5-6	6	6	7-8	7-8	8-9	8-9	8-9	6-7	5-6	5-6	2-3	2
3	2	3-4	4	5-6	6-7	7	7-8	7-8	9-10	9-10	10-11	10-11	10-11	8-9	7-8	7-8	4-5	3
4	3-4	5	5-6	7	8	8-9	9	9-10	11	11-12	12-13	12-13	10-11	9-10	9	6-7	4	4
5	5	6	7	8-9	9-10	10	10-11	11	12-13	13-14	14-15	14-15	12-13	11-12	10-11	8-9	5	5
6	6	7-8	8-9	10	11	11-12	12	12-13	14-15	15-16	16-17	16-17	14-15	13-14	12-13	10-11	6	6
7	7-8	9	10	11-12	12-13	13	13-14	14-15	16	17	18	18	16	15	14-15	12	7	7
8	9	10	11-12	13	14	14-15	15	16	17-18	18-19	19-20	19-20	17-18	16-17	16-17	13-14	8	8
9	10	11-12	13	14-15	15-16	16	16-17	17-18	19-20	20-21	21-22	21-22	19-20	18-19	18-19	15-16	9	9
10	11-12	13	14-15	16	17	17-18	18	19-20	21	22-23	23-24	23-24	21-22	20-21	20	17-18	10	10
11	13	14	16	17-18	18-19	19	19-20	21	22-23	24-25	25-26	25-26	23-24	22-23	21-22	19-20	11	11
12	14	15-16	17-18	19	20	20-21	21	22-23	24-25	26-27	27-28	27-28	25-26	24-25	23-24	21-22	12	12
13	15-16	17	19	20-21	21-22	22	22-23	24-25	26	28	29	29	27	26	25-26	23	13	13
14	17	18	20-21	22	23	23-24	24	26	27-28	29-30	30-31	30-31	28-29	27-28	27-28	24-25	14	14
15	18	19-20	22	23-24	24-25	25	25-26	27-28	29-30	31-32	32-33	32-33	30-31	29-30	29-30	26-27	15	15
16	19-20	21	23-24	25	26	26-27	27	29-30	31	33-34	34-35	34-35	32-33	31-32	31	28-29	16	16
17	21	22	25	26-27	27-28	28	28-29	31	32-33	35-36	36-37	36	34-35	33-34	32-33	30-31	17	17
18	22	23-24	26-27	28	29	29-30	30	32-33	34-35	37-38	38-39	37-38	36-37	35-36	34-35	32-33	18	18
19	>22	>24	>27	>28	>29	>30	>30	>33	>35	>38	>39	>38	>37	>36	>35	>33	19	19

Table B.8. Scaled-Score Equivalents of Raw Scores by Each Age Group: Third Interval Total Correct

Scaled Score	Age Group																	Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89		
1	-	-	-	-	0	0	0-1	0-2	0-3	0-4	0-5	0-5	0-5	0-3	0-2	0-2	0	1
2	-	0	0	0	1	1-2	2	3	4	5	6	6	4-5	3-4	3	1	2	
3	0	1	1-2	1	2-3	3	3-4	4-5	5-6	6-7	7-8	7-8	6	5	4-5	2-3	3	
4	1	2-3	3	3-4	4	4-5	5	6	7	8	9	9	7-8	6-7	6	4	4	
5	2	4	4	5	5-6	6	6-7	7-8	8-9	9-10	10-11	10-11	9	8	7-8	5-6	5	
6	3	5	5-6	6-7	7	7-8	8	9	10	11	12	12	10-11	9-10	9	7	6	
7	4-5	6	7	8	8-9	9	9-10	10-11	11-12	12-13	13-14	13-14	12	11	10-11	8-9	7	
8	6	7	8	9-10	10	10-11	11	12	13	14	15	15	13-14	12-13	12	10	8	
9	7	8	9-10	11	11-12	12	12-13	13-14	14-15	15-16	16-17	16-17	15	14	13-14	11-12	9	
10	8	9-10	11	12-13	13	13-14	14	15	16	17	18	18	16-17	15-16	15	13	10	
11	9	11	12	14	14-15	15	15-16	16-17	17-18	18-19	19-20	19-20	18	17	16-17	14-15	11	
12	10	12	13-14	15-16	16	16-17	17	18	19	20	21	21	19-20	18-19	18	16	12	
13	11-12	13	15	17	17-18	18	18-19	19-20	20-21	21-22	22-23	22-23	21	20	19-20	17-18	13	
14	13	14	16	18-19	19	19-20	20	21	22	23	24	24	22-23	21-22	21	19	14	
15	14	15	17-18	20	20-21	21	21-22	22-23	23-24	24-25	25-26	25-26	24	23	22-23	20-21	15	
16	15	16-17	19	21-22	22	22-23	23	24	25	26	27	27	25-26	24-25	24	22	16	
17	16	18	20	23	23-24	24	24-25	25-26	26-27	27-28	28-29	28-29	27	26	25-26	23-24	17	
18	17	19	21-22	24-25	25	25-26	26	27	28	29	30	30	28-29	27-28	27	25	18	
19	>17	>19	>22	>25	>25	>26	>26	>27	>28	>29	>30	>30	>29	>28	>27	>25	19	



Table B.9. Scaled-Score Equivalents of Raw Scores by Each Age Group: Fourth Interval Total Correct

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	—	—	—	—	—	—	0	0	0-1	0-1	0-1	0-1	0	—	—	—	1			
2	—	—	—	0	0	0	1	1	2	2	2-3	2-3	1	0	0	—	2			
3	—	0	0	1	1	1-2	2	2-3	3-4	3-4	4	4	2-3	1-2	1-2	0	3			
4	—	1	1-2	2	2-3	3	3-4	4	5	5	5-6	5-6	4-5	3-4	3	1	4			
5	0	2	3	3	4	4-5	5	5-6	6-7	6-7	7-8	7-8	6	5	4-5	2-3	5			
6	1	3	4	4-5	5-6	6	6-7	7	8	8-9	9	9	7-8	6-7	6-7	4-5	6			
7	2-3	4-5	5-6	6	7	7-8	8	8-9	9-10	10	10-11	10-11	9-10	8-9	8	6	7			
8	4	6	7	7	8-9	9	9-10	10	11	11-12	12-13	12-13	11	10	9-10	7-8	8			
9	5	7	8	8-9	10	10-11	11	11-12	12-13	13-14	14	14	12-13	11-12	11-12	9-10	9			
10	6-7	8-9	9-10	10-11	11-12	12	12-13	13	14	15	15-16	15-16	14-15	13-14	13	11	10			
11	8	10	11	12	13	13-14	14	14-15	15-16	16-17	17-18	17-18	16	15	14-15	12-13	11			
12	9	11	12	13	14-15	15	15-16	16	17	18-19	19	19	17-18	16-17	16-17	14-15	12			
13	10-11	12-13	13-14	14-15	16	16-17	17	17-18	18-19	20	20-21	20-21	19-20	18-19	18	16	13			
14	12	14	15	16	17-18	18	18-19	19	20	21-22	22-23	22-23	21	20	19-20	17-18	14			
15	13	15	16	17	19	19-20	20	20-21	21-22	23-24	24	24	22-23	21-22	21-22	19-20	15			
16	14-15	16-17	17-18	18-19	20-21	21	21-22	22	23	25	25-26	25-26	24-25	23-24	23	21	16			
17	16	18	19	20	22	22-23	23	23-24	24-25	26-27	27-28	27-28	26	25	24-25	22-23	17			
18	17	19	20	21	23-24	24	24-25	25	26	28-29	29	29	27-28	26-27	26-27	24-25	18			
19	>17	>19	>20	>21	>24	>24	>25	>25	>26	>29	>29	>29	>28	>27	>27	>25	19			

Table B.10. Scaled-Score Equivalents of Raw Scores for All Age Groups: Conditions 1-3  
Total Set-Loss Errors

Scaled Score	Total Set-Loss Errors	Scaled Score
1	>9	1
2	—	2
3	8	3
4	7	4
5	6	5
6	5	6
7	—	7
8	4	8
9	3	9
10	2	10
11	1	11
12	—	12
13	0	13
14	—	14
15	—	15
16	—	16
17	—	17
18	—	18
19	—	19

Table B.11. Scaled-Score Equivalents of Raw Scores by Modified Age Groups:  
Conditions 1-3 Total Repetition Errors

Scaled Score	Age Group									Scaled Score
	8-15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	
1	>5	>5	>7	>9	>9	>11	>11	>11	>12	1
2	—	—	7	9	9	11	11	11	12	2
3	5	5	6	8	8	10	10	10	11	3
4	4	4	—	7	7	9	9	9	10	4
5	3	—	5	6	6	8	8	8	9	5
6	—	3	4	5	5	7	7	7	8	6
7	2	—	—	—	—	6	6	6	7-6	7
8	1	2	3	4	4	5	5	5	5	8
9	—	—	2	3	3	4	4	4	4	9
10	0	1	—	2	2	3	3	3	3	10
11	—	—	1	1	1	2	2	2	2	11
12	—	0	0	0	0	1	1	1	1	12
13	—	—	—	—	—	0	0	0	0	13
14	—	—	—	—	—	—	—	—	—	14
15	—	—	—	—	—	—	—	—	—	15
16	—	—	—	—	—	—	—	—	—	16
17	—	—	—	—	—	—	—	—	—	17
18	—	—	—	—	—	—	—	—	—	18
19	—	—	—	—	—	—	—	—	—	19

Table B.12. Scaled-Score Equivalents of Raw Scores by Each Age Group: Conditions 1-3 Percent Set-Loss Errors

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	>12	>11.8	>10	>10	>9.5	>7.6	>7.6	>7.6	>7.3	>7.3	>7.3	>7.4	>7.4	>7.6	>7.7	>8.3	1			
2	12-11.1	11.8-10.9	10-9.3	10-9.3	9.5-8.8	7.6-7.1	7.6-7.1	7.6-7.1	7.3-6.8	7.3-6.8	7.3-6.8	7.4-6.9	7.4-6.9	7.6-7.1	7.7-7.2	9.3-8.6	2			
3	11-10.1	10.8-9.9	9.2-8.5	9.2-8.5	8.7-8	7-6.4	7-6.4	7-6.4	6.7-6.1	6.7-6.1	6.7-6.1	6.8-6.2	6.8-6.2	7-6.4	7.1-6.5	8.5-7.8	3			
4	10-8.1	9.8-8.9	8.4-7.6	8.4-7.6	7.9-7.1	6.3-5.7	6.3-5.7	6.3-5.7	6-5.4	6-5.4	6-5.4	6.1-5.5	6.1-5.5	6.3-5.7	6.4-5.8	7.7-6.9	4			
5	9-8.1	8.8-7.9	7.5-6.8	7.5-6.8	7-6.3	5.6-5.1	5.6-5.1	5.6-5.1	5.3-4.8	5.3-4.8	5.3-4.8	5.4-4.9	5.4-4.9	5.6-5.1	5.7-5.2	6.8-6.1	5			
6	8-7.1	7.8-6.9	6.7-6	6.7-6	6.2-5.6	5-4.4	5-4.4	5-4.4	4.7-4.1	4.7-4.1	4.7-4.1	4.8-4.2	4.8-4.2	5-4.4	5.1-4.5	6-5.3	6			
7	7-6.1	6.8-5.9	5.9-5.2	5.9-5.2	5.5-4.7	4.3-3.7	4.3-3.7	4.3-3.7	4-3.4	4-3.4	4-3.4	4.1-3.5	4.1-3.5	4.3-3.7	4.4-3.8	5.2-4.4	7			
8	6-5.1	5.8-4.9	5.1-4.3	5.1-4.3	4.6-3.8	3.6-3.1	3.6-3.1	3.6-3.1	3.3-2.8	3.3-2.8	3.3-2.8	3.4-2.9	3.4-2.9	3.6-3.1	3.7-3.2	4.3-3.6	8			
9	5-4.1	4.8-3.9	4.2-3.5	4.2-3.5	3.7-3	3-2.4	3-2.4	3-2.4	2.7-2.1	2.7-2.1	2.7-2.1	2.8-2.2	2.8-2.2	3-2.3	3.1-2.4	3.5-2.9	9			
10	4-3.1	3.8-2.9	3.4-2.6	3.4-2.6	2.9-2.1	2.3-1.7	2.3-1.7	2.3-1.7	2-1.3	2-1.3	2-1.3	2.1-1.5	2.1-1.5	2.2-1.7	2.3-1.8	2.8-1.9	10			
11	3-2.1	2.8-1.9	2.5-1.8	2.5-1.8	2-1.3	1.6-1.1	1.6-1.1	1.6-1.1	1.2-8	1.2-8	1.2-8	1.4-9	1.4-9	1.6-1.1	1.7-1.2	1.8-1.3	11			
12	2-1.1	1.8-1	1.7-1	1.7-1	1.2-5	1-4	1-4	1-4	7-1	7-1	7-1	8-2	8-2	1-4	1.1-5	1.2-6	12			
13	1-1	.8-1	.9-1	.9-1	.4-0	3-0	3-0	3-0	0	0	0	.1-0	.1-0	3-0	4-0	5-0	13			
14	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	14			
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15			
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16			
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17			
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18			
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19			

Table B.13. Scaled-Score Equivalents of Raw Scores by Each Age Group: Conditions 1-3 Percent Repetition Errors

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>15.5			
1	>6.8	>6.7	>6.2	>3.7	>3.7	>3.7	>3.7	>3.7	>5.5	>7.2	>7.5	>7.8	>9.6	>11.6	>13.5	>15.5	1			
2	6.8-6.3	6.7-6.2	5.2-4.8	3.7-3.4	3.7-3.4	3.7-3.4	3.7-3.4	3.7-3.4	5.5-5.1	7.2-6.7	7.5-7	7.8-7.3	9.6-8.9	11.6-10.7	13.5-12.4	15.5-14.3	2			
3	6.2-5.6	6.1-5.5	4.7-4.3	3.3-3.1	3.3-3.1	3.3-3.1	3.3-3.1	3.3-3.1	5-4.6	6.6-6	6.9-6.3	7.2-6.6	8.8-8.1	10.6-9.7	12.3-11.2	14.2-12.9	3			
4	5.5-4.9	5.4-4.8	4.2-3.8	3-2.8	3-2.8	3-2.8	3-2.8	3-2.8	4.5-4.1	5.9-5.3	6.2-5.6	6.5-5.9	8-7.2	9.6-8.7	11.1-10.1	12.8-11.6	4			
5	4.8-4.3	4.7-4.2	3.7-3.3	2.7-2.5	2.7-2.5	2.7-2.5	2.7-2.5	2.7-2.5	4-3.6	5.2-4.7	5.5-5	5.8-5.3	7.1-6.4	8.5-7.7	10-8.9	11.5-10.3	5			
6	4.2-3.6	4.1-3.5	3.2-2.8	2.4-2.1	2.4-2.1	2.4-2.1	2.4-2.1	2.4-2.1	3.5-3.1	4.6-4	4.9-4.3	5.2-4.6	6.3-5.6	7.8-6.7	8.8-7.7	10.2-8.9	6			
7	3.5-2.9	3.4-2.8	2.7-2.3	2-1.8	2-1.8	2-1.8	2-1.8	2-1.8	3-2.6	3.9-3.3	4.2-3.6	4.5-3.9	5.5-4.7	6.6-5.7	7.6-6.6	8.8-7.6	7			
8	2.8-2.3	2.7-2.2	2.2-1.8	1.7-1.5	1.7-1.5	1.7-1.5	1.7-1.5	1.7-1.5	2.5-2.1	3.2-2.7	3.5-3	3.8-3.3	4.6-3.9	5.6-4.7	6.5-5.4	7.5-6.3	8			
9	2.2-1.6	2.1-1.5	1.7-1.3	1.4-1.1	1.4-1.1	1.4-1.1	1.4-1.1	1.4-1.1	2-1.6	2.6-2	2.9-2.3	3.2-2.6	3.8-3.1	4.6-3.7	5.3-4.2	6.2-4.9	9			
10	1.5-9	1.4-8	1.2-8	1-8	1-8	1-8	1-8	1-8	1.5-1.1	1.9-1.3	2.2-1.6	2.5-1.9	3-2.2	3.6-2.7	4.1-3.1	4.8-3.6	10			
11	.8-3	.7-2	.7-2	.7-2	.7-2	.7-2	.7-2	.7-2	1-5	1.2-6	1.5-9	1.8-1.3	2.1-1.4	2.6-1.7	3-1.9	3.5-2.3	11			
12	.2-0	.1-0	.1-0	.1-0	.1-0	.1-0	.1-0	.1-0	.4-1	.5-1	.8-3	1.2-6	1.3-5	1.6-7	1.8-7	2.2-9	12			
13	-	-	-	-	-	-	-	-	0	0	2-0	5-0	4-0	6-0	6-0	8-0	13			
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14			
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15			
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16			
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17			
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18			
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19			

Table B.14. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 3 Percent Switching Accuracy

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	< 38	< 38	< 39	< 39	< 43	< 44	< 44	< 44	< 44	< 44	< 44	< 44	< 44	< 40	< 39	< 33	< 32	1		
2	38-43	38-43	39-44	39-44	43-47	44-48	44-48	44-48	44-48	44-48	44-48	44-48	44-48	40-45	39-44	33-38	32-37	2		
3	44-49	44-49	45-50	45-50	48-53	49-54	49-54	49-54	49-54	49-54	49-54	49-54	49-54	48-51	45-50	39-44	38-43	3		
4	50-54	50-54	51-55	51-55	54-58	55-59	55-59	55-59	55-59	55-59	55-59	55-59	55-59	52-56	51-55	45-50	44-49	4		
5	55-60	55-60	56-61	56-61	59-63	60-64	60-64	60-64	60-64	60-64	60-64	60-64	60-64	57-62	56-61	51-56	50-55	5		
6	61-66	61-66	62-67	62-67	64-69	65-70	65-70	65-70	65-70	65-70	65-70	65-70	65-70	63-68	62-67	57-62	56-61	6		
7	67-71	67-71	68-72	68-72	70-74	71-75	71-75	71-75	71-75	71-75	71-75	71-75	71-75	69-73	68-72	63-68	62-67	7		
8	72-77	72-77	73-78	73-78	75-79	76-80	76-80	76-80	76-80	76-80	76-80	76-80	76-80	74-79	73-78	69-74	68-73	8		
9	78-83	78-83	79-84	79-84	80-85	81-86	81-86	81-86	81-86	81-86	81-86	81-86	81-86	80-85	79-84	75-80	74-79	9		
10	84-88	84-88	85-89	85-89	86-90	87-91	87-91	87-91	87-91	87-91	87-91	87-91	87-91	86-90	85-89	81-86	80-85	10		
11	89-94	89-94	90-95	90-95	91-95	92-96	92-96	92-96	92-96	92-96	92-96	92-96	92-96	91-96	90-95	87-92	86-91	11		
12	95-100	95-100	96-100	96-100	96-100	97-100	97-100	97-100	97-100	97-100	97-100	97-100	97-100	96-100	96-100	93-98	92-97	12		
13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	99-100	98-100	13		
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14		
15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15		
16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16		
17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17		
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18		
19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19		

## D-KEFS Trail Making

Use the CIFASD test packet form, D-KEFS Record Form, child's Response Booklets and the D-KEFS Examiner's Manual pages 46-49 and 221-240 to score this test.

**Discontinue Times:** For Visual Scanning, Number Sequencing, Letter Sequencing, and Motor Speed, the discontinue time is 150 seconds (2 and a half minutes). For Number-Letter Switching the discontinue time is 240 seconds (4 minutes).

**Completion Times Scoring:** The primary scoring measure for each of the five conditions is the number of seconds that the examinee takes to complete each condition. If the examinee does not complete a particular condition at the end of the time limit, then the time limit is used as the completion time. The raw score (in seconds) for each of Conditions 1-5 is converted to a scaled score. Additional Completion Time Measures are explained on the D-KEFS record form and in the D-KEFS manual (pages 46-47).

**Error Analysis Scoring:** Count up the total number of omissions and commissions for Condition 1 and the number of set loss, sequencing, and time discontinue errors for Conditions 2 through 5 and record in the appropriate blanks. Convert to cumulative percentile ranks and standards scores as available (D-KEFS manual pgs.221-240).

**Condition 1:** There are 12 threes on each page of this response booklet.

**Omission Error:** Whenever an examinee fails to mark a target 3, either after the examinee states that he or she has completed the task or the time limit has elapsed.

**CIFASD Note:** If there is a mark in the margin/open space but near a 3 and it is obvious the child meant to mark that 3, do not count this as an omission.

**Commission Error:** Whenever an examinee marks a letter or a number that is not a 3. If an examinee makes a commission error and then self-corrects it (e.g. by scribbling over it), that response is not scored as an error.

**Conditions 2-5:** Check to make sure the child completed the proper connections and that the tester pointed out mistakes as needed. Once an incorrect connection has been made, it is counted as an error even if the examinee catches the error after it's made.

**Sequencing Error:** When an examinee makes a connection within the correct set of symbols for the condition being administered (numbers or letters) but connects the wrong item within that set (e.g. 8 to 10 or F to H). On Condition 4, a sequencing error is when an examinee **correctly switches** from one set of symbols to the other but connects an item that is out of sequence within the correct set (e.g. 3 to E instead of 3 to D).

**Set-Loss Error:** When an examinee draws a line connecting an item that belongs to the wrong set of symbols (numbers or letters) for the condition being administered (e.g. 4 to D instead of 4 to 5 or C to 5 instead of C to D). On Condition 4, a set-loss error occurs when the examinee fails to switch from one set of symbols to the other (e.g. 4 to 5 instead of 4 to D).

**Time-Discontinue Errors:** When an examinee failed to connect one or more items because the time limit for that condition had elapsed. All connections that should have been made but were not because of the expired time limit are counted as time-discontinue errors. Note exception (D-KEFS manual page 48).



## Scoring

Several types of scores are derived for the D-KEFS Trail Making Test: scaled scores based on completion times and one error measure, a composite scaled score, contrast scaled scores, and cumulative percentile ranks for most of the error measures.

### Completion-Time Scores

The primary scoring measure for each of the five conditions of the D-KEFS Trail Making Test is the number of seconds that the examinee takes to complete each condition. If the examinee does not complete a particular condition at the end of the time limit, then the time limit is used as the completion time. The raw score (in seconds) for each of Conditions 1–5 is converted to a scaled score. In addition to these five scaled scores, the scaled scores for two of the conditions, Number Sequencing and Letter Sequencing, are summed together, and a new scaled score is derived. This measure is called the Combined Number Sequencing + Letter Sequencing variable. All of these scaled scores have a mean of 10 and a standard deviation of 3. All but one are corrected for each of the 16 age groups; the composite scaled score is corrected for the entire sample. Conversion tables are provided in Appendix A. The completion-time scores are summarized in Table 3.1.

