



WMS[®]-IV
Flexible Approach

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Objectives

- ◆ Describe the WMS[®]-IV Flexible Approach Batteries.
- ◆ Describe available subtest combinations clinicians can use to derive Index scores for Immediate, Delayed, Visual, and Auditory Memory.

WMS-IV Flexible Approach

- ◆ The WMS-IV Flex was developed specifically to address some customers concerns regarding the length of administration time when using the entire WMS-IV.
- ◆ The WMS-IV Flex uses existing data from the WMS-IV standardization and tryout. No new data were collected.

WMS-IV Flexible Approach

- ◆ Provides examiners with multiple short-forms to reduce testing time
- ◆ Visual working memory subtests are optional. Use those tests:
 - Concerns about language ability
 - Limited English proficiency
 - Spoiled administration of WAIS-IV Auditory Working Memory Measures

WMS-IV Flexible Approach

WMS-IV
Standard Battery
(IMI DMI AMI VMI VWMI)

WMS-IV Older Adult /
Abbreviated Battery
(IMI DMI AMI VMI)

Logical Memory / Visual
Reproduction Battery
(IMI DMI AMI VMI)

Logical Memory / Designs
Battery
(IMI DMI AMI VMI)

Visual Reproduction /
Logos Battery
(IMI DMI VMI)

Logos / Names Battery
(IMI DMI VMI)

