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# 2009

## ASSESSING INTELLECTUAL DISABILITIES WITH THE SPANISH WAIS-III, PUERTO

### RICO



ESCALA DE INTELIGENCIA WECHSLER PARA ADULTOS® - TERCERA EDICIÓN

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## Agenda

- Definitions
- Background and significance
- Study aim
- Project and CD study methods
- Project and CD study results
- Conclusions



- Intelligence

- A global concept that involves an individual's ability to act purposefully, think rationally, and ***deal effectively*** with the environment (Wechsler, 1958).
- Intelligence is not a single, unitary ability, but rather a composite of several functions. The term denotes that combination of ***abilities required for survival and advancement*** within a particular culture (Anastasi, 1992, p. 613).



- **Intellectual Disability**

- ID is characterized by significant limitations both in intellectual functioning and in adaptive behavior as expressed in conceptual, social, and practical adaptive skills. This disability originates before age 18. (American Association on Intellectual and Developmental Disabilities AAIDD)





## Background and Significance

- Assessment of Puerto Rican adults with Intellectual disabilities prior to 2008
  - use of outdated EIWA (Wechsler, 1968)
    - In PR & Continental USA
  - EIWA banned in Massachusetts.
  - Reason: Inflated IQ scores
    - Flynn Effect: 3 IQ points per decade.
- Implications:
  - Many Latino adults with ID did not qualify for social or health services, benefits or rehabilitation placements.



**Table 1**  
**Correlation Coefficients between the scores obtained on the Puerto Rican EIWN-R and the EIWA by Subtest and by Verbal, Performance, and Full Scales (n = 31).**

Subtests	EIWN-R-PR				EIWA	
	r <sup>a</sup>	r <sup>b</sup>	X	s.d.	X	s.d.
<b>Information</b>	.81	.92	9.32	3.24	10.81	1.99
<b>Similarities</b>	.69	.89	9.90	2.87	12.19	1.76
<b>Arithmetic</b>	.74	.77	10.42	3.13	11.65	2.81
<b>Vocabulary</b>	.81	.91	9.03	3.48	11.90	2.09
<b>Comprehension</b>	.55	.80	9.45	3.11	10.45	2.01
<b>Digit Span</b>	.51	.79	9.90	3.10	12.29	1.94
<b>Picture Completion</b>	.32	.84	10.29	2.65	13.35	1.45
<b>Picture Arrangement</b>	.50	.77	8.71	2.72	13.29	2.02
<b>Block Design</b>	.66	.79	10.16	2.38	13.29	2.34
<b>Object Assembly</b>	.40	.78	10.19	2.98	14.03	1.65
<b>Digit-Symbol Coding</b>	.54	.79	10.48	3.12	14.19	2.02
<b>Verbal Scale</b>	.87	.95	97.45	16.54	110.10	9.03
<b>Performance Scale</b>	.55	.91	99.58	14.00	117.16	6.80
<b>Full Scale</b>	.84	.96	98.39	16.19	114.03	7.45

*Note:* Every correlation presented in this table reached a significance level of .01 except for the correlation between Object Assembly, which reached a significance level of .05, and the correlation of Picture Completion which was not significant.

a) Originally obtained correlation

b) Correlation obtained to correct for the impact created by the dispersion of the EIWA.



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## Aim of ID Study

**To determine the clinical usefulness of the Spanish version of the WAIS-III in assessing intellectual disabilities in Puerto Rican adolescents and adults.**

Note: This is one of the multiple psychometric studies conducted to determine the validity and reliability of the new EIWA-III





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# EIWA-III

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## METHOD

### I. EIWA-III PROJECT

### II. INTELLECTUAL DISABILITY STUDY



# EIWA-III PROJECT

- Translation of the WAIS-III to Spanish.
  - Goal of translation: Neutral Spanish.
- Cultural Adaptation:
  - Revision of verbal and non-verbal items (e.g. Pict. C.)
- Pilot Study (N = 216. F = 120 M = 96)
  - Item Analysis: levels of difficulty and discrimination
    - Determination of best order of items and
    - Determination test administration rules
- Norm development