Table 3.1. Primary (Completion-Time) Measures for the D-KEFS Trail Making Test

Variable	Raw Score Computation	Norming Method	Corrected For
Condition 1: Visual Scanning Completion Time	Seconds To Complete	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 2: Number Sequencing Completion Time	Seconds To Complete	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 3: Letter Sequencing Completion Time	Seconds To Complete	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 4: Number–Letter Switching Completion Time	Seconds To Complete	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 5: Motor Speed Completion Time	Seconds To Complete	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Combined Number Sequencing + Letter Sequencing	Sum of Scaled Scores Conditions 2 + 3	Scaled Score ( $M = 10$ ; $SD = 3$ )	Total Sample

### Contrast Measures

An examinee may perform poorly on Condition 4: Number–Letter Switching, not because of a deficit in flexibility of thinking, but because of impairment in one or more underlying component skills needed to perform Condition 4. For this reason, performance on each of

the four baseline tasks is parceled out from performance on the Number–Letter Switching condition by the computation of a series of contrast measures. For each contrast measure, the completion-time scaled score for a component task (Conditions 1, 2, 3, or 5) or the Number Sequencing + Letter Sequencing composite is subtracted from the completion-time scaled score on the switching task (Condition 4). A new scaled score, with a mean of 10 and standard deviation of 3, is derived for each scaled-score difference. These contrast measures indicate whether or not an examinee is exhibiting disproportionate impairment in cognitive flexibility relative to one of the four baseline component skills, or to the combined baseline skills measured by Conditions 2 and 3. Table 3.2 summarizes the contrast scores.

Table 3.2. Contrast Measures for the D–KEFS Trail Making Test

Variable	Raw Score Computation	Norming Method	Corrected For
Number–Letter Switching vs. Visual Scanning	Condition 4 Scaled Score Minus Condition 1 Scaled Score	Contrast Scaled Score ( $M = 10; SD = 3$ )	Total Sample
Number–Letter Switching vs. Number Sequencing	Condition 4 Scaled Score Minus Condition 2 Scaled Score	Contrast Scaled Score ( $M = 10; SD = 3$ )	Total Sample
Number–Letter Switching vs. Letter Sequencing	Condition 4 Scaled Score Minus Condition 3 Scaled Score	Contrast Scaled Score ( $M = 10; SD = 3$ )	Total Sample
Number–Letter Switching vs. Combined Number Sequencing + Letter Sequencing	Condition 4 Scaled Score Minus Conditions 2 + 3 Composite Scaled Score	Contrast Scaled Score ( $M = 10; SD = 3$ )	Total Sample
Number–Letter Switching vs. Motor Speed	Condition 4 Scaled Score Minus Condition 5 Scaled Score	Contrast Scaled Score ( $M = 10; SD = 3$ )	Total Sample

## Optional Error Scores

Cumulative percentile ranks can be derived for several types of errors, including *omission* and *commission*, *sequencing*, *set-loss*, and *time-discontinue* errors (see Table 3.3). In addition, a scaled score can be derived for the total number of errors (all types) made on Condition 4: Number–Letter Switching.

For Condition 1: Visual Scanning, two types of errors are scored: omissions and commissions. An omission error occurs whenever an examinee fails to mark a target 3, either after the examinee states that he or she has completed the task or the time limit (150 seconds) has elapsed. Approximately 14.5% of the entire D–KEFS normative sample made one or more of these types of errors. The number of omission errors is transformed to a cumulative percentile rank corrected for each of the 16 age groups (see Appendix A).

A commission error occurs whenever an examinee marks a letter or a number that is not a 3. If an examinee makes a commission error and then self-corrects it (e.g., by scribbling over it), that response is not scored as an error. Commission errors were relatively infrequent in the normative sample, with only 3.2% of the entire sample making one or more of this type of response. The number of commission errors is transformed into a cumulative percentile rank corrected for each of the 16 age groups (see Appendix A).

For Condition 2: Number Sequencing, Condition 3: Letter Sequencing, and Condition 4: Number–Letter Switching, three types of errors are scored: sequencing errors, set-loss errors, and time-discontinue errors.

A sequencing error occurs when an examinee makes a connection within the correct set of symbols for the condition being administered (numbers or letters) but connects the wrong item within that set. For example, Condition 2 requires the examinee to connect only numbers in order. If the examinee draws a line from the 8 to the 10, this response is within the correct set of symbols but is a sequencing error within that set. On Condition 3, a sequencing error is scored when an examinee draws a line from one letter to a letter that is out of sequence (e.g., from *F* to *H*). On Condition 4, a sequencing error occurs when the examinee *correctly switches* from one set of symbols to the other (e.g., from numbers to letters) but connects an item that is out of sequence within the correct set (e.g., from the 3 to the *E* instead of from the 3 to the *D*). In this example, the examinee *switched* to the correct set of symbols but made a sequencing error within that set. For each of Conditions 2, 3, and 4, the number of sequencing errors is transformed into a cumulative percentile rank corrected for each of the 16 age groups.

A set-loss error occurs when an examinee draws a line connecting an item that belongs to the wrong set of symbols (numbers or letters) for the condition being administered. On Condition 2: Number Sequencing, a set-loss error occurs when the examinee draws a line from a number to a letter, for example, from the 4 to the *D* instead of from the 4 to the 5. Set-loss errors on Condition 3: Letter Sequencing occur when an examinee draws a line from a letter to a number (e.g., from the *C* to the 5). On Condition 4: Number–Letter Switching, a set-loss error occurs when the examinee fails to switch from one set of symbols to the other, for instance, draws a line from the 4 to the 5 instead of from the 4 to the *D*. For Condition 2, the number of set-loss errors is transformed into a cumulative percentile rank corrected for the entire normative sample. For each of Conditions 3 and 4, the number of set-loss errors is transformed into a cumulative percentile rank corrected for each of the 16 age groups.

Time-discontinue errors occur when an examinee failed to connect one or more items because the time limit for that condition had elapsed. All connections that should have been made but were not because of the expired time limit are counted as time-discontinue errors. (Note: If the examinee is in the process of drawing a connection when the time limit elapses, the examinee is allowed to complete that connection. This last connection is scored as correct if the response was accurate or as a sequencing or set-loss error if it was not.)

For each of Conditions 2, 3, and 5, the number of time-discontinue errors is transformed into a cumulative percentile rank corrected for the entire normative sample (see Appendix A). For Condition 4, the number of time-discontinue errors is transformed into a cumulative percentile rank corrected for each of the 16 age groups (see Appendix A). For Condition 4, the total number of all errors (sequencing, set-loss, and time-discontinue errors) are summed together and converted to a scaled score ( $M = 10$ ,  $SD = 3$ ) corrected for each of the 16 age groups.

Table 3.3 summarizes the optional error measures.

Table 3.3. Optional Error Measures for the D-KEFS Trail Making Test

Variable	Raw Score Computation	Norming Method	Corrected For
Condition 1: Visual Scanning	Number of Omission Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 1: Visual Scanning	Number of Commission Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 2: Number Sequencing	Number of Sequencing Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 2: Number Sequencing	Number of Set-Loss Errors	Cumulative Percentile Rank	Total Sample
Condition 2: Number Sequencing	Number of Time-Discontinue Errors	Cumulative Percentile Rank	Total Sample
Condition 3: Letter Sequencing	Number of Sequencing Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 3: Letter Sequencing	Number of Set-Loss Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 3: Letter Sequencing	Number of Time-Discontinue Errors	Cumulative Percentile Rank	Total Sample
Condition 4: Number-Letter Switching	Number of Sequencing Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 4: Number-Letter Switching	Number of Set-Loss Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 4: Number-Letter Switching	Number of Time-Discontinue Errors	Cumulative Percentile Rank	Each of 16 Age Groups
Condition 4: Number-Letter Switching	Total Number of Errors (All Types)	Scaled Score ( $M = 10$ ; $SD = 3$ )	Each of 16 Age Groups
Condition 5: Motor Speed	Number of Time-Discontinue Errors	Cumulative Percentile Rank	Total Sample

Table A.1. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 1—Visual Scanning Completion Time

Scaled Score	Age Group																			Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89				
1	>73	>62	>50	>49	>47	>41	>41	>41	>40	>39	>39	>42	>44	>50	>52	>62	1			
2	73-70	62-60	50-49	49-48	47-45	41-40	41-40	41-40	40-39	39-38	39-38	42-41	44-42	50-49	52-50	62-60	2			
3	69-66	59-57	48-46	47-45	44-43	39-38	39-38	39-38	38-37	37-36	37-36	40-39	41-40	48-46	49-47	59-56	3			
4	65-62	56-53	45-43	44-42	42-40	37-35	37-35	37-35	36-34	35-34	35-34	38-36	39-37	45-43	46-45	55-53	4			
5	61-58	52-50	42-41	41-40	39-38	34-33	34-33	34-33	33-32	33-32	33-32	35-34	36-35	42-41	44-42	52-50	5			
6	57-54	49-47	40-38	39-37	37-35	32-31	32-31	32-31	31-30	31-30	31-30	33-32	34-32	40-38	41-39	49-46	6			
7	53-50	46-43	37-35	36-34	34-33	30-28	30-28	30-28	29-27	29-28	29-28	31-29	31-30	37-35	38-37	45-43	7			
8	49-46	42-40	34-33	33-32	32-30	27-26	27-26	27-26	26-25	27-26	27-26	28-27	29-27	34-33	36-34	42-40	8			
9	45-42	39-37	32-30	31-29	29-28	25-24	25-24	25-24	24-23	25-22	25-22	26-25	26-25	32-30	33-31	39-36	9			
10	41-38	36-33	29-27	28-26	27-25	23-21	23-21	23-21	22-20	21-20	21-20	24-22	24-22	29-27	30-29	35-33	10			
11	37-34	32-30	26-25	25-24	24-23	20-19	20-19	20-19	19-18	19-18	19-18	21-20	21-20	26-25	28-26	32-30	11			
12	33-30	29-27	24-22	23-21	22-20	18-17	18-17	18-17	17-16	17-16	17-16	19-18	19-18	24-22	25-23	29-26	12			
13	29-26	26-23	21-19	20-18	19-18	16-14	16-14	16-14	15-13	15-13	15-13	17-15	17-15	21-19	22-21	25-23	13			
14	25-22	22-20	18-17	17-16	17-15	13-12	13-12	13-12	12-11	12-11	12-11	14-13	14-13	18-17	20-18	22-20	14			
15	21-18	19-17	16-14	15-13	14-13	11-10	11-10	11-10	10-9	10-9	10-9	12-11	12-11	16-14	17-15	19-16	15			
16	17-14	16-13	13-11	12-10	12-10	9-7	9-7	9-7	8-6	8-6	8-6	10-8	10-8	13-11	14-13	15-13	16			
17	13-10	12-10	10-9	9-8	9-8	6-5	6-5	6-5	5-4	5-4	5-4	7-6	7-6	10-9	12-10	12-10	17			
18	9-6	9-6	8-6	7-5	7-5	4-3	4-3	4-3	3-2	3-2	3-2	5-4	5-4	8-6	9-7	9-7	18			
19	<6	<6	<6	<5	<5	<3	<3	<3	<2	<2	<2	<4	<4	<6	<7	<7	19			



Table A.2. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 2-Number Sequencing Completion Time

Scaled Score	Age Group															Scaled Score	
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79		80-89
1	>116	>109	>96	>90	>82	>77	>69	>66	>60	>60	>62	>66	>79	>92	>107	>120	1
2	116-111	109-104	96-91	90-86	82-78	77-74	69-66	66-63	60-58	60-58	62-60	66-63	79-75	92-88	107-102	120-115	2
3	110-104	103-98	90-85	85-80	77-73	73-69	65-62	62-59	57-54	57-54	59-56	62-59	74-70	87-82	101-96	114-108	3
4	103-97	97-91	84-80	79-75	72-68	68-64	61-57	58-55	53-50	53-50	55-52	58-55	69-66	81-77	95-90	107-101	4
5	96-91	90-85	79-74	74-70	67-63	63-60	56-53	54-51	49-47	49-47	51-49	54-51	65-61	76-72	89-84	100-95	5
6	90-84	84-79	73-68	69-64	62-58	59-55	52-49	50-47	46-43	46-43	48-45	50-47	60-56	71-66	83-78	94-88	6
7	83-77	78-72	67-63	63-59	57-53	54-50	48-44	46-43	42-39	42-39	44-41	46-43	55-52	65-61	77-72	87-81	7
8	76-71	71-66	62-57	58-54	52-48	49-46	43-40	42-39	38-36	38-36	40-38	42-39	51-47	60-56	71-66	80-75	8
9	70-64	65-60	56-51	53-48	47-43	45-41	39-36	38-35	35-32	35-32	37-34	38-35	46-42	55-50	65-60	74-68	9
10	63-57	59-53	50-46	47-43	42-38	40-36	35-31	34-31	31-28	31-28	33-30	34-31	41-38	49-45	59-54	67-61	10
11	56-51	52-47	45-40	42-38	37-33	35-32	30-27	30-27	27-25	27-25	29-27	30-27	37-33	44-40	53-48	60-55	11
12	50-44	46-41	39-34	37-32	32-28	31-27	26-23	26-23	24-21	24-21	26-23	26-23	32-28	39-34	47-42	54-48	12
13	43-37	40-34	33-29	31-27	27-23	26-22	22-18	22-18	20-17	20-17	22-19	22-19	27-24	33-29	41-36	47-41	13
14	36-31	33-28	28-23	26-22	22-18	21-18	17-14	17-14	16-14	16-14	18-16	18-16	23-19	28-24	35-30	40-35	14
15	30-24	27-22	22-17	21-16	17-13	17-13	13-10	13-10	13-10	13-10	15-12	15-12	18-14	23-18	29-24	34-28	15
16	23-17	21-15	16-12	15-11	12-8	12-8	9-5	9-5	9-5	9-5	11-8	11-8	13-10	17-13	23-18	27-21	16
17	16-11	14-9	11-6	10-6	7-3	7-3	4-1	4-1	4-1	4-1	7-5	7-5	9-5	12-8	17-12	20-15	17
18	10-4	8-3	<6	<6	<3	<3	<1	<1	<1	<1	4-1	4-1	4-1	7-2	11-6	14-8	18
19	<4	<3	—	—	—	—	—	—	—	—	<1	<1	<1	<2	<6	<8	19





Table A.4. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 4—Number-Letter Switching Completion Time

Scaled Score	Age Group																		Scaled Score
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89			
1	—	—	>222	>207	>189	>161	>147	>143	>136	>148	>165	>176	>203	>237	—	—	1		
2	—	240-238	222-210	207-196	189-178	161-152	147-139	143-135	136-129	148-140	165-156	175-165	203-191	237-224	240-238	—	2		
3	240-238	237-232	209-196	195-183	177-166	151-142	138-130	134-126	128-120	139-130	155-145	164-153	190-178	223-209	237-223	240-238	3		
4	237-233	231-218	195-182	182-170	165-155	141-132	129-121	125-117	119-111	129-121	144-134	152-142	177-165	208-194	222-208	237-233	4		
5	232-218	217-204	181-169	169-158	154-142	131-122	120-112	116-108	110-103	120-112	133-124	141-131	164-152	193-180	207-193	232-218	5		
6	217-203	203-189	168-155	157-145	141-130	121-112	111-103	107-99	102-94	111-102	123-113	130-119	151-139	179-165	192-178	217-203	6		
7	202-198	188-175	154-141	144-132	129-119	111-102	102-94	98-90	93-85	101-93	112-102	118-108	138-126	164-150	177-163	202-186	7		
8	197-173	174-161	140-128	131-120	118-107	101-92	93-85	89-81	84-77	92-84	101-92	107-97	125-113	149-136	162-148	197-173	8		
9	172-158	160-146	127-114	119-107	106-95	91-82	84-76	80-72	76-68	83-74	91-81	96-85	112-100	135-121	147-133	172-158	9		
10	157-143	145-132	113-100	106-94	94-84	81-72	75-67	71-63	67-59	73-65	80-70	84-74	99-87	120-106	132-118	157-143	10		
11	142-128	131-118	99-87	93-82	83-72	71-62	66-58	62-54	58-51	64-56	69-60	73-63	86-74	105-92	117-103	142-128	11		
12	127-113	117-103	86-73	81-69	71-60	61-52	57-49	53-45	50-42	55-45	59-49	62-51	73-61	91-77	102-88	127-113	12		
13	112-98	102-89	72-59	68-56	59-49	51-42	48-40	44-36	41-33	44-37	48-39	50-39	60-48	76-62	87-73	112-98	13		
14	97-83	88-75	58-46	55-44	48-37	41-32	39-31	35-27	32-25	36-28	39-29	38-29	47-35	61-48	72-58	97-83	14		
15	82-68	74-60	45-32	43-31	36-25	31-22	30-21	26-18	24-16	27-18	28-18	28-18	34-22	47-33	57-43	82-68	15		
16	67-53	59-46	31-18	30-18	24-14	21-12	20-12	17-9	15-7	17-7	17-7	17-9	21-9	32-18	42-28	67-53	16		
17	52-38	45-32	17-6	17-6	13-3	11-3	11-3	<9	<7	<7	<7	<9	<9	17-4	27-13	52-38	17		
18	37-23	31-17	<6	<6	<3	<3	<3	—	—	—	—	—	—	<4	<13	37-23	18		
19	<23	<17	—	—	—	—	—	—	—	—	—	—	—	—	—	<23	19		



**Table A.6.** Composite Scaled-Score Equivalents of Scaled Scores by All Age Groups: Combined Number Sequencing + Letter Sequencing

Scaled Score	Sum of Conditions 2 + 3 Scaled Scores
1	<5
2	5
3	6-7
4	8-9
5	10-11
6	12-13
7	14
8	15-16
9	17-18
10	19-20
11	21
12	22-23
13	24-25
14	26
15	27-28
16	29-30
17	31
18	32-33
19	>33

Table A.7. Scaled-Score Equivalents of Scaled-Score Differences by All Age Groups: Contrast Measures

Scaled Score	Number-Letter Switching				Scaled Score
	vs. Visual Scanning	vs. Number Sequencing	vs. Letter Sequencing	vs. Combined Number Sequencing + Letter Sequencing	
1	<10	<9	<8	<8	1
2	-10	-9	-8	-8	2
3	-9-8	-8-7	-7	-7	3
4	-7	-6	-6	-6	4
5	-6	-5	-5	-5	5
6	-5	-4	-4	-4	6
7	-4	-3	-3	-3	7
8	-3-2	-2	-2	-2	8
9	-1	-1	-1	-1	9
10	0	0	0	0	10
11	1	1	1	1	11
12	2	2	2	2	12
13	3-4	3	3	3	13
14	5	4	4	4	14
15	6	5	5	5	15
16	7	6	6	6	16
17	8	7	7	7	17
18	9-10	8-9	8	8	18
19	>10	>9	>8	>8	19

**Table A.8.** Cumulative Percentages of Normative Sample With Equal or Greater Total Omission Errors by Each Age Group: Condition 1-Visual Scanning

Number of Errors	Age Group													Number 80-89 of Errors			
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59		60-69	70-79	100
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	32	25	23	21	15	14	13	12	12	8	12	13	15	17	18	28	1
2	10	6	5	5	4	2	2	2	2	1	2	2	3	4	4	7	2
3	4	2	1	1	1	1	1	1	1	1	1	1	2	2	2	3	3
≥4	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	≥4

*Note.* Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.9. Cumulative Percentages of Normative Sample With Equal or Greater Total Commission Errors by Each Age Group: Condition 1—Visual Scanning

Number of Errors	Age Group													Number of Errors			
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59		60-79	80-89	
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
≥1	5	5	5	5	5	5	4	3	2	2	2	3	3	4	5	≥1	0

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.10. Cumulative Percentages of Normative Sample With Equal or Greater Total Sequencing Errors by Each Age Group: Condition 2-Number Sequencing

Number of Errors	Age Group											Number						
	8	9	10	11	12	13	14	15	16-19	20-29	30-39		40-49	50-59	60-69	70-79	80-89	100
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	6	5	4	3	3	3	3	3	3	3	3	3	4	5	7	9	9	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	5	5	2
≥3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	23

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.



Table A.11. Cumulative Percentages of Normative Sample With Equal or Greater Total Set-Loss Errors by All Age Groups: Condition 2-Number Sequencing

Number of Errors	All Ages
0	100
1	2
2	1
≥3	<1

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

**Table A.12.** Cumulative Percentages of Normative Sample With Equal or Greater Total Time-Discontinue Errors by All Age Groups: Condition 2-Number Sequencing

Number of Errors	All Ages
0	100
1	1
≥2	1

*Note.* Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.13. Cumulative Percentages of Normative Sample With Equal or Greater Total Sequencing Errors by Each Age Group:  
Condition 3-Letter Sequencing

Number of Errors	Age Group																Number of Errors	
	8	9	10	11	12	13	14	15	15-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89		100
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	15	14	13	10	6	5	3	3	3	3	6	10	10	10	11	12	15	1
2	5	4	4	3	2	2	2	2	1	1	2	4	4	5	6	7	2	2
3	2	1	1	1	1	1	1	1	1	1	1	1	2	2	3	5	3	3
≥4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	24	24

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.14. Cumulative Percentages of Normative Sample With Equal or Greater Total Set-Loss Errors by Each Age Group: Condition 3-Letter Sequencing

Number of Errors	Age Group													Number of Errors			
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59		60-69	70-79	80-89
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	3	3	2	2	2	1	1	1	1	1	1	1	2	3	9	13	1
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	2
≥3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	≥3

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.15. Cumulative Percentages of Normative Sample With Equal or Greater Total Time-Discontinue Errors by All Age Groups: Condition 3-Letter Sequencing

Number of Errors	All Ages
0	100
1	1
≥2	1

*Note.* Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.16. Cumulative Percentages of Normative Sample With Equal or Greater Total Sequencing Errors by Each Age Group: Condition 4-Number-Letter Switching

Number of Errors	Age Group																		Number 80-89 of Errors
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	100	100		
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	45	42	39	38	37	36	35	33	32	31	31	31	31	34	40	42	52	52	1
2	26	23	21	19	18	17	16	15	14	14	15	16	16	17	19	20	28	28	2
3	15	14	13	12	11	10	9	8	8	7	7	7	7	7	8	9	17	17	3
4	12	12	11	9	8	6	6	5	5	4	4	4	4	5	6	7	9	9	4
5	9	9	8	7	7	5	5	4	4	3	3	3	3	4	5	6	7	7	5
6	8	8	7	6	6	4	4	3	3	2	2	2	2	3	4	5	6	6	6
7	6	6	5	4	4	3	3	2	2	1	1	1	1	2	3	3	4	4	7
8	4	4	3	2	2	1	1	1	1	1	1	1	1	1	2	2	3	3	8
9	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	9
≥10	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	≥10

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.17. Cumulative Percentages of Normative Sample With Equal or Greater Total Set-Loss Errors by Each Age Group: Condition 4-Number-Letter Switching

Number of Errors	Age Group																	Number of Errors
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	100	
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	35	33	32	31	28	25	24	20	20	20	20	22	24	30	34	50	1	
2	16	14	12	11	10	8	7	5	5	5	5	7	8	12	14	20	2	
3	10	7	6	5	5	4	3	2	2	2	2	3	4	5	6	7	3	
4	6	4	3	2	2	2	1	1	1	1	1	2	3	4	5	6	4	
5	3	2	2	1	1	1	1	1	1	1	1	1	2	3	4	5	5	
6	2	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	6	
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	7	
≥8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	≥8	

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.