WMS-IV: Standard Battery

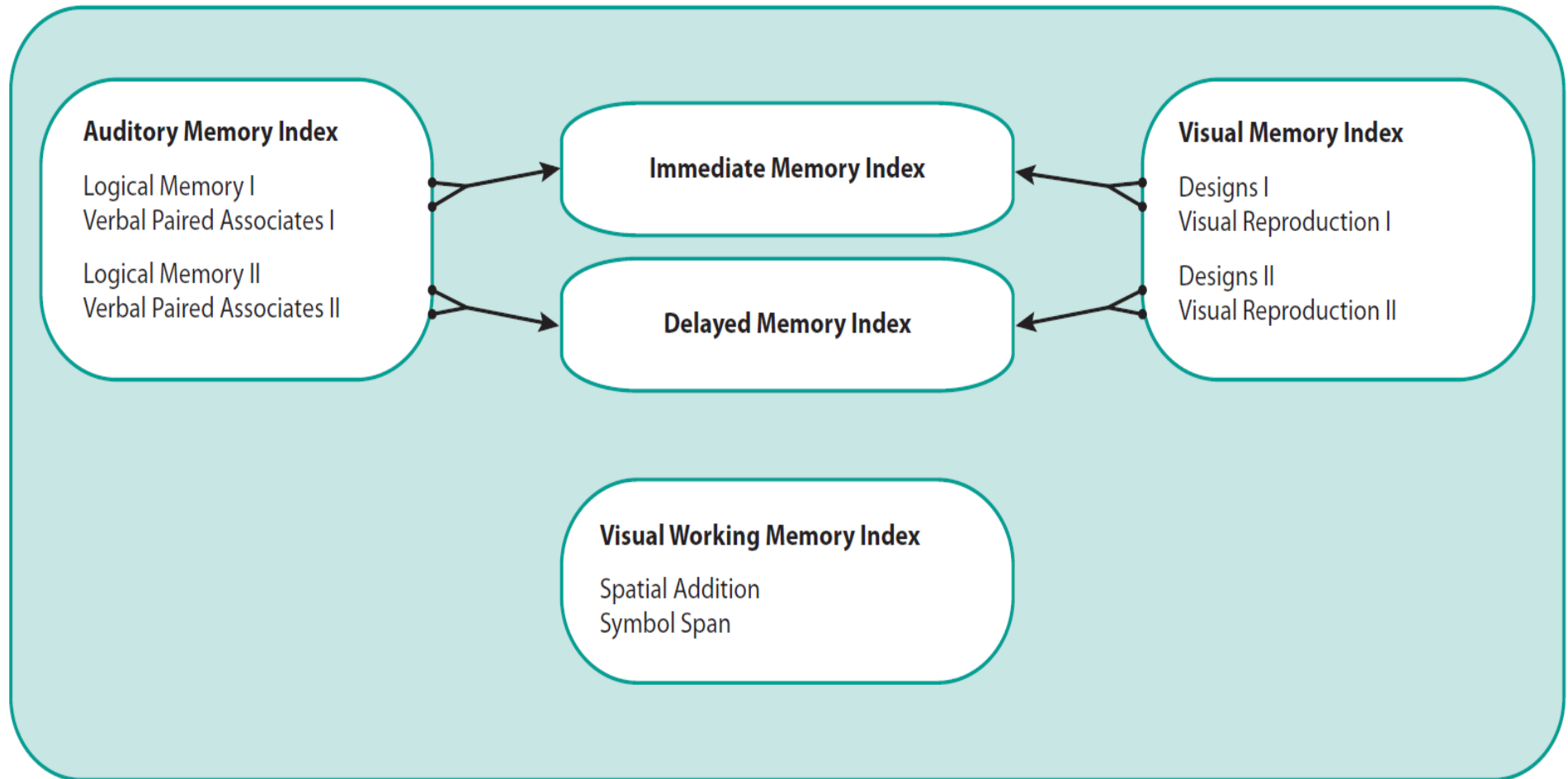


Figure 1.1 Test Framework of the WMS-IV: Adult Battery

Ages 16-69

Subtests

Auditory Memory	
Logical Memory	This subtest assesses narrative memory under a free recall condition.
Verbal Paired Associates	This subtest assesses verbal memory for associated word pairs.

Subtests

Visual Memory	
Visual Reproduction	This subtest assesses memory for nonverbal visual stimuli.
Designs	This subtest assesses spatial memory for unfamiliar visual material.

Subtests

Visual Working Memory	
Spatial Addition	This subtest assesses visual-spatial working memory using a visual addition task.
Symbol Span	This subtest assesses visual working memory using novel visual stimuli.