# Modifications to WAIS-III subtests after Pilot Study

<b>Subtest</b>	<b># of original items</b>	<b># of new items</b>	<b># of items changed order</b>	<b>Percentage of change</b>
<b><u>Verbal Scale</u></b>				
Vocabulary	<b>31</b>	<b>5</b>	<b>22</b>	<b>87%</b>
Similarities	<b>20</b>	<b>3</b>	<b>11</b>	<b>70%</b>
Arithmetic	<b>20</b>	<b>2</b>	<b>6</b>	<b>40%</b>
Information	<b>28</b>	<b>6</b>	<b>14</b>	<b>71%</b>
Comprehension	<b>18</b>	<b>4</b>	<b>6</b>	<b>66%</b>
<b><u>Performance Scale</u></b>				
Picture Completion	<b>25</b>	<b>5</b>	<b>15</b>	<b>80%</b>
Block Design	<b>14</b>	<b>---</b>	<b>2</b>	<b>14%</b>
Matrix Reasoning	<b>26</b>	<b>---</b>	<b>9</b>	<b>35%</b>
Picture Arrangement	<b>11</b>	<b>1</b>	<b>6</b>	<b>64%</b>

# What was learned from the translation & cultural adaptation process of the WAIS-III?



- **About the verbal contents of intelligence tests**
  - are not necessarily appropriate for assessing intelligence of individuals from cultures different from the one for which the test was designed.
- **About ordering of items** (including non-verbal items)
  - needs to correspond to the levels of difficulties the item presented during experimental (Pilot) phase of project.
- **Individuals with ID**
  - placed at a disadvantage when submitted to assessments with tests not appropriate for his/her cultural background.





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## **RESULTS – EIWA-III PROJECT**

**Is the EIWA-III structurally similar  
to the original WAIS-III?**



## EFA – Comparison WAIS-III with EIWA-III



	Verbal Comp		Perceptual Org		Working Memory		Processing Speed	
	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III	WAIS III / EIWA III
Vocabulary	<u>.89</u>	<u>.83</u>	-.10	-.06	.05	.11	.06	.02
Similarities	<u>.76</u>	<u>.74</u>	.10	.17	-.03	-.04	.03	-.00
Information	<u>.81</u>	<u>.77</u>	.03	.05	.06	.08	-.04	-.02
Comprehension	<u>.80</u>	<u>.80</u>	.07	.04	-.01	-.01	-.03	.02
Picture Completion	.10	.15	<u>.56</u>	<u>.73</u>	-.13	-.22	.17	.04
Block Design	-.02	-.15	<u>.71</u>	<u>.70</u>	.04	.23	.03	.05
Matrix Reasoning	.05	.07	<u>.61</u>	<u>.72</u>	.21	-.02	-.09	.02
Picture Arrang	.27	.23	<u>.47</u>	<u>.55</u>	-.09	.03	.06	-.04
Arithmetic	.22	.13	.15	.33	<u>.51</u>	<u>.42</u>	-.04	-.03
Digit Span	.00	.05	-.06	-.09	<u>.71</u>	<u>.77</u>	.03	.09
Letter-Number Seq	.01	.14	.02	-.00	<u>.62</u>	<u>.66</u>	-.13	.04
Digit Symbol Coding	.02	.13	-.03	.03	.08	-.02	<u>.68</u>	<u>.74</u>
Symbol Search	.01	.10	.16	.09	.07	.08	<u>.63</u>	<u>.73</u>