**Table A.18.** Cumulative Percentages of Normative Sample With Equal or Greater Total Time-Discontinue Errors by Each Age Group: Condition 4—Number-Letter Switching

Number of Errors	Age Group																	Number of Errors	
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	100		
0	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	0
1	15	2	2	2	2	2	2	1	1	1	1	1	1	4	5	10	15	1	1
2	15	1	1	1	1	1	1	1	1	1	1	1	1	2	3	8	12	2	2
3	12	1	1	1	1	1	1	1	1	1	1	1	1	1	2	6	8	3	3
4	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	5	6	4	4
5	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	5	5
6	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	4	6	6
7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	3	7	7
≥8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	7	7

*Note.* Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

Table A.19. Scaled-Score Equivalents of Raw Scores by Each Age Group: Condition 4-Number-Letter Switching Total All Errors

Scaled Score	Age Group																		
	8	9	10	11	12	13	14	15	16-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>14	Scaled Score	
1	>14	>10	>8	>8	>8	>6	>6	>6	>6	>6	>6	>6	>6	>8	>10	>10	>14	1	
2	14-13	10	—	8	8	—	—	—	—	—	—	—	—	8	10	10	14	2	
3	12	9	8	—	7	6	6	6	6	6	6	6	7	7	9	9	13-12	3	
4	11	8	7	7	6	5	5	5	5	5	5	5	6	6	8	8	11	4	
5	10-9	7	6	6	—	—	—	—	—	—	—	—	—	—	7	7	10	5	
6	8	6	5	5	5	4	4	4	4	4	4	4	5	5	6	6	9-8	6	
7	7	5	4	4	4	3	3	3	3	3	3	3	4	4	5	5	7	7	
8	6-5	4	—	3	3	—	—	—	—	—	—	—	—	3	4	4	6	8	
9	4	3	3	—	2	2	2	2	2	2	2	2	2	2	3	3	5-4	9	
10	3	2	2	—	2	2	2	2	2	2	2	2	2	2	3	3	—	10	
11	2-1	1	1	2	1	1	1	1	1	1	1	1	1	1	2	2	3	11	
12	0	0	0	1	—	—	—	—	—	—	—	—	—	—	1	1	2	12	
13	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	0	1-0	13	
14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	
15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	
16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	
17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17	
18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	
19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19	

Table A.20 Cumulative Percentages of Normative Sample With Equal or Greater Total Time-Discontinue Errors by All Age Groups: Condition 5-Motor Speed

Number of Errors	All Ages
0	100
1	3
≥2	2

Note. Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

## Developmental Test of Visual-Motor Integration (VMI)

Child's age: If the child is X-years, Y-months and 15 days old, their age remains at X-years and Y months. If however, the child is X-years, Y-months and 16 or more days old, their age goes up to X-years and Y+1-months. Note: For the CIFASD test battery, the only test in which you will round up the month is the VMI.

Raw Score: Use a ruler and a protractor to score each item according to the criteria listed on pages 28-75. Experienced scorers will find the Summary Scoring Information on pages 76-77 useful as a reminder of the basic scoring criteria. An item is scored a failure/no score (zero) if it fails even one of the criteria listed. Indicate which criterion results in a no score for that item by writing the criteria number next to the zero score for that item on the scoring sheet. For example, writing 0 #2 would indicate that the child received a no score for this item because they did not meet criterion #2 for that item. The total raw score is the total number of forms correctly copied. Give credit to all previous items, even if not administered. Discontinue scoring after three consecutive failures (scoring only).

Important Scoring Considerations:

- A major rule to remember when scoring a form is **if in doubt, score it as meeting a criteria**. Some scorers tend to be too strict. In general, it is better to gain a good developmental sense or gestalt for each form. For example, it is common to encounter an older child who somewhat hastily copies the easier forms, not bothering to dot the i's and cross the t's, because the forms are well within the child's command. An experienced examiner/scorer takes such behavior into account in scoring.
- Do not become obsessed with details. Look at each production as a whole in the context of the scoring criteria and examples. If it still seems too close to call, give it a passing score of one.
- Occasionally, a child makes a second attempt at a form. **Always score the first attempt** of children *below age nine*. If you did not actually see which one was first, it can often be identified by comparing the sizes of dual attempts relative to the sizes of the child's single attempts on other forms.
- Accept productions of children *over age nine* who first sketch with light lines and then complete a form with darker lines.

CIFASD Note about **extra lines**: The question has come up about what to do with extra lines. As long as it isn't a second attempt at a line (which isn't permitted) or a sign of directional confusion (i.e. Form 25), it is best to ignore extra lines.

To convert the Raw score to the Standard Score: Use the even numbered pages in the Manual pages 166-194 making sure that you are using the page with the proper age for the child you are testing.

To find the appropriate Percentile for the Standard Score: Use the 1st and last columns on page 198.

To find the Age Equivalents: Use page 160 of the Manual.

**Integration.** Ask the child to copy the stimulus form again on a blank sheet of paper. Note if the child's copy improves. If it improves, ask the child why he or she thinks it improved.

**Imitation.** If the second try did not improve, sit next to the child and ask her or him to watch carefully as you copy the stimulus. Then give the child another chance to copy.

**Motor Guidance.** If significant improvement has not been noted yet, hold and guide the child's hand and pencil while making another copy. Then let the child try again, unguided.

**Examiner (Teacher) Verbalization.** If significant improvement still has not occurred, ask the child to watch and listen carefully as you recopy the stimulus and verbalize what you are doing, including your starting point(s), direction(s), and the key spatial relations that you monitor. Then ask the child to recopy the stimulus.

**Child (Learner) Verbalization.** If significant improvement still has not been noted, ask the child to verbalize what you are doing as you copy the stimulus. Then ask the child to copy the stimulus while he or she verbalizes the actions.

**Variations.** Develop and use variations of these suggested *teach and test* procedures that seem best suited to the individual's and your own examination needs.

**Retention and Extension of Learning.** Using some or all of the foregoing procedures, consider teaching the child to adequately copy several or all of the *Berry VMI* forms on which he or she did not meet criteria on your first examination. About two weeks later, repeat the regular *Berry VMI* procedure with the child to see how well learning has been retained and/or extended to other stimuli.

This retention check often reveals which children are simply  *inexperienced* in visual-motor integration efforts. These children tend to retain what you have taught. Other children will display the *leaky bucket* syndrome characteristic of many children with learning disabilities. These children tend not to retain or extend visual-motor integration learnings unless they are provided with clear cognitive supports, such as rules about how to proceed and/or extensive rote practice and review.

## Scoring

Scoring of the *Berry VMI* is essentially the same as it was in the 1997 (fourth) edition—one point for each imitated or copied item up to three consecutive failures. These scoring criteria and procedures apply for both the Full and the Short Form *Berry VMI* test forms. Three additional items have been added for the preschool level.

## Marking and Scribbling

In response to field requests for two-year-old standardized norms, there are now a total of 30 possible raw score points versus the 27 points in earlier editions. One point per item can now be earned as follows:

1. *Imitated Marking:* Any mark(s) or scribble(s) on the *Berry VMI* test form that a child makes in imitation of an adult.
2. *Spontaneous Marking:* Any mark(s) or scribble(s) on the *Berry VMI* test form that a child makes in response to an adult's gestural and/or verbal request—without the adult having to demonstrate for the child to imitate.
3. *Contained Marking:* One point if none of the child's mark(s) or scribble(s) on the *Berry VMI* test form go beyond the edges of the 8.5" x 11" paper.

## Imitated and Copied Forms

The scoring criteria for both imitated and copied forms, such as a circle, are exactly the same. Only the age equivalents differ, as shown on the following reduction of the Recording and Scoring sheet, which appears on the inside back cover of the *Berry VMI* test booklet.

The Recording and Scoring sheet (page 23 in the Full Form and page 15 in the Short Form) shown on page 24 lists the "Age Norm" for each form, the age at which about 50% of children meet the developmental criteria for a given form. Many examiners use this sheet and the supplementary Stepping Stones (developmental age norms) on the adjoining test page to help parents better understand their child's current level of development.

## Criteria

*Berry VMI* scoring is based on *Score* and *No Score* criteria and the examples shown for each of the 24 forms on pages 28–75. The criteria and examples were derived from careful study of each form's developmental evolution, based on thousands of children's reproductions. Developmental comments and trend illustrations for the forms can be found on the pages facing the scoring criteria pages.

Experienced scorers will find the Summary Scoring information on pages 76–77 useful as a reminder of the basic scoring criteria.

**Berry VMI Recording and Scoring**

Task	Form	Score	Task	Form	Score
1	1	14	10	10	
2	2	14	11	11	
3	3	14	12	12	
4	4	14	13	13	
5	5	14	14	14	
6	6	14	15	15	
7	7	14	16	16	
8	8	14	17	17	
9	9	14	18	18	
10	10	14	19	19	
11	11	14	20	20	
12	12	14	21	21	
13	13	14	22	22	
14	14	14	23	23	
15	15	14	24	24	
16	16	14	25	25	
17	17	14	26	26	
18	18	14	27	27	
19	19	14	28	28	
20	20	14	29	29	
21	21	14	30	30	
22	22	14	31	31	
23	23	14	32	32	
24	24	14	33	33	
25	25	14	34	34	
26	26	14	35	35	
27	27	14	36	36	
28	28	14	37	37	
29	29	14	38	38	
30	30	14	39	39	
31	31	14	40	40	
32	32	14	41	41	
33	33	14	42	42	
34	34	14	43	43	
35	35	14	44	44	
36	36	14	45	45	
37	37	14	46	46	
38	38	14	47	47	
39	39	14	48	48	
40	40	14	49	49	
41	41	14	50	50	
42	42	14	51	51	
43	43	14	52	52	
44	44	14	53	53	
45	45	14	54	54	
46	46	14	55	55	
47	47	14	56	56	
48	48	14	57	57	
49	49	14	58	58	
50	50	14	59	59	
51	51	14	60	60	
52	52	14	61	61	
53	53	14	62	62	
54	54	14	63	63	
55	55	14	64	64	
56	56	14	65	65	
57	57	14	66	66	
58	58	14	67	67	
59	59	14	68	68	
60	60	14	69	69	
61	61	14	70	70	
62	62	14	71	71	
63	63	14	72	72	
64	64	14	73	73	
65	65	14	74	74	
66	66	14	75	75	
67	67	14	76	76	
68	68	14	77	77	
69	69	14	78	78	
70	70	14	79	79	
71	71	14	80	80	
72	72	14	81	81	
73	73	14	82	82	
74	74	14	83	83	
75	75	14	84	84	
76	76	14	85	85	
77	77	14	86	86	
78	78	14	87	87	
79	79	14	88	88	
80	80	14	89	89	
81	81	14	90	90	
82	82	14	91	91	
83	83	14	92	92	
84	84	14	93	93	
85	85	14	94	94	
86	86	14	95	95	
87	87	14	96	96	
88	88	14	97	97	
89	89	14	98	98	
90	90	14	99	99	
91	91	14	100	100	

See the Berry VMI manual for information on scoring methods and scoring procedures. See page 10 for information on how to use the VMI manual. See page 11 for information on how to use the VMI manual. See page 12 for information on how to use the VMI manual. See page 13 for information on how to use the VMI manual. See page 14 for information on how to use the VMI manual. See page 15 for information on how to use the VMI manual. See page 16 for information on how to use the VMI manual. See page 17 for information on how to use the VMI manual. See page 18 for information on how to use the VMI manual. See page 19 for information on how to use the VMI manual. See page 20 for information on how to use the VMI manual. See page 21 for information on how to use the VMI manual. See page 22 for information on how to use the VMI manual. See page 23 for information on how to use the VMI manual. See page 24 for information on how to use the VMI manual. See page 25 for information on how to use the VMI manual. See page 26 for information on how to use the VMI manual. See page 27 for information on how to use the VMI manual. See page 28 for information on how to use the VMI manual. See page 29 for information on how to use the VMI manual. See page 30 for information on how to use the VMI manual. See page 31 for information on how to use the VMI manual. See page 32 for information on how to use the VMI manual. See page 33 for information on how to use the VMI manual. See page 34 for information on how to use the VMI manual. See page 35 for information on how to use the VMI manual. See page 36 for information on how to use the VMI manual. See page 37 for information on how to use the VMI manual. See page 38 for information on how to use the VMI manual. See page 39 for information on how to use the VMI manual. See page 40 for information on how to use the VMI manual. See page 41 for information on how to use the VMI manual. See page 42 for information on how to use the VMI manual. See page 43 for information on how to use the VMI manual. See page 44 for information on how to use the VMI manual. See page 45 for information on how to use the VMI manual. See page 46 for information on how to use the VMI manual. See page 47 for information on how to use the VMI manual. See page 48 for information on how to use the VMI manual. See page 49 for information on how to use the VMI manual. See page 50 for information on how to use the VMI manual. See page 51 for information on how to use the VMI manual. See page 52 for information on how to use the VMI manual. See page 53 for information on how to use the VMI manual. See page 54 for information on how to use the VMI manual. See page 55 for information on how to use the VMI manual. See page 56 for information on how to use the VMI manual. See page 57 for information on how to use the VMI manual. See page 58 for information on how to use the VMI manual. See page 59 for information on how to use the VMI manual. See page 60 for information on how to use the VMI manual. See page 61 for information on how to use the VMI manual. See page 62 for information on how to use the VMI manual. See page 63 for information on how to use the VMI manual. See page 64 for information on how to use the VMI manual. See page 65 for information on how to use the VMI manual. See page 66 for information on how to use the VMI manual. See page 67 for information on how to use the VMI manual. See page 68 for information on how to use the VMI manual. See page 69 for information on how to use the VMI manual. See page 70 for information on how to use the VMI manual. See page 71 for information on how to use the VMI manual. See page 72 for information on how to use the VMI manual. See page 73 for information on how to use the VMI manual. See page 74 for information on how to use the VMI manual. See page 75 for information on how to use the VMI manual. See page 76 for information on how to use the VMI manual. See page 77 for information on how to use the VMI manual. See page 78 for information on how to use the VMI manual. See page 79 for information on how to use the VMI manual. See page 80 for information on how to use the VMI manual. See page 81 for information on how to use the VMI manual. See page 82 for information on how to use the VMI manual. See page 83 for information on how to use the VMI manual. See page 84 for information on how to use the VMI manual. See page 85 for information on how to use the VMI manual. See page 86 for information on how to use the VMI manual. See page 87 for information on how to use the VMI manual. See page 88 for information on how to use the VMI manual. See page 89 for information on how to use the VMI manual. See page 90 for information on how to use the VMI manual. See page 91 for information on how to use the VMI manual. See page 92 for information on how to use the VMI manual. See page 93 for information on how to use the VMI manual. See page 94 for information on how to use the VMI manual. See page 95 for information on how to use the VMI manual. See page 96 for information on how to use the VMI manual. See page 97 for information on how to use the VMI manual. See page 98 for information on how to use the VMI manual. See page 99 for information on how to use the VMI manual. See page 100 for information on how to use the VMI manual.

### Protractor

A number of the scoring criteria pages contain illustrations for using a protractor. All protractor degrees are read clockwise with the base of the protractor on the horizontal. These illustrations are intended as aids for learning how to score the *Berry VMI*; they have been effective for this purpose in university and other settings. The authors are particularly indebted to Lepkin and Pryzwansky (123) for their research in this regard.

Most experienced scorers will seldom need a protractor or ruler to score the *Berry VMI*. In fact, a major rule to remember when scoring a form is *if in doubt, score it as meeting the criteria*. Some scorers tend to be too strict. In general, it is better to gain a good developmental sense or *gestalt* for each form's evolution by studying its developmental trends than it is to focus on the details of reproduction.

### Exceptions

An experienced examiner will develop a *gestalt* of a given child's developmental behavior on the *Berry VMI*. For example, it is common to encounter an older child who somewhat hastily copies the easier forms, not bothering to dot the i's and cross the t's, because the forms are well within the child's command. An experienced examiner takes such behavior into account in scoring.

Occasionally, a child makes a second attempt at a form. Always score the first attempt of children below age nine. If you did not actually see which one was first, it can often be identified by comparing the sizes of dual attempts relative to the sizes of the child's single attempts on other forms.

Accept productions of children over age nine who first sketch with light lines and then complete a form with darker lines.

### Basal

The marking or scribbling tasks on page 1 of the *Berry VMI* test booklet and the imitated forms on page 2 are not administered during group testing or to most children over age six during individual testing. As with any test's basal, assume that the marking or scribbling tasks and the imitated forms would have been performed adequately if the child succeeded with the more difficult task of direct copy on Tasks 7, 8, and 9. If any of Tasks 7, 8, or 9 were not passed, the earlier tasks should be administered and scored as indicated on page 19.

### Ceiling

Although you may continue testing beyond a child's current ability level, stop scoring after three consecutive forms have not been passed. This basic rule applies whether individual or group administration of the *Berry VMI* is used and whether or not a child attempted more forms after three consecutive forms were not passed.

### Results and Recording

Age equivalents for *Berry VMI* raw test scores are listed in Appendix B, and standardized norms are listed in Appendix C. Individual examiners usually use the Recording and Scoring sheet and then fill in the cover (see page 26) of the test booklet. Group screeners often use just the cover to record results.

## Early Development Scoring

### Marking and Scribbling

As with the imitated forms, the first three *Berry VMI* tasks do not need to be administered if a child scores a point on one or more of the copied forms. If the first three *Berry VMI* tasks are administered, they are scored as follows.

1. *Imitated Marking*: One point for any mark(s) or scribble(s) on the *Berry VMI* test form that a child makes in imitation of an adult.





## Summary Scoring

Experienced scorers will find the information in this section useful as a reminder of the basic scoring criteria for Forms 4–30.

Summary Scoring				
No.	Form	Criteria	Score	No Score
4 & 7		Over 1/2 of lines within 30° vertical		
5 & 8		Over 1/2 of lines within 30° horizontal		
6 & 9		Height/width no more than 2 to 1		
10		1. Two intersecting lines 2. All parts at least 1/4" 3. At least 1/2 line within 20°		
11		1. Single line (extensions OK) 2. 1/2+ within 110° to 160° 3. No abrupt change of direction		
12		Four clearly defined sides		
13		1. Single line (extensions OK) 2. 1/2+ within 20° to 70° 3. No abrupt change of direction		
14		1. Two intersecting lines 2. Angles 20°–70° and 110°–160° 3. Long part no more than twice short		
15		1. Three clearly defined sides 2. One corner higher than others		
16		1. <1/16" gap/lap 2. No distortions 3. 2 to 1 heights 4. Bisector OK		
17		1. All intersect 2. <1/8" gap 3. <15° horizontal 4. <10° diagonals		

## Summary Scoring

No.	Form	Criteria	Score	No Score
18		1. Not reversed 2. Sharp points 3. No misdirection 4. Long < 2 X short		
19		1. Seven openings 2. One circle clearly below others		
20		1. Six circles 2. Base + sides straight 3. < 10° horizontal 4. < 2 to 1 spacing same side		
21		1. Four corners 2. < 10° axes 3. Closed corner 4. 1/16" gap/lap 5. 1/3 contact 6. < 2 to 1 heights		
22		1. Good corners 2. 170°–190° 3. No dog-ears 4. > 2/3 sides 5. < 60° angles		
23		1. Two triangles 2. 2 touch 1/3 (3rd 1/16") 3. 60°–120° left 4. 100° + slope		
24		1. Eight dots, circles, or dashes 2. No three centers on straight line 3. < 2 to 1 longest/shortest space		
25		1. All sides (one obtuse curve OK) 2. No confusion at corners 3. Overlap not extreme		
26		1. Good corners 2. 170°–190° 3. Sides > 2/3 4. 60° angles		
27		1. Three complete double-lined circles 2. All circles overlap 3. At least one clean 3-D overlap		
28		1. Correct number of parts 2. Correct orientation 3. No confusion		
29		1. Outer parallelogram 2. Inner rectangle 3. Right and down 4. No confusion		
30		1. All corners extend beyond sides 2. Over- and underlapping, same side 3. No extreme distortion		

## FORMS 4 & 7 Vertical Line

Age Norms: 2-0 Imitated  
2-10 Copied

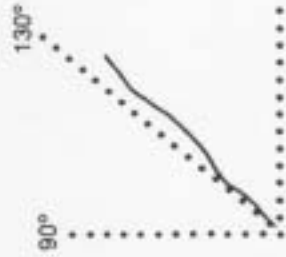
Scoring Criteria

1. Over 1/2 of line(s) within 30° of vertical

**Score 1**



**No Score**



## Supplemental Information

The same scoring criteria are used for both imitated and copied lines. See pages 19-21 for differences in test administration.

### Imitated Vertical Line

### Age Norms

Gesell (74): 40% at age 1-6 and 79% at age 2-0 succeed	1-9
Gesell (75)	2-0
Griffiths (81)	2-0
Cattell (35)	2-3
Stanford-Binet (Form LM)	3-0

The above norms are based on the child's reproduction of a single vertical stroke. However, on the *Berry VMI*, repeated vertically oriented lines by the examiner and child are also acceptable. An age norm of 2-0 has been estimated for *Berry VMI* imitation. The greater freedom allowed by the *Berry VMI* on this form has been effective in eliciting responses from young or shy children.

### Copied Vertical Line

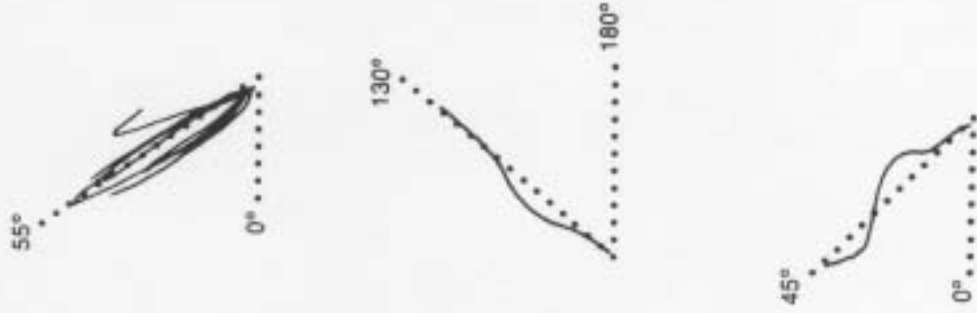
Based on 2003 standardization data, the age norm for copying is 2-10.

1. Over 1/2 of line(s) within 30° of horizontal

**Score 1**



**No Score**



**Supplemental Information**

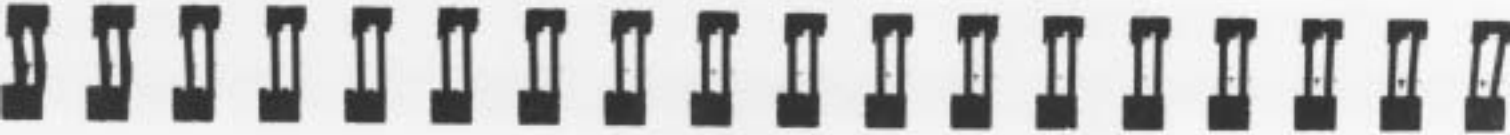
**Imitated Horizontal Line**

Griffiths (81): horizontal scribbles	Age Norms
Griffiths (81) horizontal stroke	1-8
Gesell (74): 41% at age 2-0 and 95% at age 3-0 succeed	2-0
Gesell (75)	2-6
Cattell (35)	2-6

It is difficult to disregard Griffith's data, but imitation of horizontal lines, as opposed to spontaneous horizontal scribbling at 2-0, has seldom been observed by the *Berry VMI* authors.

**Copied Horizontal Line**

It is fairly common for children younger than 3-0 to make vertical lines while attempting to copy a horizontal line. The reverse, making horizontal lines while attempting to copy a vertical line, is less common. These findings are further evidence that the horizontal line is more difficult to make than the vertical.