WMS-IV: Older Adult Battery

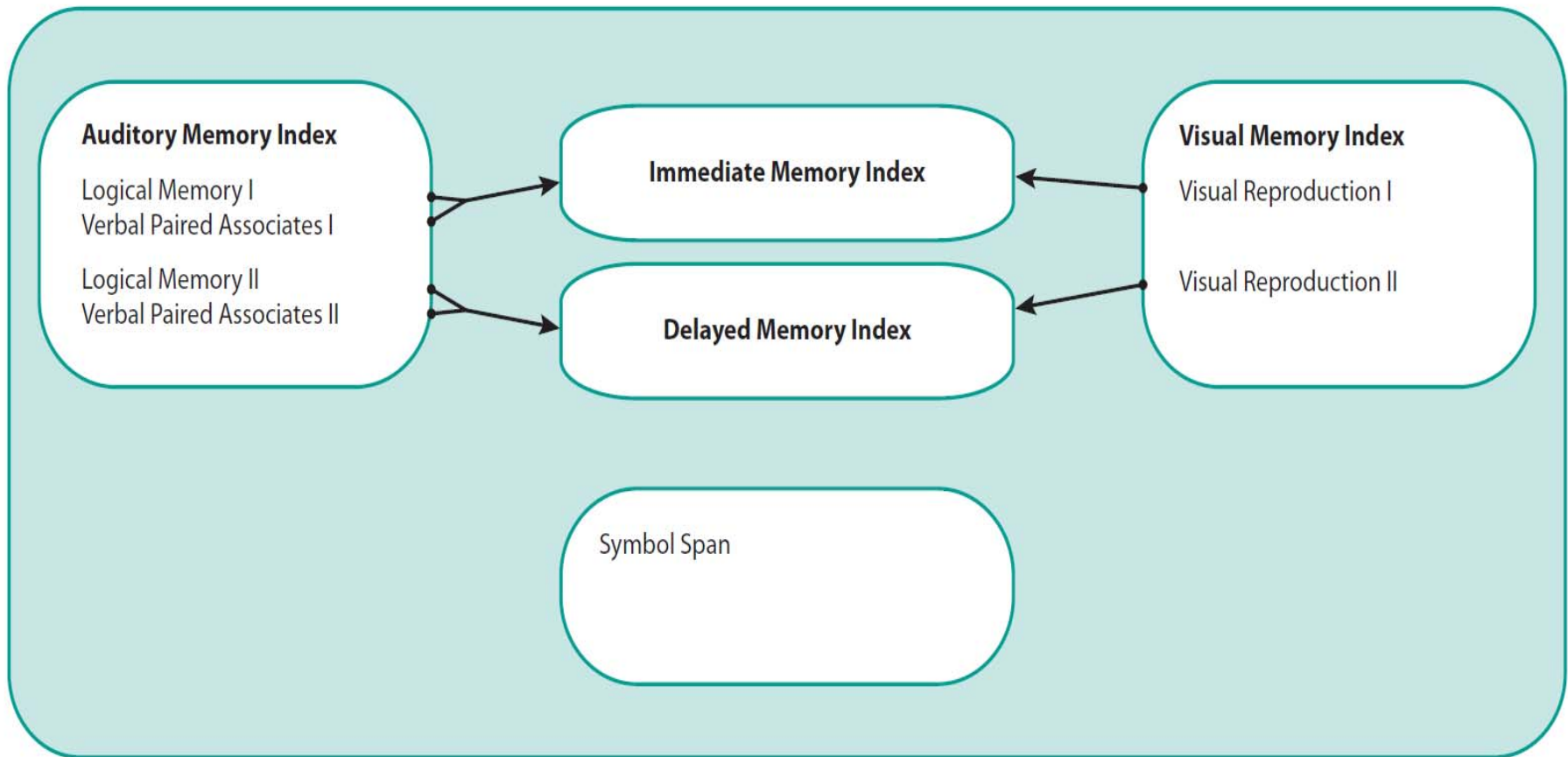
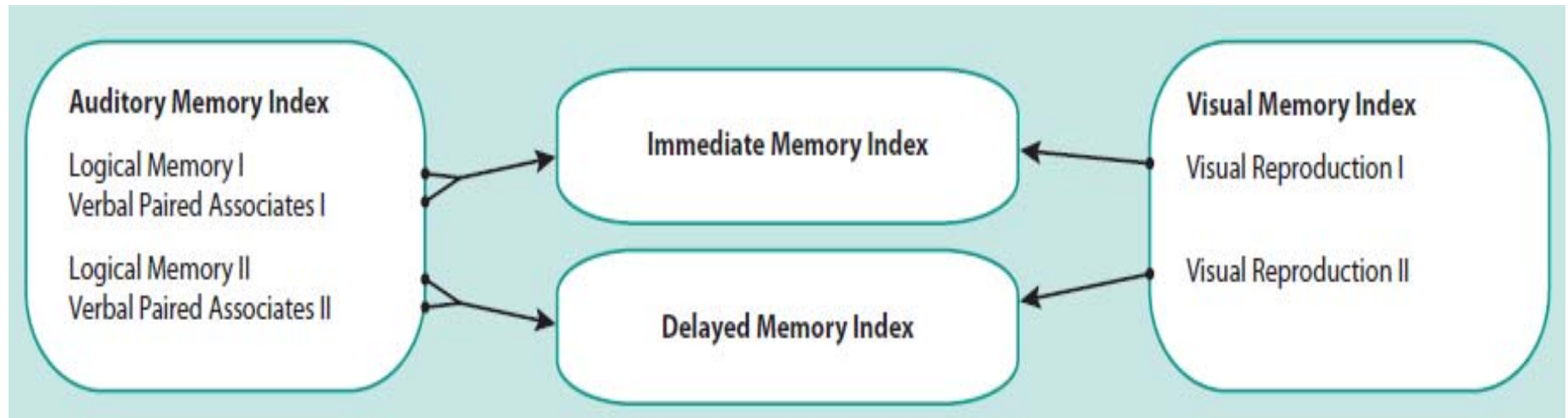


Figure 1.2 Test Framework of the WMS-IV: Older Adult Battery

Ages 65-90

Older Adult/Abbreviated Battery

WMS-IV Flex



No contrast score support
Limited comparisons to WAIS-IV GAI
(simple difference only)

Older Adult/Abbreviated Battery

Expansion of Older Adult Battery configuration to ages 16-64

- The subtests used do not change; the Adult Battery version of LM and VPA are used for the OAA.