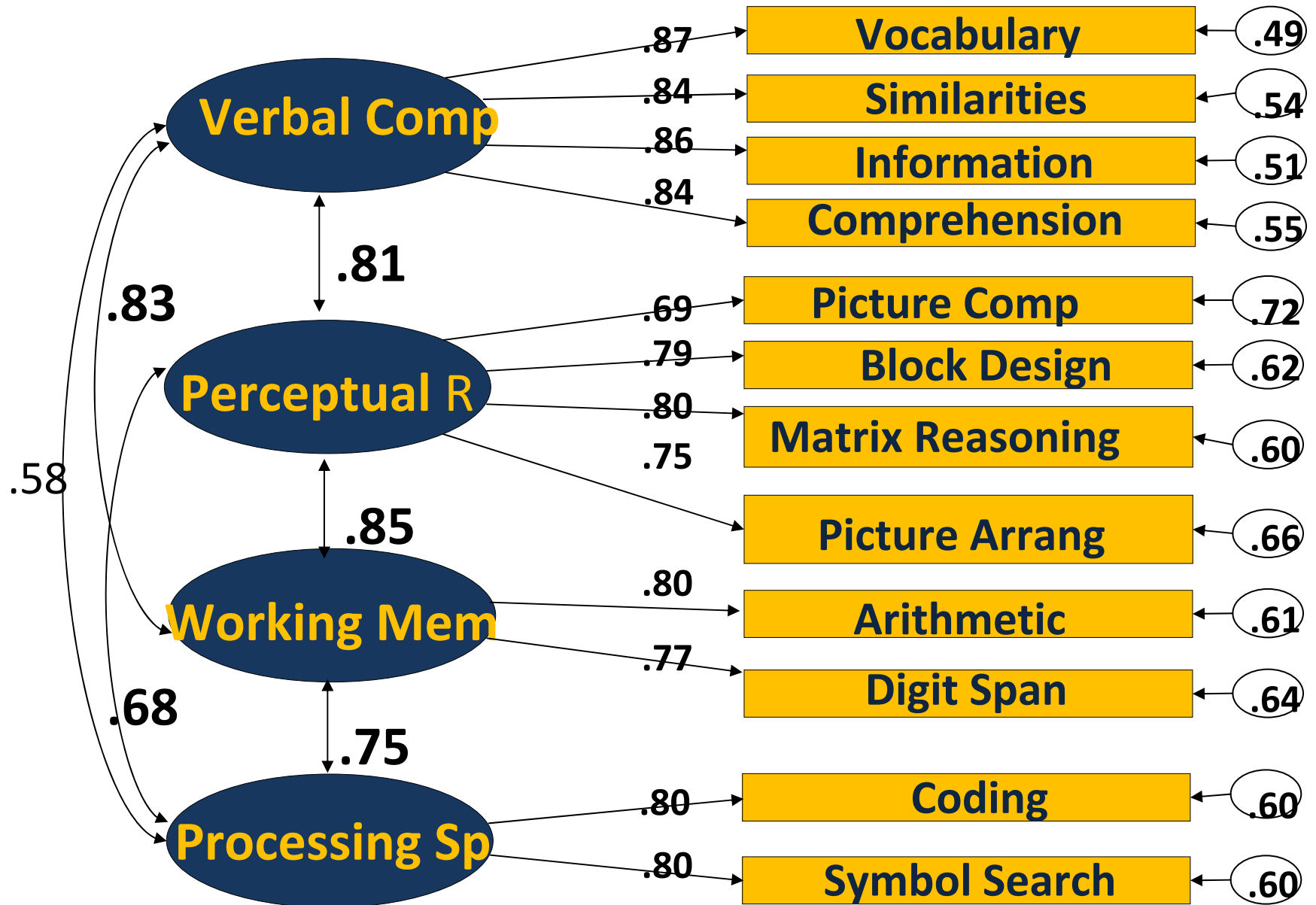


# Confirmatory Factor Analysis

Model	Goodness of Fit Indexes					Improvement			
	$\chi^2$	$df$	$\chi^2/df$	AGFI	RMSR	$\Delta\chi^2$	$\Delta df$	MTLI *	TLI
Null Model	2776.40	78	35.59						
One Factor	410.04	65	6.31	.73	.127	2366.3	13		.85
Two Factors	317.79	64	4.97	.78	.110	92.25	1	.25	.89
Three Factors	208.71	62	3.37	.87	.085	109.08	2	.55	<b>.93</b>
Four Factors	112.99	59	1.92	<b>.92</b>	<b>.053</b>	95.72	3	.83	<b>.97</b>



# Factor intercorrelations and loadings for the EIWA III



# Conclusion from EIWA-III Project

- The translation and cultural adaptation of the WAIS-III to Spanish did not adversely affect the expected configuration of the subtests.
- The subtests of the new EIWA-III cluster into four factors.
- The four constructs that support the theoretical structure of the WAIS-III were replicated through the new EIWA-III





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## RESULTS


**INTELLECTUAL DISABILITY STUDY:  
Is the EIWA-III a valid instrument for  
the assessment of ID?**



- Inclusion and Exclusion Criteria
- Selection process: Sites in PR
  - Documentation of condition
  - Levels of ID of sample
- Demographic characteristics
- Matched Control Group
  - By Gender, Age & Education



# Age, gender & education: CD Adults



	<b>Gifted</b>	<b>Intellectual Dis.</b>
<i>N</i>	<b>45</b>	<b>50</b>
<b>Age</b>		
Mean	<b>34.84</b>	<b>36.72</b>
SD	<b>14.03</b>	<b>13.12</b>
<b>Gender<sup>1</sup></b>		
Female	<b>53.3</b>	<b>48.0</b>
Male	<b>46.7</b>	<b>52.0</b>
<b>Education</b>		
≤ 8	—	<b>98.0</b>
9–11	—	<b>2.0</b>
12	<b>2.2</b>	—
13–15	<b>17.8</b>	—
≥ 16	<b>80.0</b>	—