Scoring Criteria

1. Any loop with a ratio of no more than 2 to 1 between its height and width.

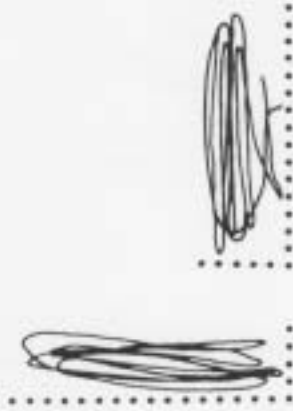
Score 1



2 to 3 ratio

1 to 1 ratio

No Score



4 to 1 ratio

1 to 3 ratio



Supplemental Information

Imitated Circle

Griffiths (81): circular scribble .....	1-11
Gesell (74): 59% at age 2-0 and 86% at age 3-0 succeed .....	2-0
Gesell (75) .....	2-0
Cattell (35) .....	2-6

Age Norms

Most experience indicates that this task is performed quite early. However, data gathered for this study suggest an age estimate of 2-9 for the *Beery VMI* imitated circle.

Copied Circle

Gesell (74) .....	3-0
Gesell (75) .....	3-0
Stanford-Binet (Form LM) .....	3-0
Merrill-Palmer .....	3-3
Bayley (7) .....	3-4

Age Norms

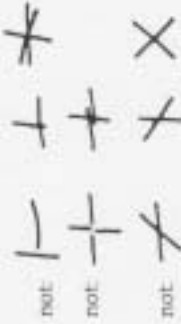
The *Beery VMI* estimate of 3-0 for the copied circle is in agreement with the results of other investigators.

Children under age 6-0 tend to begin a circle at the bottom (i.e., near their bodies) and draw away from themselves, a behavior that is compatible with their typical perception that they are at the very center of the universe. Directionality is basically perceived as either *away from me* or *toward me* rather than in terms of right, left, up, or down. The child's right-left center seems to be the forehead. Children over age 6-0 usually begin near the top of the circle and make the initial movements toward their bodies.

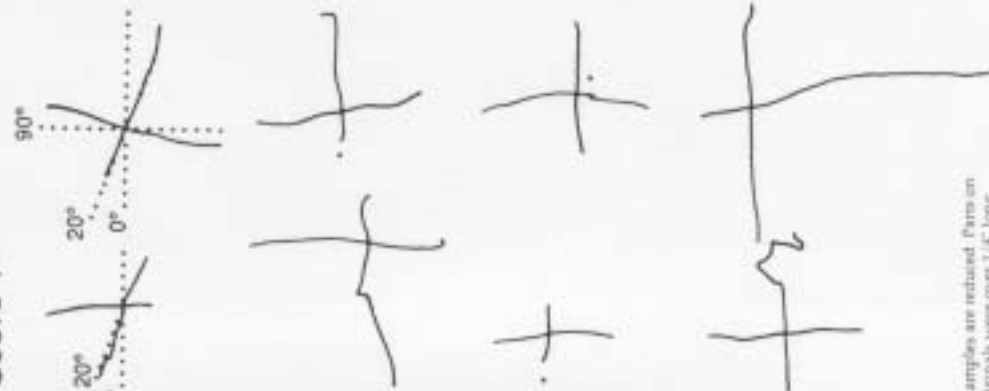
Contrary to common belief, children between ages 3-0 and 6-0 tend to make smaller circles than do other children. However, the reproductions of older children are more accurate in size.

Scoring Criteria

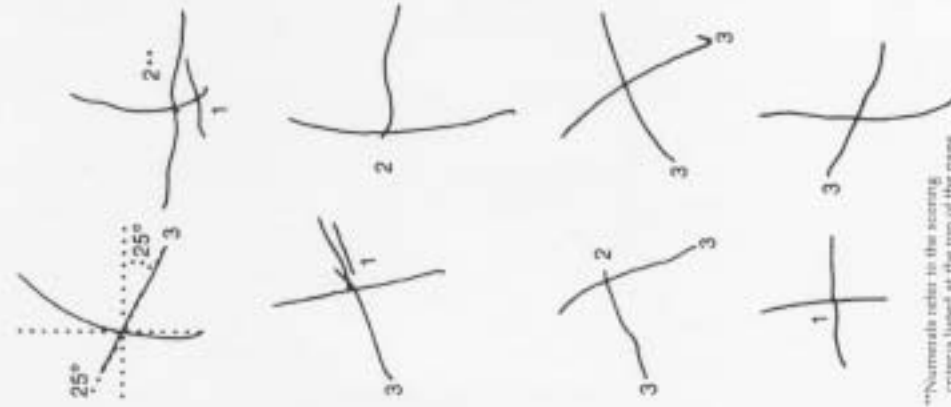
- Two intersecting lines
- All 4 "legs" at least 1/4" long (not including extensions)
- At least 1/2 of each line within 20° of correct angle



Score 1



No Score



\*Examples are reduced. Parts on originals were over 1/4" long

\*\*Numerals refer to the scoring criteria listed at the top of the page

Supplemental Information

Imitated Cross

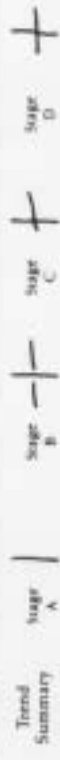
Gesell (74): 3% at age 2-0 and 77% at age 3-0 succeed  
 Gesell (75) ..... 2-10  
 ..... 3-0

The authors have done no systematic work with the imitated cross but consider 3-0 too low an estimate for the task; 3-3 is probably closer.

Copied Cross

Gesell (74): 55% at age 4-0 and 53% at age 5-0 succeed  
 Gesell (75) ..... 4-0  
 Merrill-Palmer (1948) ..... 4-1  
 ..... 4-6

Successful achievement of this form is primarily dependent on the child's ability to cross the vertical line with a continuous horizontal line. There is some evidence to indicate the following developmental pattern:



Reproductions of this form by children up to age 4-6 commonly display a bold vertical line and a weak horizontal line. Segmenting (Stage B) is definitely an immature trait occurring most often in the horizontal line. It is thought that this fact is related to the phenomenon that Kephart (104) refers to as *crossing the midline*. With reference to the spine as the midline of the body, children have difficulty making a smooth movement across the midline, probably because they have to *reverse* at that point from a *toward me* motion to an *away from me* motion. The difficulty is usually observed in activities on a large spatial scale such as chalkboard work but may occur with young children even in pencil work. Reading and writing reversals are often based on midline problems at older ages.

Consistent with Kephart's discussion of the problem, the authors have observed that a child who segments the horizontal line often draws the left segment from left to right and the right segment from right to left (or the reverse combination).

Vereecken (231) reported that a child who segments the horizontal line will draw to the midline and stop, even after the examiner has manually guided the child's hand through the midline several times. He further noted that the ability to make vertical structures with blocks precedes that of making similar horizontal structures.

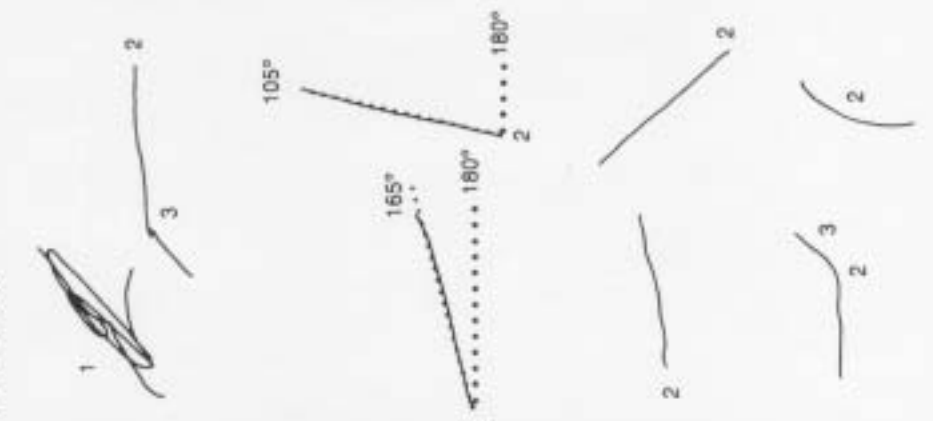
Scoring Criteria

- 1. A "single" line (extensions OK)
- 2. At least 1/2 of the line within 110°-160°
- 3. No abrupt change of direction

not:   
 not:   
 not: 

Score 1

No Score



Supplemental Information

Copied Right Oblique Line

Vereecken (231) cited a report that the right oblique line was not reproduced until 5-6 to 6-0 and that the left oblique line was not reproduced until 6-0 to 6-6. Vereecken found, however, that many five-year-olds could perform these tasks. Bender (21) suggested that oblique lines were not copied correctly until age nine or 10.

There seems to be little question that the obliques develop later than the vertical and horizontal lines and that the right oblique precedes the left oblique, at least for right-handed individuals. However, the more extensive *Berry VMI* data do not support earlier estimates concerning the age levels at which oblique lines are accomplished.

The present data suggest the following developmental progression in the achievement of oblique lines:



Most early errors consist of horizontal straight lines. Vereecken (231) pointed out that execution of the oblique lines requires the *simultaneous* coordination of vertical and horizontal movement. Most near successes show evidence of difficulty with such coordination, with excursions into simple vertical or horizontal movements, as in Stage B above. Children can perceive obliqueness and have the motor ability to execute oblique lines long before they can reproduce them.

Crossing the midline may be the basis for some Stage B productions. This can be checked by having the child copy oblique lines to the right and the left of the midline. At older ages, moving a child's book to the left and/or right sometimes reduces reversals while the child is being taught to cross the midline easily.





## Scoring Criteria

1. Four clearly defined sides (corners need not be angular)

not:

## Score 1



## No Score



## Copied Square

Starford-Binet (Form L, LM)

Gesell (75)

Gesell (74): 53% at age 5-0 succeed

## Age Norms

4-0

4-6

5-0

In most evaluations of pencil copies of the square, attention is focused on the corners of the reproduction. There are good reasons for this because the square is usually the first form presented to children that requires them to draw in one direction, stop the line in a fairly specific area, and then continue in a different direction. Kephart (88) recognized the importance of this ability to stop and change direction and noted that its absence is often associated with pathology in older children. However, deviations in corners of the square occur too frequently throughout the age range of the present sample for the authors to regard them as criteria for success on the form. It appears that most children are at least six years old before they can produce four good corners. Actually, diamonds appear to be more informative of *stop-and-go* ability, inasmuch as both obtuse and acute turns are required.

Four-sidedness seems to be the better criterion for success on the square. Empirically, this criterion provides the simplest and most reliable basis for scoring. The authors' experience supports Vereecken's (231) argument that the perception of spatial relationships among the *sides* of the square is closely related to achievement on this form. The following developmental trend supports this argument.

Trend Summary

stage A



stage B



stage C



stage D



Some children copy a square in the following fashion: . Such constructions indicate that these children have *seen* the corners and realize something should be done about them. However, despite the ability to perceive and to reproduce the straight vertical and horizontal lines of which the square is composed, they have not been able to organize these components. If they had been able to do so, they would have at least drawn something like this: . Children who organize the lines in such a manner nearly always go on to complete four corners:



## Scoring Criteria

1. A "single" line (extensions OK)

2. At least 1/2 of the line within 20°-70°

3. No abrupt change of direction

not

not

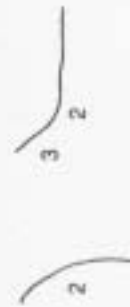
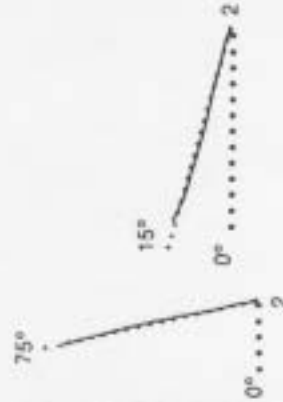
not



## Score 1



## No Score



## Supplemental Information

## Copied Left Oblique Line

It was mentioned earlier that reproduction of the right oblique line usually occurs earlier than that of the left oblique line, by some estimates a full year earlier. (See the general discussion of obliques accompanying Form 11.) However, this applies more to right-handed than to left-handed individuals. Furthermore, the age difference in performance is debatable. The authors' data indicate that the left oblique is executed, on average, within three to six months after the right oblique. This difference may be attributed to mechanical difficulties rather than to perceptual differences.

Right-handed individuals usually have a complete view of the reproduction when constructing the right oblique. When reproducing the left oblique, however, they cannot see where to aim the line because their hands and wrists obstruct their view.



Scoring Criteria

1. Two intersecting lines
2. Lines form angles between 20° and 70° and between 110° and 160°
3. Longest of 4 unextended legs no more than twice as long as shortest (not including extensions)

not: X X  
 not: + +  
 not: X X

Score 1



No Score



Supplemental Information

Trend Summary: S \* + + X X X X

Age Range Random Samples at Each Age

Age Range	Random Samples at Each Age
2-0 - 2-11	
3-0 - 3-11	
4-0 - 4-5	
4-6 - 4-11	
5-0 - 5-5	

Imitated Cross

Stanford-Binet (Form M) ..... 3-6

The imitated oblique cross may fill the age gap between the copied circle and the copied vertical-horizontal cross. The examiner who wants the child to imitate the oblique cross should wait until the child has completed the *Berry VMI*.

Copied Cross

Some of the developmental phenomena observed in earlier forms appear here:

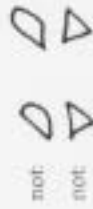
1. Vertical and horizontal lines are drawn prior to oblique lines.
2. The right oblique is reproduced before the left oblique.
3. There is difficulty crossing the midline.

Note that both obliques may require crossing the midline. Segmenting of either or both lines is commonly found in early attempts.

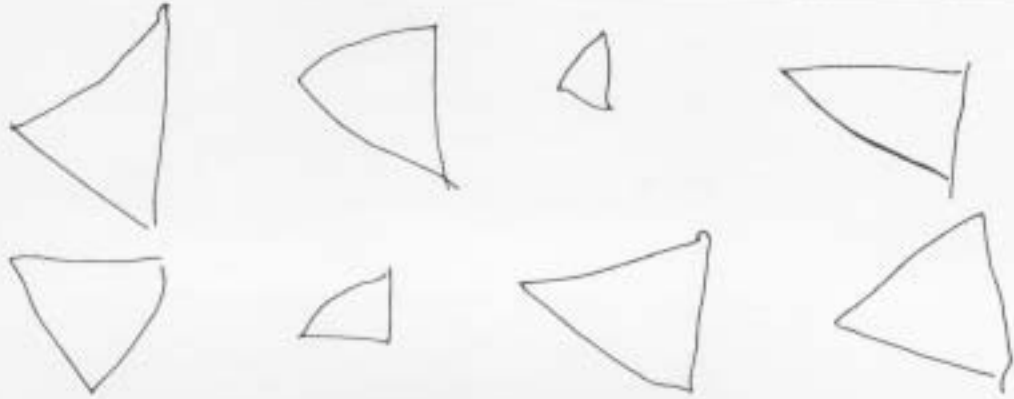


## Scoring Criteria

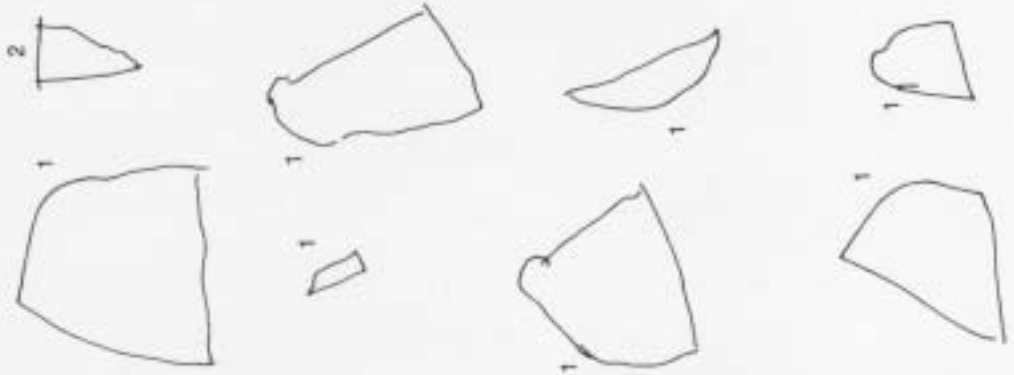
- Three clearly defined sides
- One corner higher than others



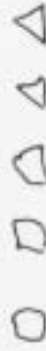
## Score 1



## No Score



## Trend Summary



## Age Range

## Random Samples at Each Age

2-0 - 2-11



3-0 - 3-11



4-0 - 4-5



4-6 - 4-11



5-0 - 5-5



6-0 - 6-3



7-0 - 7-3



8-0 - 8-3



## Copied Triangle

Gesell (74): 40% at age 5-0 and 95% at age 6-0 succeed . . . . . 5-3

Gesell (75) . . . . . 5-0

## Age Norms

This form emerges rather suddenly. As with the square, circularity is the main tendency the child must overcome. However, the problem is more difficult in the case of the triangle because oblique lines must be coordinated.

Note the consistency with which vertical-horizontal forms precede similar oblique forms: |— vs. / \, + vs. X, and □ vs. △.

Note also that the closed forms follow similar open forms: + vs. □ and X vs. △.

It is highly unusual for the base line of the triangle to depart more than a few degrees from the horizontal after the age of 7-0.

# FORM 16 Open Square and Circle

Age Norm: 5-6

## Scoring Criteria

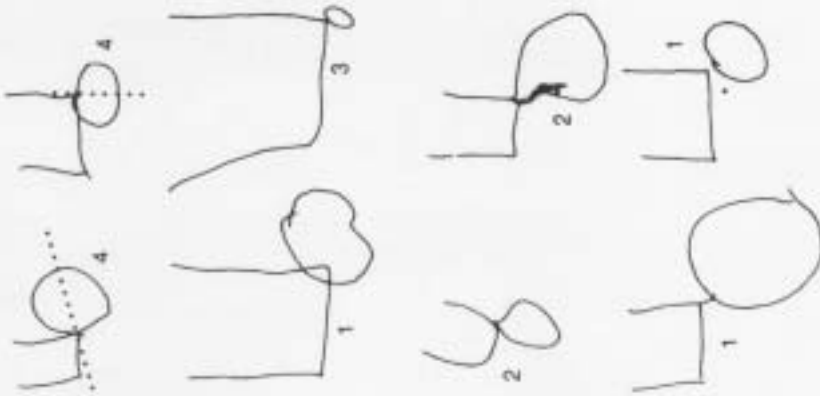
1. No more than 1/16" separation or overlap of forms
2. No major distortions of circle or open square
3. Height of circle and square within a 2 to 1 ratio
4. Bisector of circle passing through corner of square must project into the square



### Score 1



### No Score



\*Examples are reduced. Copy the original w/e over 1/16"

## Supplemental Information

Trend Summary	Random Samples at Each Age
○ □ 8 4 4 4	
Age Range	Random Samples at Each Age
2-0 - 2-11	
3-0 - 3-11	
4-0 - 4-5	
4-6 - 4-11	
5-0 - 5-5	
5-6 - 5-11	

Although developmental stages of this form are difficult to determine, it should be noted that placement of the circle at the lower right corner of the open square usually does not occur before age 5-0.

This form is one of several in the sequence that seems to magnify visual-motor difficulties. Failures are usually obvious. Even the illustrations of No Scores on the opposite page do not fully reflect the degree of distortion that is characteristic of children below age 5-0 or of older children who have visual-motor problems.



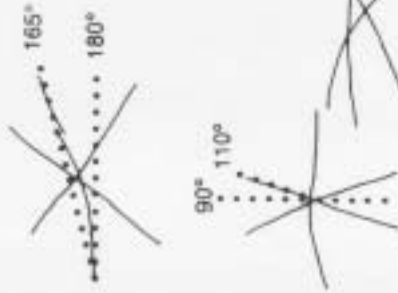
Scoring Criteria

- 1. Three intersecting lines
- 2. Intersection gap no more than 1/8" in height
- 3. Over 1/2 of horizontal line within 15° correct
- 4. Over 1/2 of both diagonals more than 10° from vertical

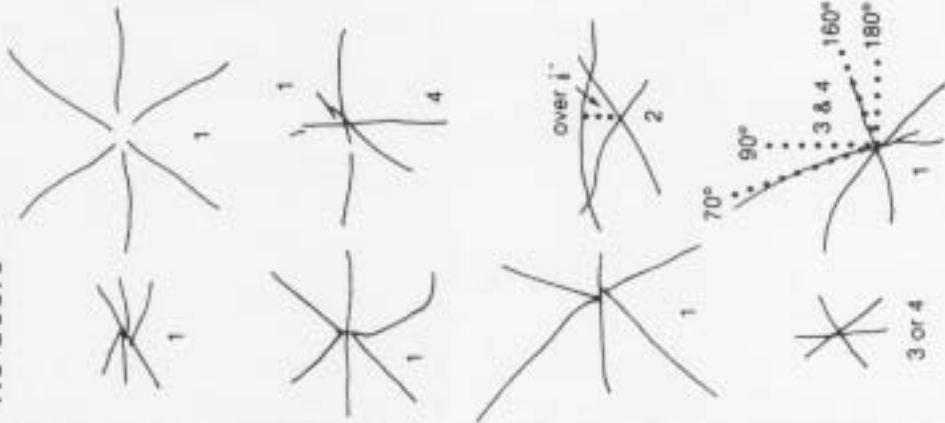


not  
not  
not  
not

Score 1



No Score



3 or 4

Supplemental Information

Trend Summary



Age Range

Random Samples at Each Age

2-0 - 2-11



3-0 - 3-11

4-0 - 4-5

4-6 - 4-11

5-0 - 5-5

5-6 - 5-11

6-0 - 6-11

8-0 - 8-11

10-0 - 10-11

12-0 - 12-11

Form 17 differs from the Merrill-Palmer form (age norm: 5-0), which has equal angles between all lines. However, immature subjects tend to draw horizontal lines in both cases.

Form 17 is more subject to segmentation at the midpoint than any of the other crossing forms. See Kephart (104) regarding the midline problem. Note that children may shift their bodies to the left or right of the stimulus to avoid the problem. Shifting should not be allowed during testing.

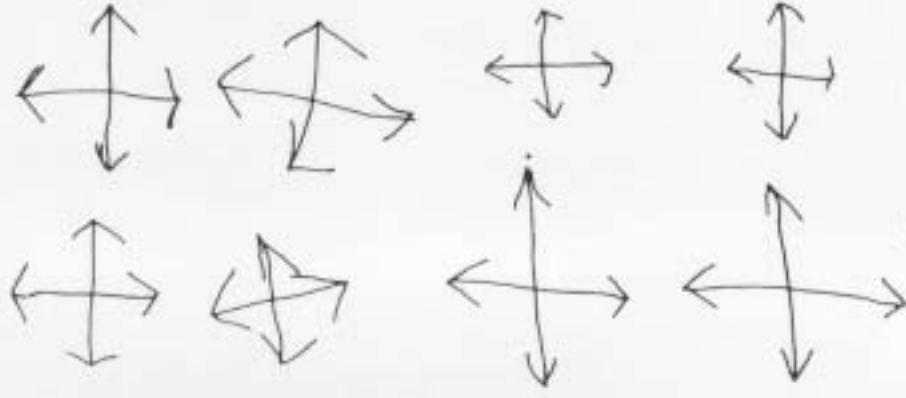
One will find reproductions that display obtuse upper and lower angles scattered throughout the age range 5-0 through 11-11. However, it is not until about 13-0 that this dimension appears with a consistency. These latter reproductions are characterized by a greater obtuseness of the appropriate angles than exists in the stimulus. In general, exaggerations of this kind are found beyond the age level at which a form dimension is achieved. Usually the child is merely emphasizing awareness of the dimension.