LM + VR Battery

Logical Memory + Visual Reproduction only option

- Initial WMS-IV research indicated that many examiners used only LM and VR from WMS-III
- On-going research often uses only LM and VR
- Subtests most widely associated with WMS

LM + VR Battery

- ◆ Auditory Memory = LM I + LM II
- ◆ Visual Memory = VR I and VR II
- ◆ Immediate Memory = LM I + VR I
- ◆ Delayed Memory = LM II + VR II
- ◆ No contrast scores
- ◆ Limited Comparison with WAIS-IV GAI
- ◆ Separate Record Form



Record Form (LMVR)

Examinee Name: _____

Examiner Name: _____

LM + DE Battery

- ◆ Logical Memory + Designs
 - Some examiners do not like the motor demands of VR but still want a shorter battery
 - Designs more sensitive to some disorders (e.g. TBI)
- ◆ Shorter battery makes using Designs easier
- ◆ We also have a new design grid that will be produced - it was developed to be less susceptible to tearing than the current grid

LM + DE Battery

- Auditory Memory - LM I + LM II
- Visual Memory - DE I and DE II
- Immediate Memory - LM I + DE II
- Delayed Memory - LM II + DE II
- No contrasts
- Limited comparison to WAIS-IV GAI

VR + LOGOS Battery

- ◆ Optional Visual Memory Indexes - VR + LOGOS
- ◆ LOGOS - new subtest originally developed to be part of the WMS-IV, but dropped at tryout due to administration length of the core battery.

WMS-IV Flex LOGOS

- ◆ Auditory-visual association memory task designed to measure similar memory functions as Family Pictures
- ◆ Does not require a verbal response but therefore relies on recognition memory
- ◆ Multiple learning trials
- ◆ Examinee sees a design (LOGO) and is told the company's name (nonsense word) associated with that specific LOGO

LOGOS

- Company names: Examples: Hastren, Shoming, Ecag, Drogant
- 14 names provided
- 2 items are self-generated
- After 1st learning trial, examinees presented with a page with 8 LOGOS, 4 correct and 4 distractors

LOGOS

- The examinee is given the company name and must point to the correct LOGO
- 3 additional pages are presented for a total of 16 items
- There are 3 learning trials and 1 delayed recognition trial

LOGOS

Administration

“I am going to show you some logos, one at a time.

For each logo, I will say a company name.

After I say the company name, I want you to say the company name.

Try to remember all the logos and the companies.

I will show you the logos and read the company names three times so you will have several chances to learn each company name and the logo that goes with it.”

WMS-IV Flex Names

- ◆ This test appears in the ACS
- ◆ Only difference is expanded age range - up to age 90
- ◆ Memory for Names
 - Examinee sees a child's face and is told the child's first and last name and an activity they like to do
 - Later, examinee sees a group of faces and must say the child's first and last name and activity

WMS-IV Flex Names

- ◆ The names subtest is an auditory-visual association memory measure
- ◆ Designed to measure visual-semantic and visual-proper name memory association memory-also a measure of face memory
- ◆ No motor involvement

WMS-IV Flex Names

- ◆ Is both recognition memory and free recall
- ◆ 3 immediate learning trials and 1 delayed recall trial
- ◆ 10 faces, examinee self-generates information for 2 of the faces

Names - Record Form

Immediate Recall

Trial 1

Item	First Name	Last Name	Activity
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Trial 1

Item	Proper Name			Activity	
*1.	0	1	2	0	1
2.	0	1	2	0	1
3.	0	1	2	0	1
4.	0	1	2	0	1
*5.	0	1	2	0	1
6.	0	1	2	0	1
7.	0	1	2	0	1
8.	0	1	2	0	1
9.	0	1	2	0	1
10.	0	1	2	0	1

WMS-IV Flex LOGOS and Names

Reliability

LO I	.85 - .95
LO II	.70 - .92
NA I	.84 - .94
NA II	.81 - .90

WMS-IV Flex LOGOS and Names

Optional Index combinations

- LOGOS + Visual Reproduction
 - ◆ Alternate Visual Memory Index
 - ◆ Alternate Immediate Visual Memory Index
 - ◆ Alternate Delayed Visual Memory Index
 - ◆ No comparison with WMS-IV and WAIS-IV

WMS-IV Flex LOGOS and Names

Optional Index combinations

- LOGOS + Names
 - ◆ Auditory-Visual Memory Index
 - ◆ Auditory-Visual Immediate Memory Index
 - ◆ Auditory-Visual Delayed Memory Index
 - ◆ No comparison with WMS_IV or WAIS-IV

WMS-IV Flex LOGOS and Names

Table 3.10 Intercorrelations of ACS Faces, WMS–IV Primary, and WMS–IV Supplemental Subtests (All Ages)

Score	NA I	NA II	LO I	LO II	VR I	VR II	FA I	FA II	DE I ^a	DE II ^a
NA I										
NA II	.89									
LO I	.48	.51								
LO II	.43	.49	.76							
VR I	.36	.35	.42	.50						
VR II	.35	.35	.35	.37	.57					
FA I	.47	.44	.34	.36	.40	.27				
FA II	.46	.49	.48	.47	.49	.38	.76			
DE Ia	.30	.25	.31	.24	.35	.29	.36	.33		
DE IIa	.30	.27	.27	.20	.31	.34	.39	.36	.66	

Note. See Frequently Used Abbreviations on page [xiii](#) for subtest and index abbreviations.

^aDE I and DE II estimates are based on a different version than the final edition but with the same scoring and administration rules.

WMS-IV Flex TBI Results

Table 3.7 Mean Performance of Traumatic Brain Injury and Matched Control Groups on Alternate Indexes Using WMS-IV Primary Subtests

Alternate WMS-IV Index	Traumatic Brain Injury		Matched Control		Group Mean Comparison			Standard Difference ^a
	Mean	SD	Mean	SD	Difference	t value	p value	
IMI (OAA)	82.5	17.3	101.7	15.6	19.16	4.72	<.01	1.16
DMI (OAA)	79.1	19.5	100.9	16.5	21.84	4.69	<.01	1.21
VMI (VR)	86.1	20.4	101.3	14.7	15.19	3.39	<.01	0.85
IMI (LMVR)	87.7	18.3	102.3	14.7	14.56	3.45	<.01	0.88
DMI (LMVR)	82.1	21.0	100.4	16.6	18.31	3.67	<.01	0.97
AMI (LM)	85.9	20.7	100.8	15.3	14.81	3.23	<.01	0.81
IMI (LMDE)	82.7	20.2	102.5	14.4	19.80	4.84	<.01	1.13
DMI (LMDE)	78.2	22.7	100.6	12.8	22.40	4.69	<.01	1.22
VMI (DE)	81.5	21.1	101.0	12.2	19.52	4.44	<.01	1.13

Note. See Frequently Used Abbreviations on page [xiii](#) for subtest and index abbreviations.

WMS-IV Flex Alzheimer's Results

Table 3.6 Mean Performance of Probable Dementia of the Alzheimer's Type and Matched Control Groups on Alternate Indexes Using WMS-IV Primary Subtests

Alternate WMS-IV Index	Probable Dementia of the Alzheimer's Type		Matched Control		Group Mean Comparison			Standard Difference ^a
	Mean	SD	Mean	SD	Difference	t value	p value	
IMI (LMVR)	74.3	19.0	105.7	14.9	31.40	9.64	<.01	1.84
DMI (LMVR)	62.3	20.0	102.9	15.0	40.65	10.87	<.01	2.30
AMI (LM)	70.7	19.3	105.0	15.7	34.31	9.67	<.01	1.95
VMI (VR)	—	—	—	—	—	—	—	—

Note. See Frequently Used Abbreviations on page [xiii](#) for subtest and index abbreviations.

^aStandard difference is Cohen's *d*, computed as the difference of the two test means divided by the square root of the pooled variance (Cohen, 1988, p. 20 and 44).