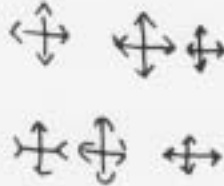
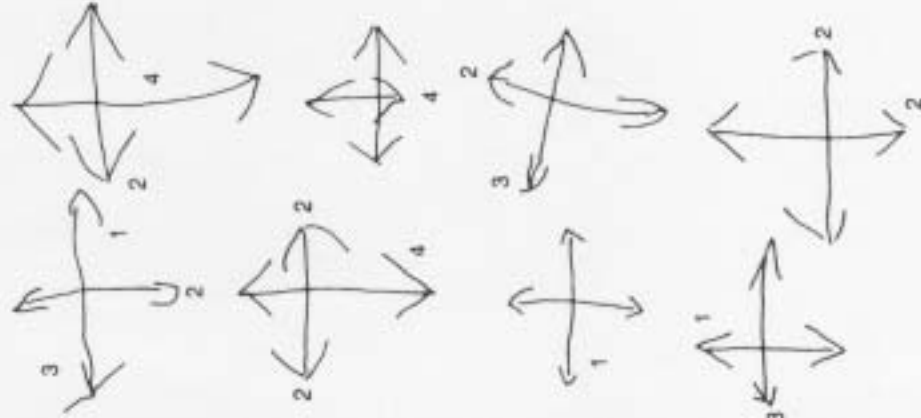
## Scoring Criteria

1. Absence of reversed or "floating" tips (see page 51) not:
2. Sharp points on tips not:
3. No directional confusion not:
4. Longest of 4 legs no more than twice as long as shortest not:
5. Also apply all criteria for Form 10 on page 34

## Score 1



## No Score



## Supplemental Information

Trend Summary +

Age	Developmental Trends	Random Samples at Each Age
2-0	No response	
3-0	Vertical-horizontal lines	
4-0	Some indication of points	
4-4	Points at all ends	
4-6	V-shaped points developing	
5-6	Better control of points	
6-5	Adequately control	

The fact that the points, if extended, would form the sides of a tilted square is realized by only a few children, even in the older age groups. The points are usually more acute in the reproductions than they are in the stimulus, where they are 90° angles.

This form is particularly valuable as an indicator of a young child's developing directionality. However, it presents a bit of a scoring problem for older children, who tend to copy it quickly because it is within their easy command. *Floating* points among these children are fairly common as a result. Therefore, allow floating points of no more than 1/16 of an inch if the reproduction is otherwise good and the child succeeds on each of the next three forms.

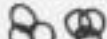


Scoring Criteria

- Three overlapping circles showing seven openings.  
The triangular opening in the center must show.



not



not

- One circle clearly below the others.  
(Position can be checked by connecting the mid-points of the circles to form a triangle. The lowest side of the triangle must be 20° or more off horizontal.)



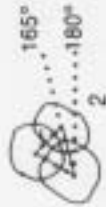
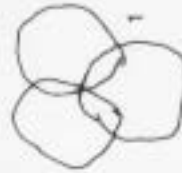
160°

180°

Score 1



No Score



165°

180°



Supplemental Information



Age	Developmental Trends	Random Samples at Each Age
3-0	Minimal response	
3-10	Groups of circles	
4-6	Two or more linked	
5-0	Better grouping	
6-0	General positioning, but incomplete overlap	
6-8	Essential reproduction	
8-0	Fairly rounded and balanced	

No essential change is noted beyond age 8-0.



Scoring Criteria

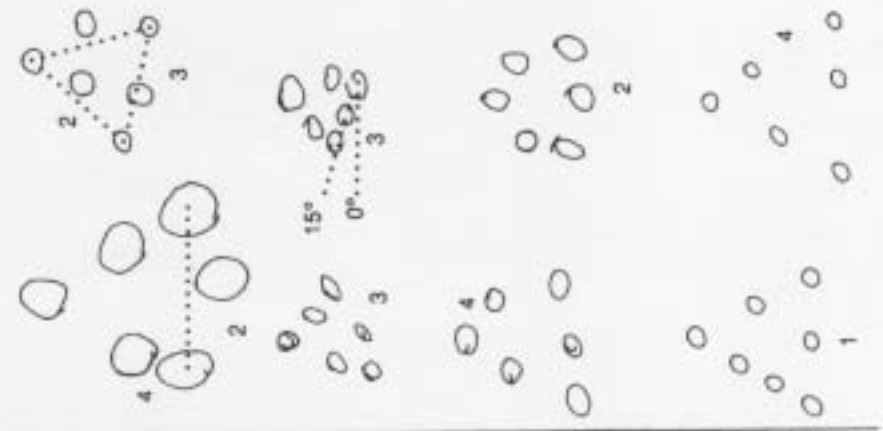
1. Six circles
2. Baseline and at least one other side "straight" (i.e., dotted line from the centers of two outside circles must at least touch the edge of the circle between them)
3. Baseline within 30° of horizontal
4. Space between circles on the same side no more than 2 to 1.



Score 1



No Score



Item Summary	Developmental Trends	Random Samples at Each Age
	Little or no response	
	Two or more circles	
	Closed form emerging	
	Closed form, rounded or curved	
	Triangularity emerging	
	Two straight sides	
	Precise circles and placements	

Rounded sides are the major scoring aspect because they are clearly an immature tendency. Precise placement is usually achieved by constructing the corner circles first and then inserting the remaining circles midway between the corners.

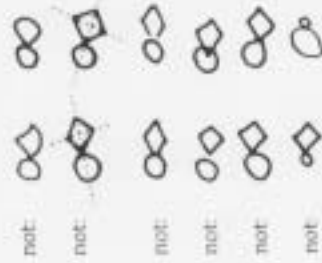
# FORM 21 Circle and Tilted Square

Age Norm: 7-11

## Supplemental Information

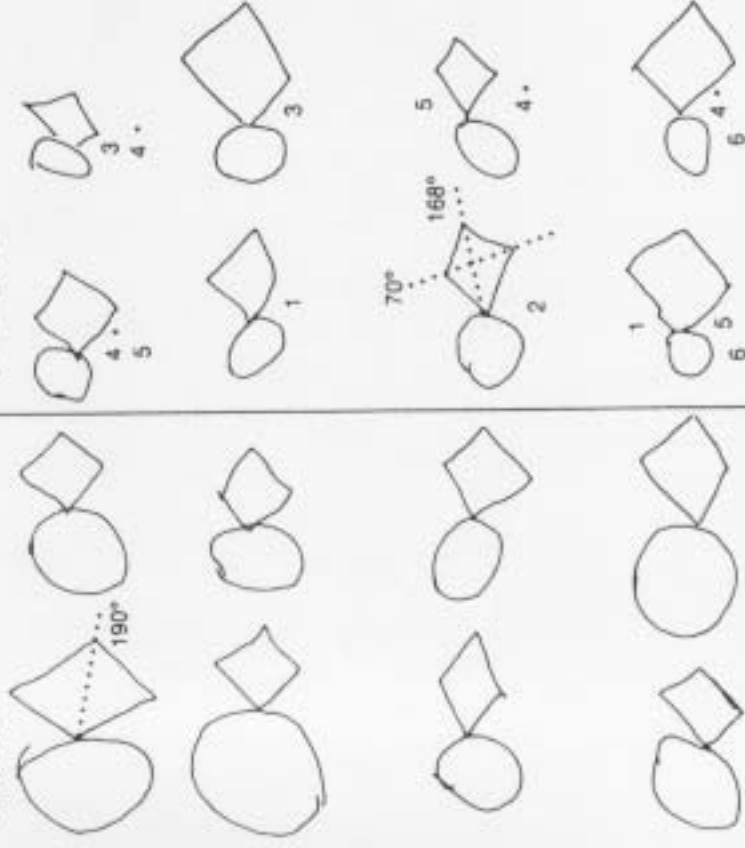
### Scoring Criteria

- Four-cornered square and a circle
- Opposite corners within  $10^\circ$  of vertical and horizontal
- Square "touches" circle with closed corner
- No more than  $1/16"$  gap or overlap of forms
- Contact of corner within middle  $1/3$  of circle
- Heights of circle and square not more than 2 to 3 ratio



### Score 1

### No Score



\*Examples reduced.  
Original gaps were over 1/16"

Trend Summary	Developmental Trends	Random Samples at Each Age
OO	Age	Random Samples at Each Age
OO	3-0	OO
OO	4-0	OO
OO	4-6	OO
OO	5-0	OO
OO	5-8	OO
OO	6-4	OO
OO	7-11	OO

Form 21 is one of the best illustrations in the sequence of Werner's (238) concept of hierarchical integration. The first example above for age 5-0 may appear to be a better reproduction than the last example at age 5-8 or the third example at age 6-4. However, the older child has attempted to add a dimension (tilting the square) that the younger child has not. Until the added dimension is integrated, the reproductions are not as neat as the 5-0 example, which is integrated at a lower level. The two parts are often separated by the child who is attempting to integrate a new dimension. On this form and others, however, separation of component parts may indicate a generalized difficulty in integrating parts into a cohesive whole. In the latter case, separation occurs even in forms that the child has otherwise mastered.

Like Form 16, this form seems to magnify visual-motor difficulties in children. Distortions for children with these difficulties are apt to be gross.

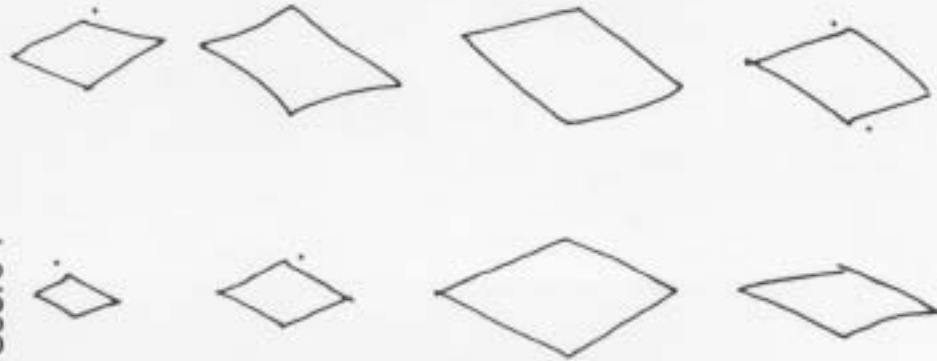
Scoring Criteria

1. Four good corners (openings under 1/16")
2. Horizontal within 170°-190°
3. No dog-ears (see next page)
4. Shortest side at least 2/3 of longest side
5. Both acute angles must be 60° or less

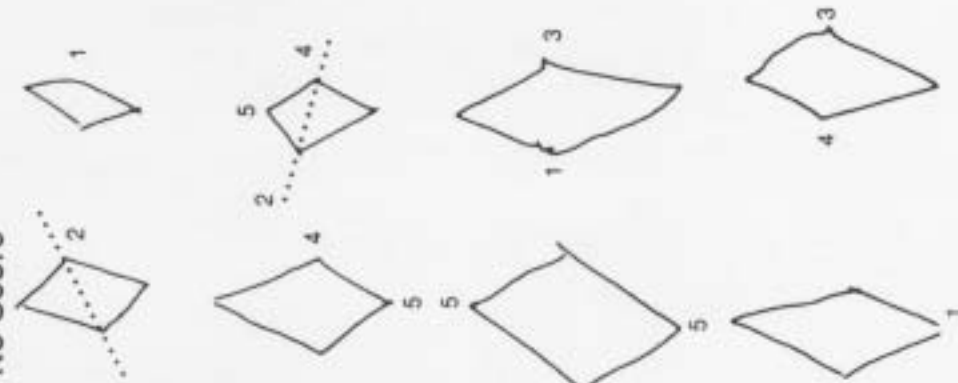


not  
not  
not  
not  
not

Score 1



No Score



Supplemental Information



Age	Developmental Trends	Random Samples at Each Age
3-6	Vertical lines	
4-6	Reflections of vertical and straight lines	
5-6	Closed form with angles	
7-8	Squared	
9-10	Definitely elongated	
11-1	Acceptable angularity	

In the *Stanford-Binet (Form LM)*, the vertical diamond was regarded as a 7-0 task. It should be noted that the top and bottom angles (45°) of Form 22 are more acute than are those of the Binet diamond. It is the relatively accurate representation of these 45° angles that is the major criterion on Form 22. As shown above, the immature tendency is to make acute angles too large.

*Dog-earring* is a behavior that deserves notice. The immature child has difficulty turning a corner; the dog-ear introduces an extra line and an extra angle to the form. The mature child (often in a hurry to complete a form that is well within his or her ability) may slide in and out of a corner, thereby introducing a slight curve to the lines near the point, but does not add extra lines and angles. This behavior is not penalized unless it is extreme.

Immature (Dog-eared) Mature (Curved)



Scoring Criteria

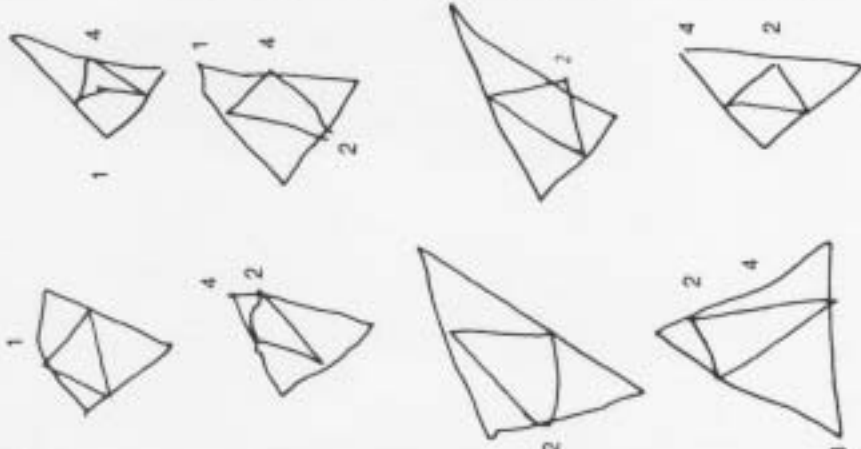
1. Two triangles
2. Two corners of inner triangle cleanly touch middle 1/3 of outer triangle sides. Third corner within 1/16" of cleanly touching (may either under- or overlap)
3. Outer triangle left angle within 60° to 120°
4. Outer triangle right side slopes 100° or more



Score 1



No Score



Trend Summary



Age Developmental Trends

Random Samples at Each Age

4-0 Single, closed form

5-0 Enclosed form that floats

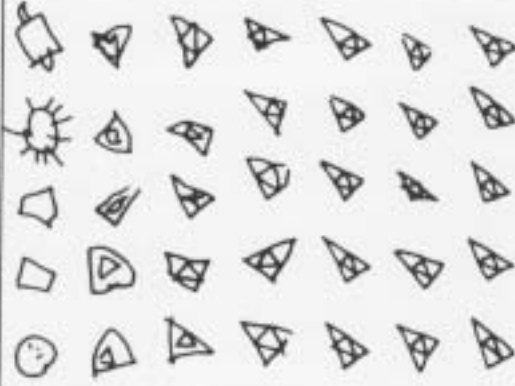
6-0 Two triangles, one or more corners touching sides

7-6 All corners touch or overlap

8-11 Acceptable

10-0 Little change

12-0 Slope and elongation are integrated



The immature tendency is to produce a floating inner form.

The correct slope of the form and accurate representation of the 90° angle of the outer triangle are observed prior to age 8-0. However, these two factors are seldom coordinated before age 8-7.

The hypotenuse of the outer triangle is usually too short until the child is 12 years old, but this variable did not prove reliable enough to be included in the criteria.

## Scoring Criteria

1. Eight dots, circles, or dashes
2. Circularity: no three adjacent dots fall on a straight line
3. Spacing: greatest space between any two dots no more than twice the shortest space

not

not

not

Score 1

No Score



Trend Summary



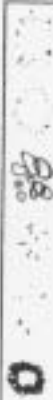
Age

Developmental Trends

Random Samples at Each Age

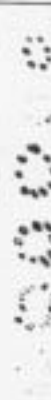
4-0

Massive dotting



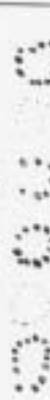
5-0

Relatively round circle



6-0

Nearer dots and forms; some number awareness



7-0

Acceptable; correct number of dots



8-0

Careful placement of dots



9-6

Acceptable; correct number of dots



13-0

Careful placement of dots



Many children make clean, circular dots from age eight through 15. Large filled-in dots are common between ages five and eight.

Scoring Criteria

1. All sides indicated

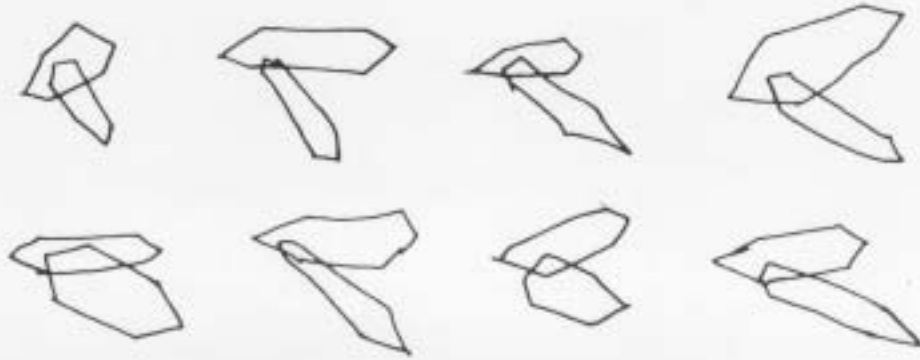
(One of the most obtuse angles may be rounded)

2. No evidence of directional confusion at the corners

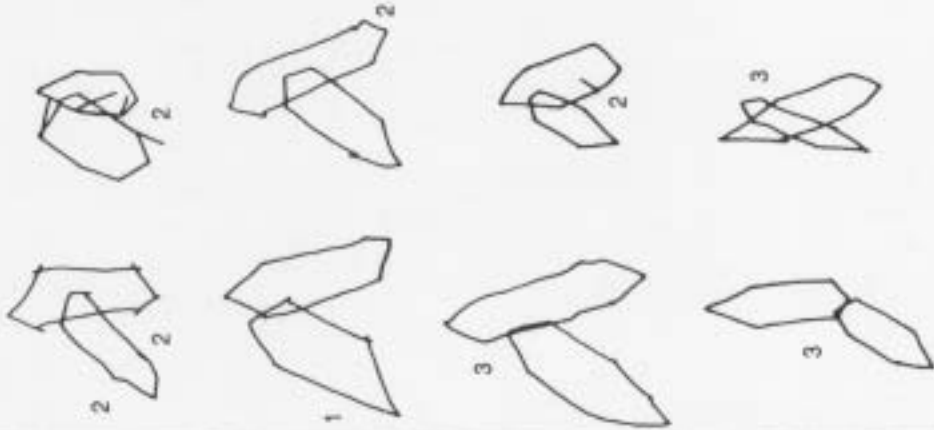
3. Overlap clearly shown, but not extreme



Score 1



No Score



Supplemental Information



Age	Developmental Trends	Random Samples at Each Age
4-10	Single outline forms	
4-4	One or two closed forms	
6-9	Touching or overlapping	
6-6		
7-6		
8-6		
10-2	Acceptable	
12-0	Fairly clean and accurate	

General spatial organization of the forms is achieved about age 6-0, with gradual improvement in the coordination of parts until age 10-2, when all parts are roughly organized. The points of form intersection are not always accurate, however. True command of the form as a coordinated whole is not achieved consistently until age 12 or 13.

On this and other complex forms, older children sometimes sketch and/or plot with dots. These behaviors are acceptable if they are not used to correct errors.

Distortions made by older children tend to be rather obvious. One of the most frequent is separation of the two figures.

# FORM 26 Horizontal Diamond

Age Norm: 10-11

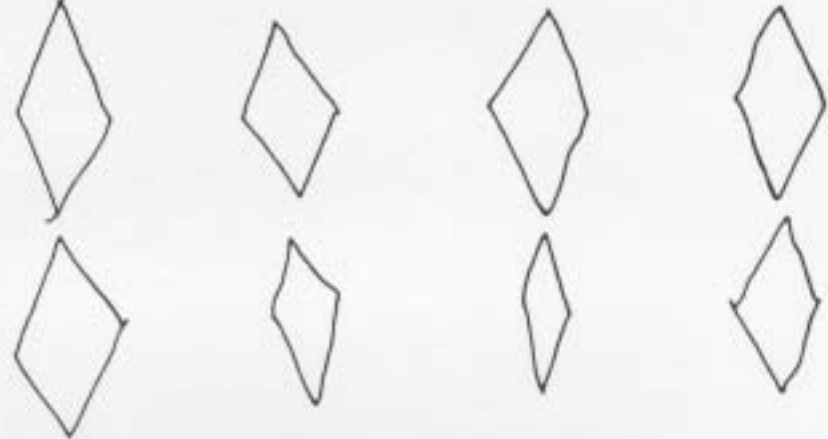
## Supplemental Information

### Scoring Criteria

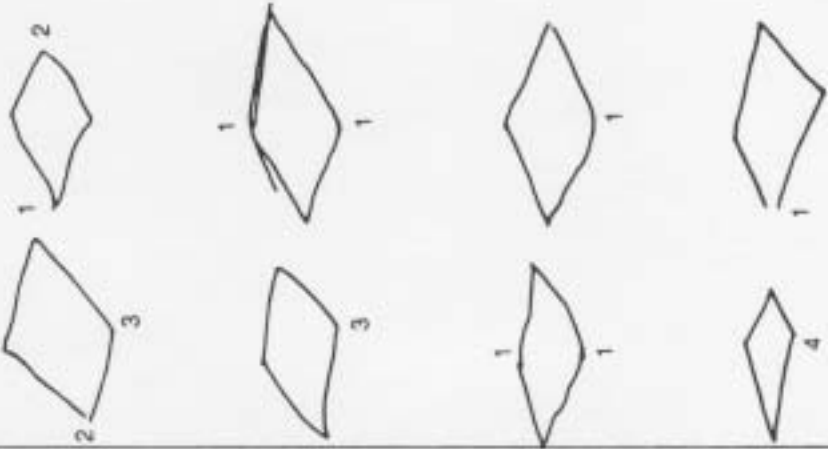
- Four good corners (openings under 1/16")
- Both acute angles 60° or less
- Horizontal axis within 170° to 190°
- Shortest side at least 2/3 of longest side



### Score 1



### No Score



### Trend Summary



Age	Developmental Trends	Random Samples at Each Age
4-0	Closed, angular form	
4-4	Flat square or rectangle	
5-4	Attempts at rotation	
6-0	Rotated square	
6-6	Definite elongation	
8-0		
9-0		
10-11	Balance and correct angularity	

Gesell (74) indicated that 9% of five-year-olds and 61% of six-year-olds reproduced this horizontal diamond adequately. The lateral angles (45°) of Form 26 are more acute than those of the Gesell diamond, which accounts for a large part of the discrepancy in age norms between the two.

The tendency to reproduce a squared form is even stronger in the horizontal diamond than it is in the vertical diamond. This empirical finding perhaps has to do with the vertical-horizontal illusion.

The criteria and the Score/No Score examples are similar for both the vertical and the horizontal diamonds. However, the horizontal diamond is scored less strictly.

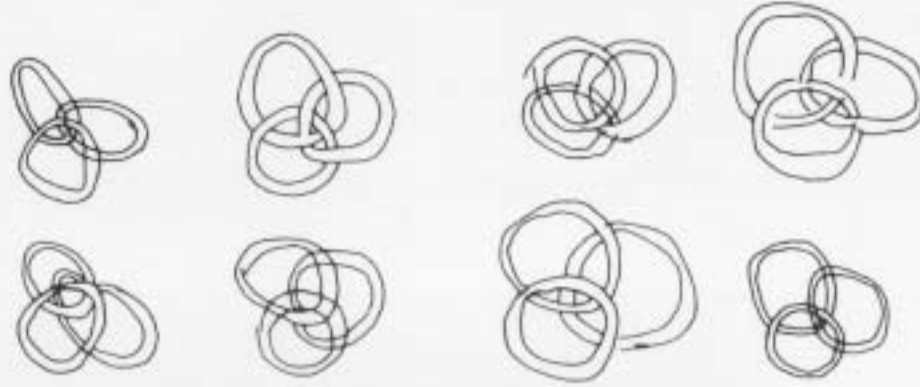


Scoring Criteria

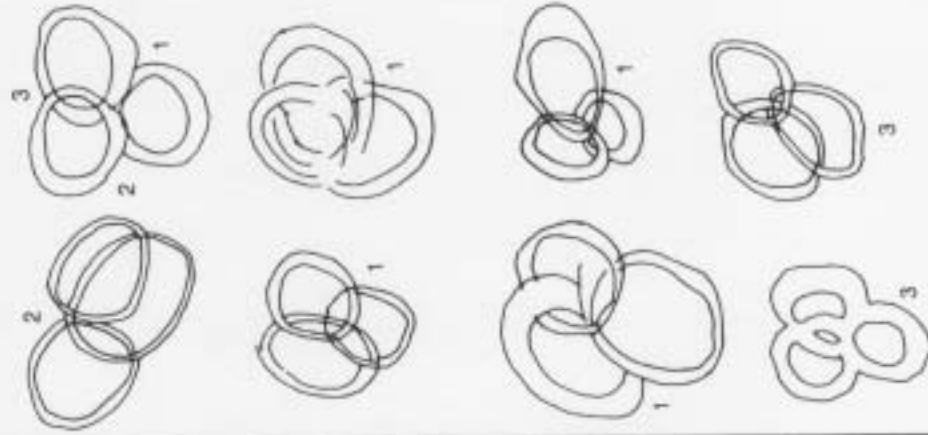
- 1. Three complete, double-line circles
- 2. All circles overlap
- 3. At least one clean 3-D overlap



Score 1



No Score



Supplemental Information



Age	Developmental Trends	Random Samples at Each Age
4-3	Various circle groupings	
5-4	Four grouping, single-line circles	
6-8	Double circles and better positioning	
11-2	One or more three-dimensional overlappings	

See examples on preceding page.

The first successful attempts usually result after the child has constructed one complete double-lined circle with the second and third circles touching the edges of the first.

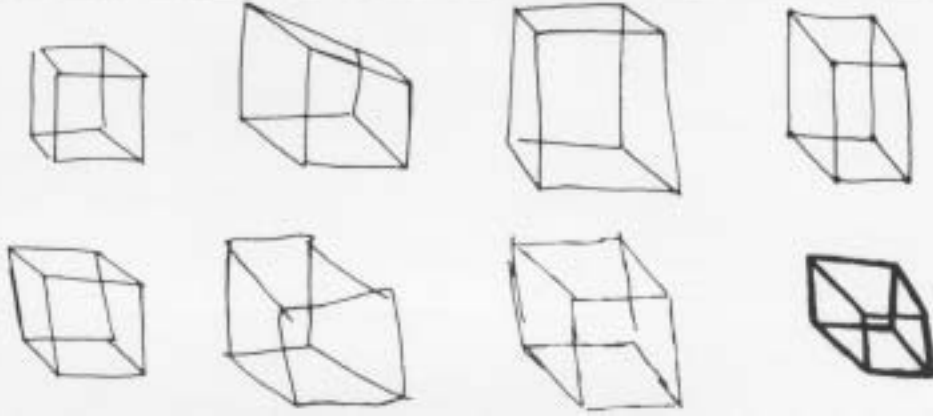


Scoring Criteria

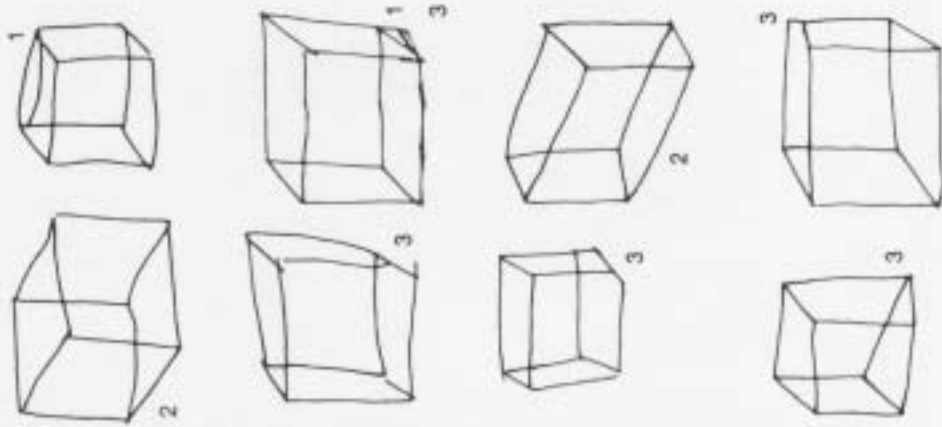
- 1. Correct number of parts
- 2. Correct orientation
- 3. No evidence of confusion



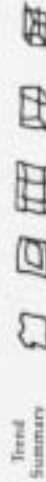
Score 1



No Score



Supplemental Information



Age Developmental Trends Random Samples at Each Age

4-6	Single, closed forms
3-7	Internal lines and/or external rectangles
7-9	Partial structure
9-10	Good beginnings but angular confusion
10-11	Nearly adequate
12-8	Adequate



See examples on preceding page.

In the reproductions of this form, it is common to find all aspects of the figure reversed, rather than portions. That is, part-whole perception is preserved, but directionality seems to be ignored. When a child does not perceive the reversed copy as different from the model, this indicates oversight of directionality. The child who truly sees things backwards will also see the copy backwards and will notice that it is different from the model.

Reproduction of this form may depend more on cognitive analysis than is the case with other forms in the sequence. Perceiving the cube as two squares that overlap at one corner and are joined at corresponding corners by diagonals seems to facilitate its reproduction.

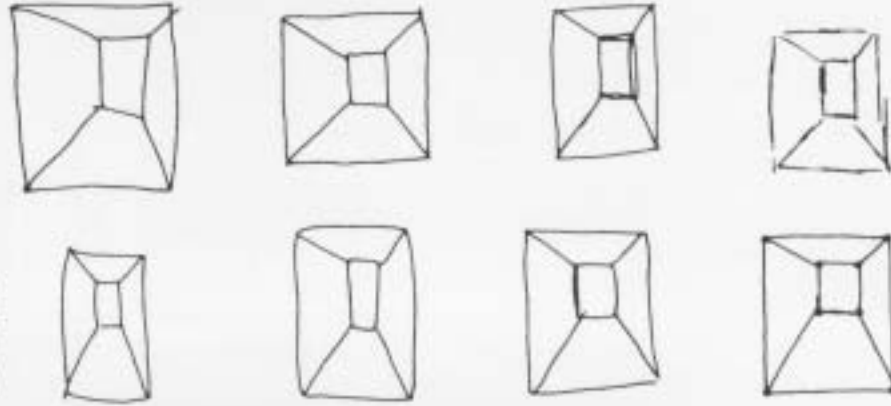


Scoring Criteria

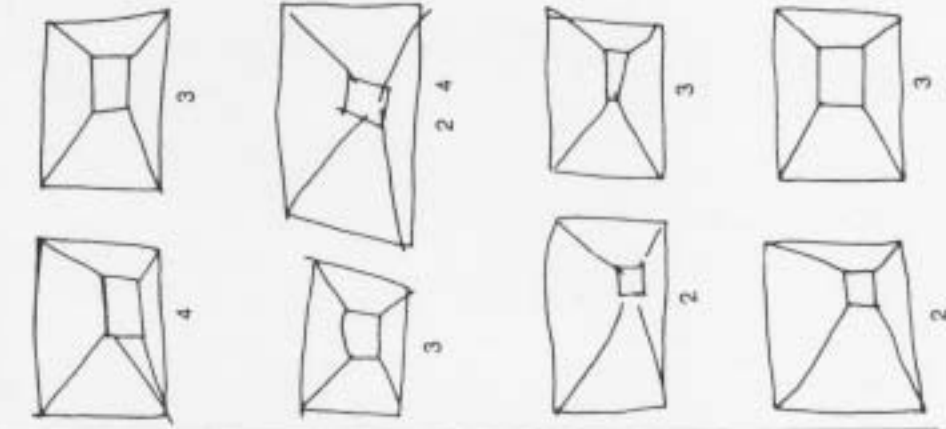
1. Outer form a parallelogram (may be square)
2. Inner form a horizontal rectangle
3. Inner form clearly shifted right and down (lower-right diagonal line the shortest)
4. No confusion or distortion



Score 1



No Score



Trend Summary



Age

Developmental Trends

Random Samples at Each Age

3-0	Scribbling	
4-0	Circles or squares	
5-0	Inner lines	
5-7	Diagonal lines	
5-11	All parts shown; tends to be squared and symmetrical	
7-0	Somewhat neater; some rectangularity	
8-6	Outer form rectangular; inner form shifts right	
9-0	Inner form rectangular	
10-0	Little change	
11-0	Neater, especially at intersections	
13-2	Inner form shifts downward	
14-6	Almost total integration of proportion and space	

The general trend of development is not always additive. A relatively early achievement such as rectangularity of the outer form may disappear temporarily during the achievement of a later feature, such as downward shifting of the inner form. When correct positioning of the inner form is first attempted, the outer form again tends to become square. There is a strong tendency to exaggerate a new achievement; for example, the inner form is often shifted much more than is necessary.



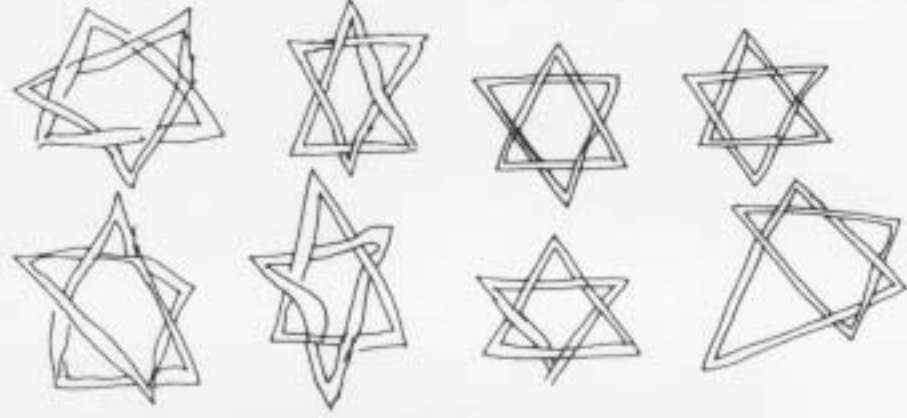
Scoring Criteria

1. All corners of triangles extend beyond opposing sides
2. One over- and one underlapping of the same triangle
3. No extreme distortion

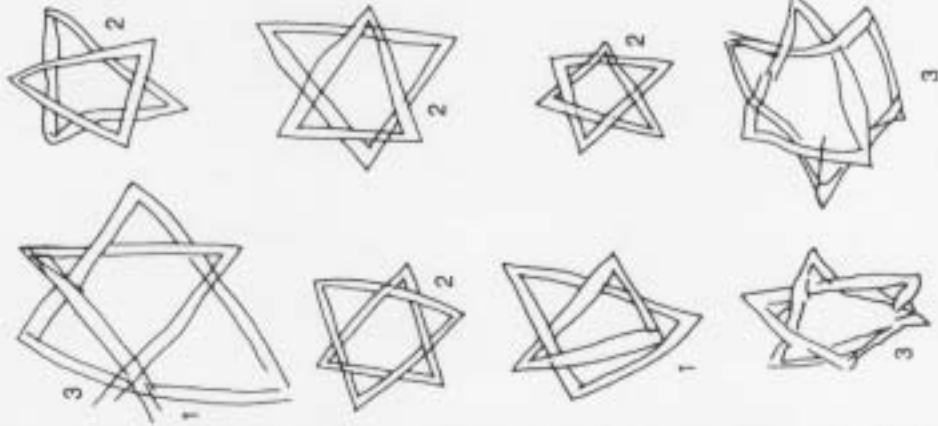
not:



Score 1



No Score



Trend Summary



Age Developmental Trends

- 4-6 Closed, angular form
- 5-6 Two single-line triangles
- 8-9 Double-line triangles
- 11-9 Three-dimensional, but inadequate
- 13-8 Adequate

Random Samples at Each Age



See examples on preceding page.

Particular care should be exercised in determining whether both overlapping and underlapping have been achieved on the same triangle. It is common, but unacceptable, for part or all of one triangle to be superimposed over the other.

**Beery VMI Raw Scores to Standard Scores**

**Ages 4-0 through 4-11**

<b>BEERY VMI Raw</b>	<b>4-0 through 4-1</b>	<b>4-2 through 4-3</b>	<b>4-4 through 4-5</b>	<b>4-6 through 4-7</b>	<b>4-8 through 4-9</b>	<b>4-10 through 4-11</b>
30	•	•	•	•	•	•
29	•	•	•	•	•	•
28	•	•	•	•	•	•
27	•	•	•	•	•	•
26	•	•	•	•	•	•
25	•	•	•	•	•	•
24	•	•	•	•	•	•
23	•	•	•	•	•	155
22	•	•	•	155	155	151
21	•	•	155	152	149	145
20	•	•	151	144	141	139
19	•	155	145	139	136	134
18	155	151	140	135	132	129
17	150	143	133	128	125	123
16	144	137	128	123	120	117
15	136	130	121	117	114	111
14	129	123	116	112	109	106
13	122	116	110	106	103	100
12	114	109	103	100	97	95
11	106	102	96	93	91	88
10	98	95	90	88	86	83
9	92	89	85	83	81	78
8	84	81	79	77	75	72
7	78	76	73	72	70	67
6	72	70	67	66	64	62
5	66	63	61	59	57	55
4	62	60	57	56	54	52
3	58	57	55	54	53	51
2	56	54	53	52	51	50
1	53	52	51	50	49	48
0	•	•	•	•	•	•

Note. See page 198 for conversions to percentiles and other scaled scores.

<b>BEERY VMI Raw</b>	<b>5-0 through 5-1</b>	<b>5-2 through 5-3</b>	<b>5-4 through 5-5</b>	<b>5-6 through 5-7</b>	<b>5-8 through 5-9</b>	<b>5-10 through 5-11</b>
30	•	•	•	•	•	•
29	•	•	•	•	•	•
28	•	•	•	•	•	•
27	•	•	•	•	•	155
26				155	155	153
25			155	153	150	147
24	155	155	151	148	145	142
23	154	150	145	143	140	137
22	148	145	140	138	135	132
21	142	139	134	132	129	126
20	136	133	130	128	125	122
19	131	128	125	123	120	117
18	126	123	119	117	114	111
17	120	117	114	112	109	106
16	114	112	108	106	103	101
15	108	106	102	100	97	95
14	103	100	96	94	92	89
13	98	95	91	89	86	84
12	92	89	86	84	82	79
11	86	83	80	78	76	73
10	80	78	75	73	70	68
9	76	73	70	68	66	64
8	70	68	65	63	61	58
7	65	63	60	58	56	53
6	60	57	55	53	51	49
5	53	51	48	47	46	45
4	50	49	46	45	45	•
3	50	48	45	•	•	•
2	48	47	•	•	•	•
1	47	46	•	•	•	•
0	•	•	•	•	•	•

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores**

**Ages 6-0 through 6-11**

<b>BEERY VMI Raw</b>	<b>6-0 through 6-1</b>	<b>6-2 through 6-3</b>	<b>6-4 through 6-5</b>	<b>6-6 through 6-7</b>	<b>6-8 through 6-9</b>	<b>6-10 through 6-11</b>
30	•	•	•	•	•	•
29	•	•	•	155	155	155
28		155	155	154	153	151
27	155	150	146	144	143	141
26	150	146	143	140	138	135
25	144	141	138	135	133	131
24	139	136	133	130	128	126
23	134	131	128	125	123	121
22	129	126	123	121	119	117
21	124	121	118	116	114	112
20	119	116	113	111	109	107
19	114	111	108	106	104	102
18	108	105	102	100	99	97
17	104	101	98	96	95	93
16	98	96	93	91	90	88
15	92	90	87	85	84	82
14	87	85	82	80	79	78
13	81	79	76	75	74	73
12	77	75	72	70	69	68
11	71	69	66	65	64	63
10	65	63	60	59	58	58
9	61	59	57	56	55	54
8	56	54	51	50	49	48
7	51	49	46	45	45	45
6	48	46	45	•	•	•
5	45	45	•	•	•	•
4	•	•	•	•	•	•
3	•	•	•	•	•	•
2	•	•	•	•	•	•
1	•	•	•	•	•	•
0	•	•	•	•	•	•

Note. See page 198 for conversions to percentiles and other scaled scores.



<b>BEERY VMI Raw</b>	<b>7-0 through 7-1</b>	<b>7-2 through 7-3</b>	<b>7-4 through 7-5</b>	<b>7-6 through 7-7</b>	<b>7-8 through 7-9</b>	<b>7-10 through 7-11</b>
30	•	•	•	155	155	155
29	155	155	155	154	153	151
28	149	148	146	144	143	142
27	140	138	137	135	134	133
26	133	131	128	127	126	125
25	129	127	125	123	122	121
24	125	123	121	119	118	116
23	119	117	115	113	112	111
22	115	113	111	109	108	107
21	110	108	106	105	104	103
20	105	103	101	100	99	98
19	101	99	97	96	95	94
18	96	94	93	92	91	90
17	91	90	88	87	86	85
16	86	85	83	82	81	80
15	81	79	78	77	76	76
14	76	75	74	73	72	72
13	72	71	70	69	68	67
12	66	65	64	63	62	62
11	62	61	60	59	59	58
10	57	57	56	56	55	54
9	53	52	51	50	50	49
8	48	47	46	46	46	46
7	45	45	45	45	45	45
6	•	•	•	•	•	•
5	•	•	•	•	•	•
4	•	•	•	•	•	•
3	•	•	•	•	•	•
2	•	•	•	•	•	•
1	•	•	•	•	•	•
0	•	•	•	•	•	•

Note. See page 198 for conversions to percentiles and other scaled scores.

<b>BEERY VMI Raw</b>	<b>8-0 through 8-1</b>	<b>8-2 through 8-3</b>	<b>8-4 through 8-5</b>	<b>8-6 through 8-7</b>	<b>8-8 through 8-9</b>	<b>8-10 through 8-11</b>
30	155	155	155	155	155	154
29	149	148	146	145	144	143
28	140	139	138	137	136	135
27	131	130	129	128	127	126
26	124	123	122	122	121	120
25	120	119	118	116	115	113
24	115	113	112	111	110	109
23	109	108	107	106	105	104
22	106	105	104	103	102	101
21	102	101	100	98	97	96
20	97	96	95	95	94	93
19	93	92	91	90	89	88
18	90	89	88	87	86	85
17	84	83	82	82	81	80
16	79	78	77	77	76	76
15	75	75	74	74	73	72
14	71	71	70	70	69	68
13	67	66	65	65	64	63
12	61	61	60	60	59	59
11	58	58	57	57	57	56
10	54	53	52	52	51	51
9	49	49	48	48	48	47
8	45	45	45	45	45	45
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores**

**Ages 9-0 through 9-11**

<b>BEERY VMI Raw</b>	<b>9-0 through 9-1</b>	<b>9-2 through 9-3</b>	<b>9-4 through 9-5</b>	<b>9-6 through 9-7</b>	<b>9-8 through 9-9</b>	<b>9-10 through 9-11</b>
30	154	154	153	152	151	150
29	142	141	140	139	138	136
28	134	133	132	130	129	128
27	125	124	123	122	121	120
26	119	118	117	116	115	114
25	112	110	109	108	107	106
24	108	107	106	106	105	104
23	103	102	101	101	100	99
22	100	99	98	97	96	95
21	94	93	92	91	91	90
20	92	91	90	89	88	87
19	88	87	86	86	85	84
18	84	83	82	81	80	80
17	79	78	77	77	76	76
16	75	75	74	74	73	73
15	72	71	70	70	69	68
14	68	67	66	66	65	64
13	63	62	61	61	60	60
12	58	58	57	57	57	57
11	56	56	55	55	54	53
10	50	50	49	49	49	48
9	47	47	46	46	46	46
8	45	45	45	45	45	45
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

## Beery VMI Raw Scores to Standard Scores Ages 10-0 through 10-11

BEERY VMI Raw	10-0 through 10-1	10-2 through 10-3	10-4 through 10-5	10-6 through 10-7	10-8 through 10-9	10-10 through 10-11
30	148	147	146	145	144	143
29	135	133	132	131	130	129
28	127	126	125	123	122	120
27	119	118	117	116	115	114
26	113	112	111	111	110	109
25	105	104	103	103	102	101
24	103	102	101	100	99	98
23	99	98	97	97	96	95
22	95	94	93	93	92	91
21	90	90	89	89	88	87
20	87	86	85	85	84	83
19	84	83	82	82	81	80
18	79	79	78	78	77	76
17	75	75	74	74	73	73
16	72	72	71	71	70	69
15	68	67	66	66	65	64
14	64	63	62	62	61	61
13	59	59	58	58	58	58
12	56	56	56	56	56	55
11	53	52	51	51	50	50
10	48	48	47	47	47	47
9	45	45	45	45	45	45
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

## Beery VMI Raw Scores to Standard Scores Ages 11-0 through 11-11

BEERY VMI Raw	11-0 through 11-1	11-2 through 11-3	11-4 through 11-5	11-6 through 11-7	11-8 through 11-9	11-10 through 11-11
30	142	141	140	138	137	135
29	128	127	126	124	123	122
28	119	117	116	115	114	113
27	113	112	111	110	109	108
26	108	107	106	105	104	103
25	101	100	99	99	98	98
24	98	97	96	96	95	95
23	94	93	92	92	92	91
22	91	90	89	89	88	87
21	86	85	84	84	84	83
20	83	82	81	81	80	80
19	79	78	77	77	76	76
18	76	75	74	74	73	73
17	72	72	71	71	70	69
16	69	68	67	67	66	65
15	64	63	62	62	61	61
14	60	60	59	59	59	58
13	57	57	57	57	56	56
12	55	55	54	54	53	52
11	49	49	48	48	48	47
10	46	46	46	46	46	46
9	45	45	45	45	45	45
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores Ages 12-0 through 12-11**

<b>BEERY VMI Raw</b>	<b>12-0 through 12-1</b>	<b>12-2 through 12-3</b>	<b>12-4 through 12-5</b>	<b>12-6 through 12-7</b>	<b>12-8 through 12-9</b>	<b>12-10 through 12-11</b>
30	134	132	131	130	129	128
29	121	120	119	118	117	116
28	112	111	110	110	109	109
27	107	106	105	105	104	103
26	102	101	100	100	99	98
25	97	97	96	96	95	94
24	94	94	93	93	92	91
23	91	91	90	90	89	88
22	87	86	85	85	84	84
21	83	83	82	82	81	80
20	79	79	78	78	77	76
19	75	75	74	74	73	73
18	72	72	71	71	70	69
17	69	68	67	67	66	66
16	65	64	63	63	62	62
15	60	60	59	59	59	58
14	58	58	57	57	57	56
13	55	55	54	54	53	52
12	51	50	49	49	48	48
11	47	47	46	46	46	46
10	45	45	45	45	45	45
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores Ages 13-0 through 13-11**

<b>BEERY VMI Raw</b>	<b>13-0 through 13-1</b>	<b>13-2 through 13-3</b>	<b>13-4 through 13-5</b>	<b>13-6 through 13-7</b>	<b>13-8 through 13-9</b>	<b>13-10 through 13-11</b>
30	127	126	125	125	124	123
29	116	115	114	114	113	112
28	108	108	107	107	106	105
27	102	101	100	100	99	98
26	98	97	96	96	95	95
25	94	93	92	92	92	91
24	90	89	88	87	87	87
23	87	86	85	84	84	83
22	83	83	82	82	81	80
21	80	79	78	78	77	77
20	76	75	74	74	74	73
19	72	72	71	71	70	70
18	69	68	67	67	66	66
17	65	65	64	64	63	62
16	61	61	60	60	60	59
15	58	58	57	57	57	57
14	56	56	55	55	54	53
13	51	50	49	49	49	48
12	47	47	46	46	46	46
11	45	45	45	45	45	45
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.