WMS-IV Flex Alternate Subtests TBI Results

Table 3.12 Mean Performance of Traumatic Brain Injury and Matched Control Groups on Supplemental Subtests and Alternate Indexes Using Supplemental Subtests

Alternate WMS-IV Score	Traumatic Brain Injury		Matched Control		Group Mean Comparison			Standard Difference ^a
	Mean	SD	Mean	SD	Difference	<i>t</i> value	<i>p</i> value	
Subtest								
LO I	8.2	3.8	10.2	2.9	1.95	2.19	.04	0.58
LO II	8.3	3.9	10.4	2.4	2.10	2.56	.02	0.65
NA I	7.4	3.4	10.7	3.0	3.25	4.09	<.01	1.01
NA II	7.6	3.3	10.7	3.1	3.04	4.44	<.01	0.95
NA Proper Names	7.4	3.5	10.5	3.2	3.17	4.20	<.01	0.95
NA Activity	8.0	3.6	10.7	2.8	2.67	2.98	<.01	0.83
Index								
VMI (VRLO)	89.3	21.8	101.3	12.7	12.00	2.37	.03	0.67
VIMI (VRLO)	90.6	19.4	100.4	12.0	9.73	2.04	.05	0.60
VDMI (VRLO)	90.2	22.0	101.7	13.2	11.50	2.35	.03	0.63
AVMI (LONA)	86.8	19.1	103.3	15.9	16.50	4.20	<.01	0.94
AVIMI (LONA)	88.0	19.2	102.3	15.7	14.27	3.33	<.01	0.81
AVDMI (LONA)	88.0	19.3	103.6	15.0	15.60	4.29	<.01	0.90

Note. See Table 3.1 for subtest and index abbreviations.

^aStandard difference is Cohen's *d*, computed as the difference of the two test means divided by the square root of the pooled variance (Cohen, 1988, pp. 20 and 44).

WMS-IV Flex Alternate Subtests Alzheimer's Results

Table 3.11 Mean Performance of Probable Dementia of the Alzheimer's Type and Matched Control Groups on Supplemental Subtests and Alternate Indexes Using Supplemental Subtests

Alternate WMS-IV Score	Probable Dementia of the Alzheimer's Type		Matched Control		Group Mean Comparison			Standard Difference ^a
	Mean	SD	Mean	SD	Difference	t value	p value	
Subtest								
LO I	5.1	3.1	10.8	3.3	5.67	5.73	<.01	1.77
LO II	5.9	3.1	10.6	3.5	4.73	5.29	<.01	1.43
NA I	6.3	2.1	10.8	3.0	4.47	6.34	<.01	1.73
NA II	6.5	1.8	10.0	3.3	3.48	4.23	<.01	1.31
NA Proper Names	6.6	2.3	10.5	3.0	3.83	4.98	<.01	1.43
NA Activity	6.4	1.9	10.5	2.8	4.08	5.14	<.01	1.71
Index								
AVMI (LONA)	74.8	11.5	103.1	16.0	28.31	6.64	<.01	2.03
AVIMI (LONA)	75.6	12.8	105.4	14.9	29.85	7.06	<.01	2.15
AVDMI (LONA)	77.6	11.3	102.7	16.7	25.17	6.20	<.01	1.77

Note. See Table 3.1 for subtest and index abbreviations.

^aStandard difference is Cohen's *d*, computed as the difference of the two test means divided by the square root of the pooled variance (Cohen, 1988, pp. 20 and 44).



Alternate Indexes Worksheet (Ages 16–69)

Examinee's Test Age		
Year	Month	Day
<input type="text"/>	<input type="text"/>	<input type="text"/>

Examinee Name: _____

Examiner Name: _____

Total Raw Score to Scaled Score Conversion

Subtest	Raw Score	Scaled Score							
		Immediate Memory (OAA)	Delayed Memory (OAA)	Auditory Memory	Visual Memory (VR)	Immediate Memory (LMDE)	Delayed Memory (LMDE)	Auditory Memory (LM)	Visual Memory (DE)
Logical Memory I	<input type="text"/>								
Logical Memory II	<input type="text"/>								
Verbal Paired Associates I	<input type="text"/>								
Verbal Paired Associates II	<input type="text"/>								
CVLT-II Trials 1-5	<input type="text"/>	()		()					
CVLT-II Long-Delay	<input type="text"/>		()	()					
Designs I	<input type="text"/>								
Designs II	<input type="text"/>								
Visual Reproduction I	<input type="text"/>								
Visual Reproduction II	<input type="text"/>								
Sum of Scaled Scores to Index Conversion		Immediate Memory (OAA)	Delayed Memory (OAA)	Auditory Memory	Visual Memory (VR)	Immediate Memory (LMDE)	Delayed Memory (LMDE)	Auditory Memory (LM)	Visual Memory (DE)
Sum of Scaled Scores	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Index Score	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Percentile Rank	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> 90% or <input type="checkbox"/> 95% Confidence Interval	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Alternate Indexes Worksheet (Ages 16–69)