## Beery VMI Raw Scores to Standard Scores Ages 14-0 through 14-11

BEERY VMI Raw	14-0 through 14-1	14-2 through 14-3	14-4 through 14-5	14-6 through 14-7	14-8 through 14-9	14-10 through 14-11
30	123	122	121	121	120	119
29	112	111	110	110	109	108
28	104	103	102	102	101	100
27	98	97	96	96	95	95
26	94	94	93	93	92	91
25	91	91	90	90	89	88
24	86	86	86	86	85	84
23	83	83	82	82	81	80
22	80	79	78	78	77	77
21	76	76	75	75	74	73
20	73	73	72	72	71	70
19	69	69	68	68	67	66
18	65	65	64	64	63	62
17	62	61	60	60	59	59
16	59	59	58	58	57	57
15	56	56	56	55	54	53
14	52	51	50	50	49	48
13	48	48	47	47	47	46
12	45	45	45	45	45	45
11	.	.	.	.	.	.
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

*Note.* See page 198 for conversions to percentiles and other scaled scores.

## Beery VMI Raw Scores to Standard Scores Ages 15-0 through 15-11

BEERY VMI Raw	15-0 through 15-1	15-2 through 15-3	15-4 through 15-5	15-6 through 15-7	15-8 through 15-9	15-10 through 15-11
30	118	117	116	116	115	114
29	107	106	105	104	103	102
28	99	98	97	97	96	95
27	94	94	93	93	92	91
26	91	90	89	89	88	87
25	88	87	86	86	85	84
24	84	83	82	82	81	80
23	80	79	78	78	77	77
22	76	76	75	75	74	73
21	72	71	70	70	70	69
20	69	68	67	66	66	66
19	66	65	64	64	63	62
18	62	61	60	60	59	59
17	58	58	57	57	57	56
16	56	56	55	55	54	53
15	52	51	50	49	49	48
14	48	47	46	46	46	46
13	46	46	45	45	45	45
12	45	45	.	.	.	.
11	.	.	.	.	.	.
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

## Beery VMI Raw Scores to Standard Scores Ages 16-0 through 16-11

BEERY VMI Raw	16-0 through 16-1	16-2 through 16-3	16-4 through 16-5	16-6 through 16-7	16-8 through 16-9	16-10 through 16-11
30	113	112	111	110	109	109
29	101	100	99	98	97	96
28	95	94	93	93	92	91
27	90	89	88	88	88	88
26	87	86	85	85	84	84
25	83	82	81	81	80	79
24	80	79	78	78	77	76
23	76	76	75	75	74	74
22	73	72	71	71	71	70
21	69	69	68	68	67	67
20	65	65	65	65	64	63
19	62	61	60	60	59	59
18	58	58	57	57	57	56
17	56	56	55	55	54	53
16	52	51	50	50	49	48
15	48	48	47	47	47	46
14	45	45	45	45	45	45
13	.	.	.	.	.	.
12	.	.	.	.	.	.
11	.	.	.	.	.	.
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores Ages 17-0 through 17-11**

<b>BEERY VMI Raw</b>	<b>17-0 through 17-1</b>	<b>17-2 through 17-3</b>	<b>17-4 through 17-5</b>	<b>17-6 through 17-7</b>	<b>17-8 through 17-9</b>	<b>17-10 through 17-11</b>
30	108	108	107	107	106	105
29	96	95	94	94	94	94
28	91	90	89	89	89	88
27	87	87	87	87	86	86
26	83	83	82	82	81	81
25	78	77	76	76	75	75
24	75	74	73	72	71	69
23	73	73	72	71	69	67
22	70	70	69	68	65	63
21	66	66	65	64	61	58
20	62	61	60	59	56	54
19	58	58	57	56	53	51
18	56	56	55	54	51	48
17	52	51	50	49	47	45
16	48	47	46	45	45	.
15	46	46	45	.	.	.
14	45	45	.	.	.	.
13	.	.	.	.	.	.
12	.	.	.	.	.	.
11	.	.	.	.	.	.
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

**Beery VMI Raw Scores to Standard Scores Ages 18-0 through 18-11**

<b>BEERY VMI Raw</b>	<b>18-0 through 18-1</b>	<b>18-2 through 18-3</b>	<b>18-4 through 18-5</b>	<b>18-6 through 18-7</b>	<b>18-8 through 18-9</b>	<b>18-10 through 18-11</b>
30	105	104	103	103	102	101
29	95	95	95	95	94	93
28	88	88	87	87	86	85
27	85	85	84	84	83	82
26	80	80	79	79	78	77
25	74	74	73	73	72	71
24	68	66	65	64	63	62
23	65	63	61	60	59	58
22	60	58	55	54	53	52
21	56	53	50	49	48	47
20	51	49	46	45	45	45
19	48	46	45	.	.	.
18	46	45	.	.	.	.
17	45	.	.	.	.	.
16	.	.	.	.	.	.
15	.	.	.	.	.	.
14	.	.	.	.	.	.
13	.	.	.	.	.	.
12	.	.	.	.	.	.
11	.	.	.	.	.	.
10	.	.	.	.	.	.
9	.	.	.	.	.	.
8	.	.	.	.	.	.
7	.	.	.	.	.	.
6	.	.	.	.	.	.
5	.	.	.	.	.	.
4	.	.	.	.	.	.
3	.	.	.	.	.	.
2	.	.	.	.	.	.
1	.	.	.	.	.	.
0	.	.	.	.	.	.

Note. See page 198 for conversions to percentiles and other scaled scores.

# Standard Score Conversions to Percentiles and Other Scaled Scores

SS	NCE's	T Scores	Scaled Scores	%ile Ranks
X=100 SD=15	X=50 SD=21.06	X=50 SD=10	X=10 SD=3	
155	99+	80+	20+	99.98
154	99+	80+	20	99.97
153	99+	80+	20	99.96
152	99+	80+	20	99.95
151	99+	80+	20	99.94
150	99+	80+	20	99.93
149	99+	80+	19	99.92
148	99+	80+	19	99.91
147	99+	80+	19	99.9
146	99+	80+	19	99.8
145	99+	80	19	99.7
144	99+	79	19	99.6
143	99+	79	19	99.5
142	99+	78	18	99.4
141	99+	77	18	99.3
140	99+	77	18	99.2
139	99+	76	18	99.1
138	99	75	18	99
137	99	75	17	99
136	99	74	17	99
135	99	73	17	99
134	98	73	17	99
133	96	72	17	99
132	95	71	16	98
131	94	71	16	98
130	92	70	16	98
129	91	69	16	97
128	89	69	16	97
127	88	68	15	96
126	87	67	15	96
125	85	67	15	95
124	84	66	15	95
123	82	65	15	94
122	81	65	14	93
121	79	64	14	92
120	78	63	14	91
119	77	63	14	90
118	75	62	14	88
117	74	61	13	87
116	72	61	13	86
115	71	60	13	84
114	70	59	13	82
113	68	59	13	81
112	67	58	12	79
111	65	57	12	77
110	64	57	12	75
109	63	56	12	73
108	61	55	12	70
107	60	55	11	68
106	58	53	11	65
105	57	53	11	63
104	56	53	11	61
103	54	52	11	58
102	53	51	10	55
101	51	51	10	53
100	50	50	10	50

SS	NCE's	T Scores	Scaled Scores	%ile Ranks
X=100 SD=15	X=50 SD=21.06	X=50 SD=10	X=10 SD=3	
99	49	49	10	47
98	47	49	10	45
97	46	48	9	42
96	44	47	9	39
95	43	47	9	37
94	42	46	9	34
93	40	45	9	32
92	39	45	8	30
91	37	44	8	27
90	36	43	8	25
89	35	43	8	23
88	33	42	8	21
87	32	41	7	19
86	30	41	7	18
85	29	40	7	16
84	28	39	7	14
83	26	39	7	13
82	25	38	6	12
81	23	37	6	10
80	22	37	6	9
79	21	36	6	8
78	19	35	6	7
77	18	35	5	6
76	16	34	5	5
75	15	33	5	5
74	13	33	5	4
73	12	32	5	4
72	11	31	4	3
71	9	31	4	3
70	8	30	4	2
69	6	29	4	2
68	5	29	4	2
67	4	28	3	1
66	2	27	3	1
65	1	27	3	1
64	1	26	3	1
63	1	25	3	1
62	1	25	2	1
61	1-	24	2	.9
60	1-	23	2	.8
59	1-	23	2	.7
58	1-	22	2	.6
57	1-	21	1	.5
56	1-	21	1	.4
55	1-	20	1	.3
54	1-	20	1	.2
53	1-	20	1	.1
52	1-	20-	1-	.09
51	1-	20-	1-	.08
50	1-	20-	1-	.07
49	1-	20-	1-	.06
48	1-	20-	1-	.05
47	1-	20-	1-	.04
46	1-	20-	1-	.03
45	1-	20-	1-	.02

## Beery VMI Raw Score Age Equivalents

Raw	Beery VMI <sup>a</sup>	Visual Perception <sup>a</sup>	Motor Coordination	Raw
30	18-11	17-6	17-6	30
29	16-2	16-0	16-1	29
28	14-10	14-3	14-6	28
27	13-5	12-10	12-11	27
26	12-6	11-5	11-3	26
25	11-2	10-3	10-1	25
24	10-6	9-6	9-2	24
23	9-8	8-6	8-6	23
22	9-0	8-0	8-0	22
21	8-4	7-6	7-6	21
20	7-6	7-0	6-11	20
19	7-1	6-6	6-6	19
18	6-7	6-2	6-0	18
17	6-3	5-6	5-11	17
16	5-11	5-0	5-6	16
15	5-6	4-8	4-11	15
14	5-2	4-4	4-6	14
13	4-10	4-0	4-0	13
12	4-6	3-8	3-9	12
11	4-3	3-6	3-6	11
10	3-11	3-0	3-3	10
9	3-6	2-11	3-0	9
8	3-3	2-10	2-11	8
7	3-1	2-8	2-8	7
6	2-10	2-7	2-7	6
5	2-7	2-5	2-2	5
4	<2-7	<2-2	<2-2	4
3	-	-	-	3
2	-	-	-	2
1	-	-	-	1

<sup>a</sup>Up to three consecutive forms receiving No Score.



## CANTAB

Some sites have slightly different versions of this program. The tests and results are the same, but procedural steps might be slightly different for each site. For instance, the CANTAB at San Diego's site is an older model and does not have some of the export/print options that newer versions contain. These steps were written to correspond with the CANTAB version in Russia (which is not the earliest version). Please contact Jill Vander Velde (vanderv@mail.sdsu.edu) or Kim Ogle (kowens@projects.sdsu.edu) if you have any questions/concerns.

1. If still in the Control Centre, click on "Analyse Results." If you have closed out of the Control Centre, double click on "Results Manager" on the desktop.
2. In the new window that pops up, click on "Open an Existing Results Set." Make sure "C:\My Documents\Default Results Set.can" is highlighted and click "OK." Test scores are brought in automatically (a box will appear showing scores being transferred if a subject was tested and their data has not been brought in yet, otherwise, there will be nothing).
3. If you are maintaining subject information in a separate results set (i.e., "Consortium Results Set.can"), open that results set by clicking on File Open Results Set..., highlighting the results set of interest, and clicking "Open."
4. Return to the "Default Results Set" window and highlight the subject you want to transfer to the new results set.
5. Click on Edit Copy, then go to the separate results set window, check to make sure that "Subjects" is highlighted (i.e., ALL subjects' tests are viewable in the right-hand window), and click on Edit Paste.
6. If not all the subject details were entered prior to testing, highlight the subject's name, go to View Properties, and click on the "Details" tab. To enter information into a field, click on the field. Then, click on the box at the top (a green box and a red X box should appear next to it when you can enter data). Enter the appropriate information for that field and click on the green box. Repeat as necessary until all fields are entered. Close the Properties window. **Note:** If you do not click on the green box, changes will NOT be saved.

### Exporting Data –

7. Highlight either "Subjects" (this will export ALL children within that results set) or a single individual.
8. Click on the "Analysis Wizard..." button.
9. Click "Next." (If you click on the box to not show the dialog box again, you will not have to take this step again.)
10. Make sure "Summary datasheet" is marked and click "Next."
11. Make sure only "Include warnings of failed or non-clinical tests" is checked and click "Next."
12. Make sure "Raw Scores" is checked and click "Next."
13. A new box tells you that you must now choose which measures to include in the summary. Just click on "Next."

14. Where it says “Recommended Measures,” change it to “Consortium Battery” (or choose the measures required) and click “Finish.” **Note:** The first time you do this, you should create a new collection of measures that will contain ALL variables of interest. To do this, follow these steps (if done, go to Step 15):
  - a. Make sure “Recommended Measures” is highlighted under “Collection:.”
  - b. Delete unwanted measures by highlighting them within the “Selected Metrics:” (right-hand window) and then clicking on the “X” box (located to the right of this window). **Note:** When you highlight a measure, if information about the measure exists, it will appear in the box at the bottom of the screen.
  - c. To add a different measure, click on the pop-up window under “Available Metrics:” to locate the appropriate subtest or “(Subject Properties),” then highlight the measure of interest, and click on “Select .”
  - d. Measures to include (in this order) are:
    - i. CIFASD ID (Site Code + Individual ID, i.e., SMS1).
    - ii. Subject name.
    - iii. Date of birth (DOB).
    - iv. Age.
    - v. Sex.
    - vi. Handedness.
    - vii. Ethnicity.
    - viii. NART (same as FSIQ, but please use **this** measure for FSIQ).
    - ix. MOT Mean latency.
    - x. BLC Percent correct.
    - xi. PRM Percent correct.
    - xii. SRM Percent correct.
    - xiii. SSP Span length.
    - xiv. SWM Strategy.
    - xv. SWM Total errors.
    - xvi. SWM Between errors.
    - xvii. SWM Between errors (4 boxes).
    - xviii. SWM Between errors (6 boxes).
    - xix. SWM Between errors (8 boxes).
    - xx. SWM Double errors.
    - xxi. SWM Double errors (4 boxes).
    - xxii. SWM Double errors (6 boxes).
    - xxiii. SWM Double errors (8 boxes).
    - xxiv. SWM Within errors.
    - xxv. SWM Within errors (4 boxes).
    - xxvi. SWM Within errors (6 boxes).
    - xxvii. SWM Within errors (8 boxes).
  - e. To move measures up and down in the “Selected Metrics:” window, highlight the one to move and use the and arrow keys located on the far right until it is in the appropriate position.
  - f. Once you have all measures of interest (in order) within the “Selected Metrics:” window, click on “Save As...” (next to the “Collection:” pop-up

menu) and name it appropriately (i.e., “CIFASD Collection” or “Consortium Collection”). **Note:** This allows you to just click on this collection in Step 14 rather than repeat this process again.

- g. Click on “Finish.”
15. A new window will appear with the data – click on File Save As... Give the file an appropriate name (i.e., “Russian Raw Scores Wk1”) and make sure the “Save as type:” field says “CSV (comma-delimited) (\*.csv)” and click “Save” (make sure you know where it saves to – the default is “My Documents” found on the desktop).
16. Repeat steps 7 through 15, but at step 12, click on “Standardised Scores” and then make sure the “Narrow peer group individually for each measure” is checked (you can ignore the warning that may appear). Save this file as appropriate (i.e., “Russian Z Scores Wk1”).

### Printed Reports –

17. To create a printed report with the Z-scores or raw scores, highlight a single subject’s name and click on the “Analysis Wizard...” button.
18. Click “Next.” (If you click on the box to not show the dialog box again, you will not have to take this step again.)
19. Make sure “Summary report” (to get report with Z-scores) is checked and click “Next.”
20. Check/uncheck boxes so that only “Include warnings of failed or non-clinical tests.” and “Include basis of comparison for standard scores.” are checked. Also, make sure to check “Narrow peer group individually for each measure.” Click on “Next.”
21. A new box tells you that you must now choose which measures to include in the summary. Just click on “Next.”
22. Where it says “Recommended Measures,” change it to “Consortium Battery” (or whatever you named the collection in Step 14.f.) and click “Finish.”
23. When the report appears on the screen, click on “Print...” In the new “Print” window, make sure the printer is correct, that you print “All” pages (located under “Print Range”), then click on “OK.”
24. To create a printed report of the raw data, repeat steps 17 to 22, except at step 19, make sure “Detailed Report” is checked and click “Next.” Make sure both “Summary” and “Trial by Trial” are checked, then click “Finish.”
25. When you close both the “Summary Report” and the “Detailed Report” you do not need to save the file. The file will just take up space and you can always repeat the above steps (17-23) to recreate them. Plus, a hard copy has just been printed up and stored in the subject’s file. Just click on “Close.”

### Important Notes –

- A. After exporting/printing, double-check the printouts to make sure that all variables/subtests desired are present (as appropriate – see Step 14. d.).
- B. For the “Detailed Report,” make sure that all subtests are in administration order (Motor Screening, Big/Little Circle, Pattern Recognition Memory, Spatial Recognition Memory, Spatial Span, and Spatial Working Memory) and staple

- together. **Note:** Some older versions print this report such that the subtests do not always start on a new page. Do not worry about stapling in administration order if this is the case.
- C. For the “Detailed Report,” do not worry if other “Subject Properties” appear at the top of each subtest, besides the ones listed above (in Step 14. d.). For this particular report, ALL possible “Subject Properties” are listed.
  - D. Place both the “Summary Report” and “Detailed Report” into the subject’s file.
  - E. The subtest “Spatial Span” may be marked as “Test not complete” on both the “Summary Report” and the “Detailed Report.” THIS IS OK. The subject just did not reach and complete 9 boxes (the maximum number of boxes a subject can receive on this subtest), but the data is valid and can still be used/scored.

### Troubleshooting –

- A. *Print out shifts to right for each subtest:*
  - 1. Make sure you are in the “Results Manager”.
  - 2. Click on Tools Options...
  - 3. Under the “General” tab, uncheck the box near the bottom that reads: “Attempt to work around browser printing problems (recommended).”  
Note: **DO NOT** uncheck this box if you are not having problems with the print out shifting to the right.
- B. *Error message about Internet Explorer backgrounds:*
  - 1. If an error message pops up when you print that tells you that the backgrounds for Internet Explorer are not turned on, click on “Cancel.”  
Note: The computer will still print the report, whether you have the “print backgrounds” on or not.
  - 2. Contact Jill or Kim at the e-mail address at the top of the page to let them know you are receiving this message. They will advise you what to do.
- C. *Extra pages print up:*
  - 2. Do not worry about extra pages printing up. At the present time, we do not know how to stop this from happening.
  - 3. Contact Jill or Kim at the e-mail address at the top of the page and they will contact you as soon as this issue is solved. Sorry for any inconvenience this may cause.
- D. *Print out does not print colors appropriately:*
  - 1. Make sure you are in “Results Manager.”
  - 2. Click on Tools Options...
  - 3. Under the “Reports” tab, under “Colour,” change to “Monochrome,” and click on “OK.” Reports will now print in black and white.
- E. *When click on “All” in Print window, not all subtests print:*
  - 1. Currently, there is no way to fix this. When you are in the “Print” window, just print up those subtests that did not print, by choosing their “Page Number” and only printing that page.
  - 2. Contact Jill or Kim at the e-mail address at the top of the page and they will contact you as soon as this issue is solved. Sorry for any inconvenience this may cause.

## Virtual Water Maze

### Locating Data:

1. Go to your 'NIVN Morris Water Task' folder and click open. You can do a search for this folder on your computer if you are not sure where it is located. More than likely it is in your C:\Program Files unless you specifically saved it somewhere else.
2. Once in this folder, open the folder entitled 'Data'. You should now see now see a series of folders with the subject IDs you entered (i.e. SMS13). REMINDER: Please try and use the site code and subject number when labeling the children for all CIFASD tests. If you are not sure of your site code, please contact myself or Sarah. (NOTE: This 'Data' folder is the one you should be backing up on a regular basis as it contains all subject output.)
3. Select the folder of the subject you have just completed testing. Once this folder is open, you will see two different types of files (Bitmap Images and Text Files). There should be Bitmap Images labeled with as such PATH\_X\_Y where the X is the block number and the Y is the trial number. There will be 8 blocks with each one having 4 trials with the exception of block 6 where there is only one trial. Therefore, you will have a total of 29 Bitmap Images. As for text files, there will be a total of 30 and all but one will be labeled RAW\_X\_Y (with the X & Y variables meaning the same thing as above). The unique text file is labeled SUM\_SubjectID where the SubjectID is the same as the folder name for this subject. This unique file is the one you will be using to print this subject's data output.

### Printing the Data:

(Follow the steps to locating data above for the subject you are interested in printing.)

1. Select the data file labeled SUM\_SubjectID and open this file.
2. Under the FILE toolbar, select PAGE SETUP.
3. Under ORIENTATION, select 'Landscape' and click OK. (NOTE: This ensures that the data will print on one page as opposed to two and does not wrap the data which would decrease the readability.)
4. Under the FILE toolbar, select PRINT.
5. Select your printer and hit PRINT.
6. You should now have a printout of a spreadsheet containing this subject's data. Make sure this printout contains your subject's ID# and file it in the subject's file.

## NES3

### Locating Data:

Do a search for a Microsoft Access (.mdb) file entitled 'NES3'. More than likely it is located in a folder in your C drive entitled 'NES3'. If you have problems locating this file, please let us know. (NOTE: This .mdb file is the one you should be backing up on a regular basis as it contains all subject data for the NES3 tasks.)

### Scoring and Printing:

Use the 'NES3 CPT Data.xls' file (located on CIFASD website) to organize, save and print your NES3 CPT data.

## Visual Discrimination Reversal Learning

### Locating Data:

1. Go to your 'ReversalLearning' folder and click open. You can do a search for this folder on your computer if you are not sure where it is located. More than likely it is in your C:\Program Files unless you specifically saved it somewhere else.
2. Once in this folder, open the folder entitled 'Data'. (NOTE: This 'Data' folder is the one you should be backing up on a regular basis as it contains all subject output.)

### Printing:

(Follow the steps to locating data above for the subject you are interested in printing.)

1. Select the data file labeled SubjectID\_sumdata.txt and open this file.
2. Under the File menu, select Print.

## Hand Scoring Old RevLearn Data

The below details how to hand score every variable for the RevLearn using the subject's raw data file. All RevLearn subjects run before 4/22/05, will need to be hand scored to correct the Number of Reversals variable ONLY. All other variables on the summary data output are correct and do not need to be hand scored, but we are leaving all steps for reference below. An e-mail was sent to contact Dr. Mattson for the newest version of the RevLearn program on 4/22/05 to the CIFASD NB Core ListServ. Versions of the RevLearn program created after 4/22/05 all have the corrected calculation for this variable. The older versions of the program did not calculate this variable correctly and defaulted to giving all subjects a score of 3 on this variable.

1. To score Trials to Criterion (TTC), Commissions (COM), and Omissions (OM), open the subject's raw .txt file.
2. The trials to criterion per phase will come from the second column (labeled "TRL") in the raw data file, which is the running count of trials for the current phase. Just take the greatest number for each phase than add all those up to get "Total Trials." (NOTE: for the summary, Phase 1 is actually "PHASE" -1 in the raw data file, and goes up from there, i.e., Phase 2 = "PHASE" 0, Phase 3 = "PHASE" 1, etc.)
3. For commissions, if there's a response (1 in "RESP" column) and it's incorrect (INC in "EVAL" column) it's a commission error. Add up the total number of commissions per phase and then add all those up to get "Total Commission Errors."
4. For omissions, if there's no response (0 in "RESP" column) and it's incorrect (INC in "EVAL" column) it's an omission error. Add up the total number of omissions per phase and then add all those up to get "Total Omission Errors."
5. Use one of the two systems below to get the "Number of Reversals":
  - A. In the subject's raw file:
    - I. Determine how many phases subject completed in 30 trials after the end of phase 2 (listed as "PHASE" 1 in raw file). The maximum possible is 3.
  - B. Open the subject's summary file. Determine ***ONE*** of the following:
    - I. If the sum of the TTCs for phases 3, 4 & 5 is  $\leq 30$ , this variable is 3.
    - II. If the sum of the TTCs for phases 3 & 4 is  $\leq 30$ , this variable is 2.
    - III. If the total for phase 3 is  $\leq 30$ , this variable is 1.
    - IV. If the total for phase 3 is  $> 30$ , this variable is 0.If the # of reversals score is wrong in the summary file, delete the old number and replace it with the new number (do not delete any tabs or spaces, just the score itself). Make sure to save the changes before closing the file.



## Questionnaires

ASEBA Questionnaires: Use the computer scoring program that was provided to you to score the CBCL, YSR and TRF forms for each child. Be sure to use the child's CIFASD Global ID as the child's ID. If more than one score is circled and it is not clear which the respondent intended, input the higher of the two into the scoring program.

SCT Scale (Barkley Slug): Add up the total of each column with 1 point being given for each check mark. Place this total at the bottom of each column. The overall score will be the total of the 'often' and 'very often' columns. Please place this total in the lower right hand corner of the page and circle it. This is the raw score that will go in to the database.

Parent/Teacher DBD Rating Scale: Use the 'DBD Scoring Tool CIFASD' (located on the CIFASD website) to score this questionnaire. Directions provided on the first Excel workbook tab.

## Re-Checking System

Each file is to be scored by the examiner/tester and one other person (the re-checker). The tester is to score the file within 3 days of the testing session. The re-checker will score the file independently of the tester within 5 days of the tester's scoring.

The purpose of the re-checker is to carefully score the file as if they were the tester by using the re-checker form to calculate the child's scores on their own. While the re-checker will rely on information collected by the tester in the test packet, it is essential that they score the file ignoring the calculations and scoring judgments made by the tester. For example, the re-checker will need to rely on the words listed by the tester that the child responded with on D-KEFS Verbal Fluency, but the re-checker should decide on their own whether or not each word meets the scoring criteria and if not, which type of error it falls into. Other examples of things that the re-checker should score independently: the child's age (using the date of testing and date of birth provided by the tester), the Leiter-R FG raw score (by adding up the number of correct responses and coming up with the raw score NOT just simply transferring the raw score the tester calculated and looking up the scaled score), or verifying that the time listed for Grooved Pegs was converted properly into seconds. Reminder: These were just a few examples to demonstrate that anything the re-checker can score, they should do so independently (including raw scores).

The tester will complete the re-checker form (located on the following pages) test by test and score the entire file. Once they are finished, they will compare their scores to that of the tester and highlight any and all differences. They should also leave comments to the tester as needed to help explain the difference to the tester if the difference isn't obvious.

Within 4 days of the re-checkers scoring, the tester will look at the re-checker sheet highlights and comments and finalize the file by correcting any obvious mistakes and making judgments on those items with differences. It is essential that the tester communicate with the re-checker regarding any differences that are unclear on the re-checker form.

After the file's scores are finalized, they are ready to be entered into the CIFASD Neurobehavioral Access Database. Data should be submitted to the informatics core weekly.

There are certain tests that require a lot of the examiner and it is strongly suggested that you videotape each child's testing session so that you can review the tapes later if necessary. The tester may also request that the re-checker review a portion of the tape if the child has done something unique that that tester feels the re-checker should view as well. There are blanks on the re-checker form for the tester to request the re-checker to review the videotape for the following tests: PPT, FL and D-KEFS VF. The tester should note which portion of the test they are requesting the re-checker to review in that area of the re-checker form. Tape review request for other tests may be made by the tester as well in the margin near that test.



**Progressive Planning Test:** Request to Review Tape (by Tester): Y N  
 Date of Video Review (if requested): \_\_\_\_\_

**Max. Const. Cond.**

Mean Latency (1<sup>st</sup> Trial): \_\_\_\_\_  
 Mean Total Time (Successful Trials): \_\_\_\_\_  
 Total Rules Broken: \_\_\_\_\_  
 1<sup>st</sup> Trial Score (**Bold** Only!): \_\_\_\_\_  
 Total Score (All Trials): \_\_\_\_\_

**Min. Const. Cond.**

Mean Latency: \_\_\_\_\_  
 Mean Total Time: \_\_\_\_\_  
 Pass/Fail Total: \_\_\_\_\_  
 Total Rules Broken: \_\_\_\_\_  
 Total X Equations: \_\_\_\_\_

**Additional PPT Variables (added 1/10/06):**

Number of cards (#1-12) solved on the 1st trial: \_\_\_\_\_  
 Number of cards (#1-12) solved (on any trial): \_\_\_\_\_  
 Number of cards #1 - 4 solved (on any trial): \_\_\_\_\_  
 Number of cards #5-8 solved (on any trial): \_\_\_\_\_

**Finger Localization:** Request to Review Tape (by Tester): Y N  
 Date of Video Review (if requested): \_\_\_\_\_

A.	UC R	UC L	UC T	C R	C L	C T
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
B.						
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
C.						
# Final Errors (X)						
# Initial Errors						
# >1 Response						
# Incorrect Hand (*)						
# Inversion Errors						

**D-KEFS Verbal Fluency:** Request to Review Tape (by Tester): Y N  
 Date of Video Review (if requested): \_\_\_\_\_

\*Use the attached form to transfer raw scores into scaled scores for the D-KEFS VF test. Complete the entire form including the optional measures.

Use the space below for raw scoring comments.

E: Animals:

A: Boy's Names:

S: Fruits/Furniture:

**D-KEFS Trail Making:**

\*Use the attached form to transfer raw scores into scaled scores for the D-KEFS Trails test. Complete the entire form including the optional measures.

Use the space below for raw scoring:

<u>Condition</u>	<u>Time</u>	<u>Error Type:</u>		<u>Time D/C</u>
		<u>Omissions</u>	<u>Commissions</u>	
Visual Scanning (1):	_____	<u>Sequence</u>	<u>Set Loss</u>	_____
Number Sequencing (2):	_____	_____	_____	_____
Letter Sequencing (3):	_____	_____	_____	_____
Number-Letter Switching (4):	_____	_____	_____	_____
Motor Speed (5):	_____			_____

**VMI -5:** \* Use the attached form to score the VMI.

**Leiter-R Attention Sustained Subtest – Booklet C**  
(The Drawing Game)

<u>Item</u>	<u>Time</u> (min.)	<u>Description/Cues</u>	<u>Total</u> <u>Marks</u>	–	<u>Number</u> <u>Correct</u>	=	<u>Number</u> <u>Errors</u>
<b>Part 1</b> AS T9	<b>Child's approach to Part 1:</b> 2:00	Training – Not Scored	Rows		Columns		Random
<b>AS9</b>	<b>0:30</b>	<b>Scored</b>	[32]*	_____	_____		_____
<b>Part 2</b> AS T10	<b>Child's approach to Part 2:</b> 0:30	Training – Not Scored	Rows		Columns		Random
<b>AS10</b>	<b>0:30</b>	<b>Scored</b>	[64]	_____	_____		_____
<b>Part 3</b> AS T11	<b>Child's approach to Part 3:</b> 0:30	Training – Not Scored	Rows		Columns		Random
<b>AS11</b>	<b>1:00</b>	<b>Scored</b>	[69]	_____	_____		_____
<b>Part 4**</b> AS T12	<b>Child's approach to Part 4:</b> 0:30	Training – Not Scored	Rows		Columns		Random
<b>AS12</b>	<b>1:00</b>	<b>Scored</b>	[52]	_____	_____		_____

**Total Number** (Parts 1-4) **Correct** [217] & **Errors** **Raw Scores:** \_\_\_\_\_  
(Use Appendix C)

**Total Number** (Parts 1-4) **Correct** & **Errors** **Scaled Scores:** \_\_\_\_\_  
↓

\*Note: Numbers in [brackets] indicate the maximum possible of correct responses for this item.

**AS Adjusted Raw Score** = Total # Correct \_\_\_\_\_ – Total # Errors \_\_\_\_\_ = \_\_\_\_\_  
If the adjusted AS raw score value is less than zero enter NEG. (Use Appendix B)

**AS Adjusted Scaled Score:** ↓ \_\_\_\_\_

\*\***Quadrant scores for AS12** (Use Appendix H):

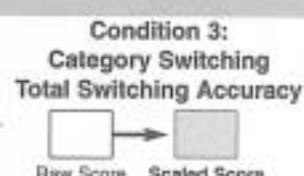
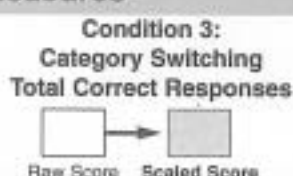
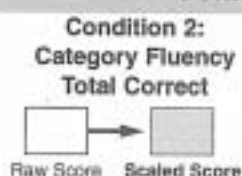
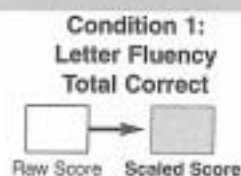
Raw: UL = \_\_\_\_\_ LL = \_\_\_\_\_ UR = \_\_\_\_\_ LR = \_\_\_\_\_

Cum. %: UL = \_\_\_\_\_ LL = \_\_\_\_\_ UR = \_\_\_\_\_ LR = \_\_\_\_\_

**Notes on Child's Approach:** The author's of the manual have indicated (pg. 118) that noting the process by which the child accomplishes this task (i.e. focused vs. disorganized) may be an important clinical observation. Please note the manner in which the child completed the majority of items for each individual part of the Attention Sustained subtest and any other observations you feel will be helpful. For example, Part 2: Child's approach was in columns from top to bottom always starting in the left upper corner of the page.

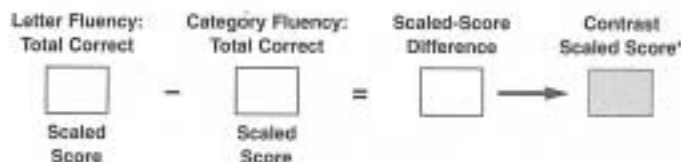
# D-KEFS Verbal Fluency Test: Summary of Scores

## Primary Measures

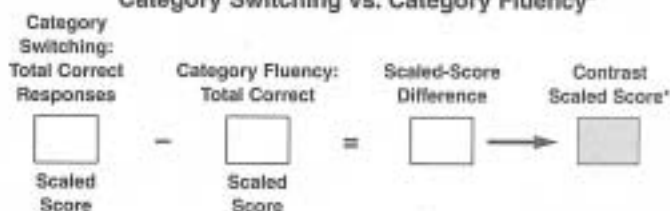


## Primary Contrast Measures

### Letter Fluency vs. Category Fluency\*



### Category Switching vs. Category Fluency\*



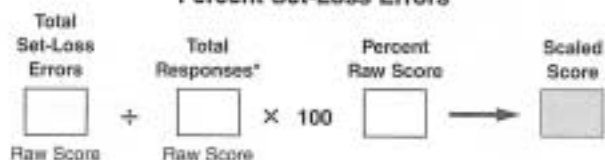
\* A low or high contrast scaled score may reflect different cognitive problems; see examiner's manual.

## Optional Measures: Conditions 1-3 Combined

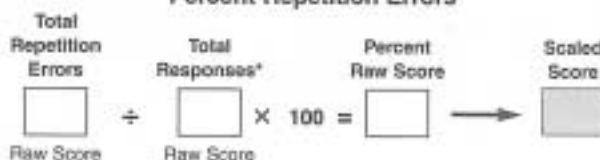
	Condition 1: Letter Fluency Raw Score	+	Condition 2: Category Fluency Raw Score	+	Condition 3: Category Switching Raw Score	=	Total Raw Score	Scaled Score
First Interval (1"-15"): Total Correct	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Second Interval (16"-30"): Total Correct	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Third Interval (31"-45"): Total Correct	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Fourth Interval (46"-60"): Total Correct	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Set-Loss Errors	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Repetition Errors	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	<input type="text"/>
Total Responses (Correct + Incorrect)*	<input type="text"/>		<input type="text"/>		<input type="text"/>		<input type="text"/>	

\* Note: Some repetition errors are coded also as set-loss errors; each double-coded error counts as only one response for the total responses measure.

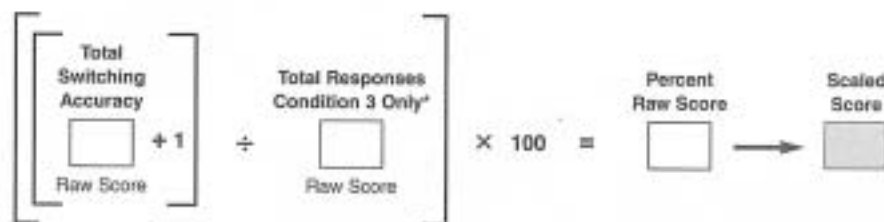
### Percent Set-Loss Errors



### Percent Repetition Errors



### Category Switching: Percent Switching Accuracy (Condition 3 Only)

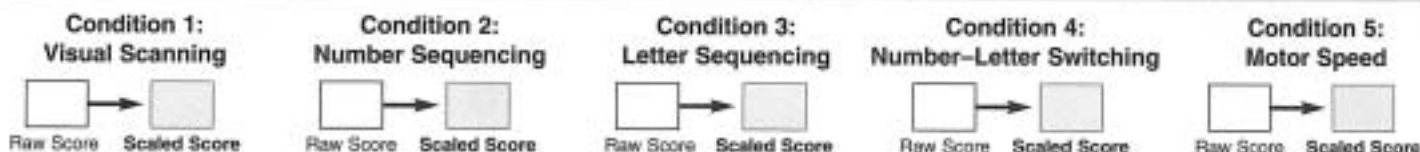


\* Note: Some repetition errors are coded also as set-loss errors; each double-coded error counts as only one response for the total responses measure.

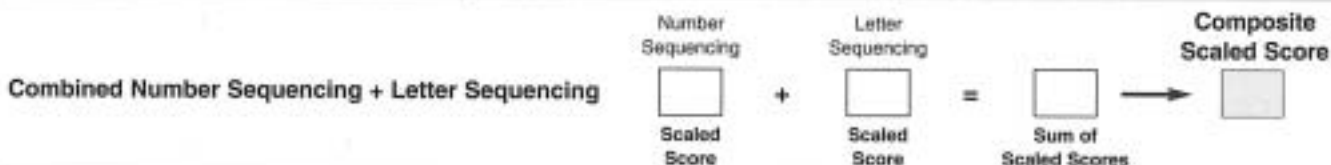


# D-KEFS Trail Making Test: Summary of Scores

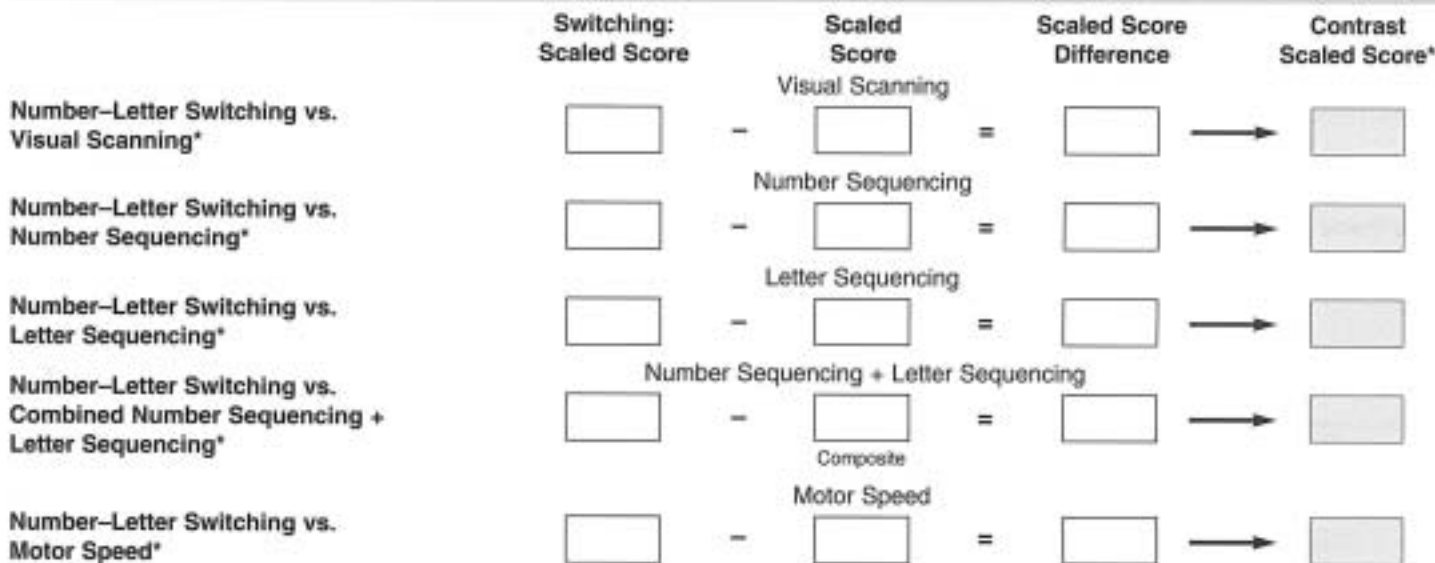
## Primary Measures: Completion Times



## Primary Combined Measure: Completion Times

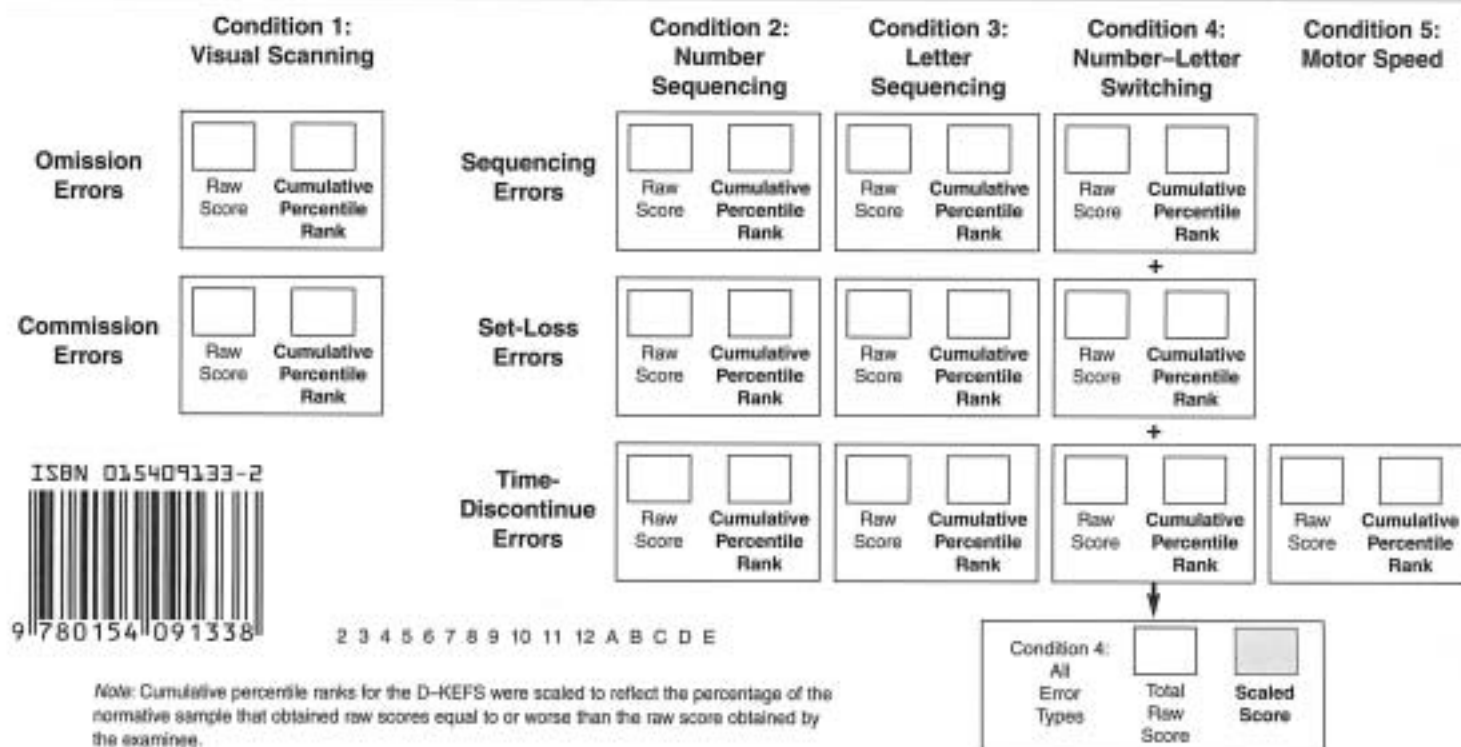


## Primary Contrast Measures: Completion Times



\* A low or high contrast scaled score may reflect different cognitive problems; see examiner's manual.

## Optional Measures: Error Analysis



Note: Cumulative percentile ranks for the D-KEFS were scaled to reflect the percentage of the normative sample that obtained raw scores equal to or worse than the raw score obtained by the examinee.

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2 3 4 5 6 7 8 9 10 11 12 A B C D E

### VMI-5 SCORING SHEET

<u>Item:</u>	<u>Score (1/0)</u>	<u>Item:</u>	<u>Score (1/0)</u>
**1.	_____	16.	_____
**2.	_____	17.	_____
**3.	_____	18.	_____
*4.	_____	19.	_____
*5.	_____	20.	_____
*6.	_____	21.	_____
7.	_____	22.	_____
8.	_____	23.	_____
9.	_____	24.	_____
10.	_____	25.	_____
11.	_____	26.	_____
12.	_____	27.	_____
13.	_____	28.	_____
14.	_____	29.	_____
15.	_____	30.	_____

Items only given when necessary (otherwise full credit is awarded for #1-6): Total Score \_\_\_\_\_

\*\* Marking and Scribbling Items

Std. Score \_\_\_\_\_

\* Imitation Items

Percentile \_\_\_\_\_

Age Equiv. \_\_\_\_\_