Process Score Conversion

Process Scores	Raw Score	Scaled Score	Cumulative Percentage
LM II Recognition	<input type="text"/>		<input type="text"/>
VPA II Recognition	<input type="text"/>		<input type="text"/>
VPA II Word Recall	<input type="text"/>	<input type="text"/>	
DE I Content	<input type="text"/>	<input type="text"/>	
DE I Spatial	<input type="text"/>	<input type="text"/>	
DE II Content	<input type="text"/>	<input type="text"/>	
DE II Spatial	<input type="text"/>	<input type="text"/>	
DE II Recognition	<input type="text"/>		<input type="text"/>
VR II Recognition	<input type="text"/>		<input type="text"/>
VR II Copy	<input type="text"/>		<input type="text"/>

Alternate Indexes Worksheet (Ages 16–69)

Index Discrepancy Comparisons

	Score 1		Score 2		Difference	Significance Level .15 or .05 Critical Value	Significant Difference	Base Rate
IMI (OAA) – DMI (OAA)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
AMI – VMI (VR)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
IMI (LMDE) – DMI (LMDE)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
AMI (LM) – VMI (DE)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>

Alternate Indexes Worksheet (Ages 16–69)

Ability-Memory Analysis

WAIS–IV GAI / WMS–IV Discrepancy Analysis Using Simple-Difference Method

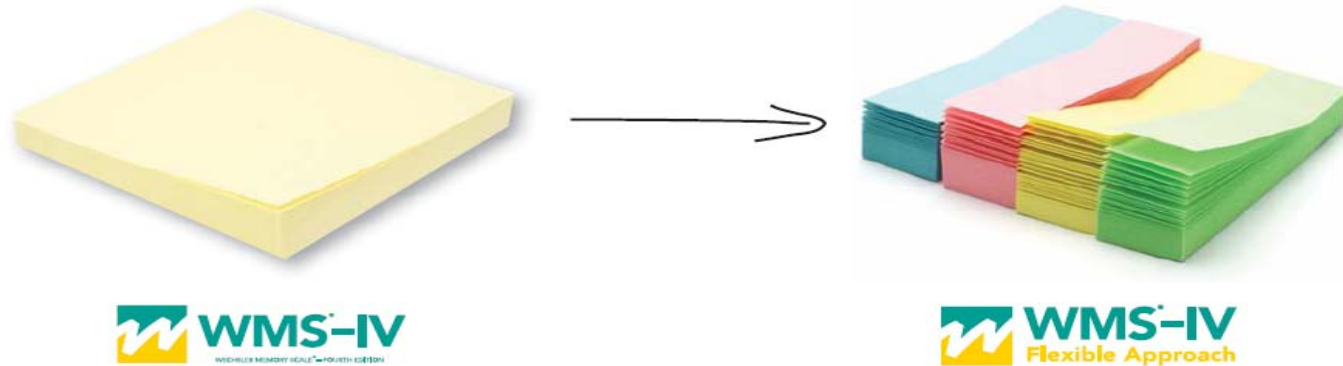
	WAIS–IV GAI Score	–	WMS–IV Alternate Index Score	=	Difference	Significance Level .05 or .01 Critical Value	Significant Difference	Base Rate
IMI (OAA)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
DMI (OAA)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
AMI	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
VMI (VR)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
IMI (LMDE)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
DMI (LMDE)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
AMI (LM)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>
VMI (DE)	<input type="text"/>	–	<input type="text"/>	=	<input type="text"/>	<input type="text"/>	Y or N	<input type="text"/>

Summary

- ◆ Short Forms are less reliable and not as clinically sensitive as longer forms; however reliabilities and sensitivity are still quite good.
- ◆ Some short forms are less sensitive than others and depends on the clinical group being tested.
- ◆ New subtests based on tryout version and would have changed if carried to standardization; however, they still show good reliability.

Introducing the WMS[®]-IV Flexible Approach

Brief. Adaptable. Efficient.



Comments or Questions

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