<sup>1</sup> Gender & Education data are presented in Percentage



## Intellectual Disability: Verbal Scale

Subtest	M	SD	MCG	SD	t Value	Effect Size
Vocabulary	3.1	1.5	10.4	2.4	18.99*	3.49
Similarities	2.6	2.1	10.4	2.7	15.86*	3.15
Information	3.8	2.2	10.5	2.9	13.31*	2.56
Comprehension	3.7	1.3	10.4	3.0	15.62*	2.82
Arithmetic	3.8	1.5	10.2	2.9	13.86*	2.67
LN Sequencing	3.1	1.6	10.1	2.6	14.39*	3.16
Digit Span	2.9	2.0	10.7	3.2	14.04*	2.91

\*  $p < 0.01$



## Intellectual Disability: Performance Scale

Subtest	M	SD	MCG	SD	t Value	Effect Size
Picture Completion	4.6	2.0	9.8	2.5	9.61*	2.23
Digit Symbol - Coding	2.5	1.7	10.4	3.0	17.14*	3.20
Block Design	3.3	2.15	10.5	2.7	15.15*	2.88
Matrix Reasoning	4.2	1.7	10.58	2.7	14.72*	2.73
Picture Arrangement	3.6	2.6	10.4	2.3	15.03*	2.71
Symbol Search	2.2	1.5	10.1	3.1	15.28*	3.22

\*  $p < 0.01$



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## Intellectual Disability: IQ Scores

Intellectual Quotients	M	SD	MCG	SD	t Value	Effect Size
Verbal IQ	57.62	9.24	102.42	12.92	20.30*	3.99
Performance IQ	58.28	10.47	101.88	12.40	20.53*	3.80
Full IQ	55.78	9.09	102.28	12.13	23.38*	4.34

\*  $p < 0.01$



## Intellectual Disability: Index Scores

Index Scores	M	SD	MCG	SD	t Value	Effect Size
Verbal Comprehension	59.68	10.19	102.24	12.68	19.05*	3.70
Perceptual Organization	65.06	9.73	101.48	12.27	16.29*	3.29
Working Memory	60.06	8.30	101.92	14.00	17.39*	3.64
Processing Speed	54.18	10.96	101.32	14.98	17.63*	3.59

\*  $p < 0.01$



# Comparison of IQ Scores between EIWA-III and WAIS-III

Intellectual Quotients	EIWAIII Mean	SD	WAIS III Mean Mild ID	SD	WAIS III Mean Moderate ID	SD
Verbal IQ	57.62	9.24	60.1	5.0	54.7	4.7
Performance IQ	58.28	10.47	64.0	5.8	55.3	4.4
Full IQ	55.78	9.09	58.3	4.8	50.9	4.1

WAIS III n = 46 Mild ID + 62 Moderate ID



# Comparison of Index Scores between EIWA-III and WAIS-III

Index Scores	EIWA III Mean	SD	WAIS III Mean Mild	SD	WAIS III Mean Moderate	SD
Verbal Comprehension	59.68	10.19	63.4	6.3	56.8	6.0
Perceptual Organization	65.06	9.73	66.8	5.6	58.9	5.4
Working Memory	60.06	8.30				
Processing Speed	54.18	10.96	63.3	4.0	57.8	3.8

WAIS III n = 46 Mild ID + 62 Moderate ID





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## Gifted (EIWA-III Ceiling)

- **N = 45**
  - Female = 53%
  - Male = 47%
- **Mean Age = 35**
- **Educacion**
  - 12th grade = 2%
  - 13 – 15 = 18%
  - $\geq 16$  = 80%



Subtest	Mean	SD	MCG Mean	SD	t Value	Effect Size
Vocabulary	13.8	1.7	11.7	2.6	-4.00*	-.91
Similarities	14.3	1.7	11.9	2.5	-5.43*	-1.14
Information	14.8	2.1	11.5	3.0	-6.37*	-1.28
Comprehension	14.0	1.8	11.4	3.0	-5.74*	-1.04
Arithmetic	13.5	2.5	11.2	3.2	-3.51*	-.79
LN Sequencing	12.9	2.8	11.5	2.8	-2.59*	-.49
Digit Span	12.7	3.3	12.0	3.3	-0.94	<b>-.20</b>

\*  $p < 0.01$



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## Gifted: Performance Scale

Subtest	Mean	SD	MCG Mean	SD	t Value	Effect Size
Picture Completion	13.3	2.2	10.5	2.7	-5.69*	-1.11
Digit Symbol Coding	13.3	2.8	11.1	2.8	-3.72*	<b>-.78</b>
Block Design	13.7	2.4	11.0	2.9	-4.71*	-1.02
Matrix Reasoning	13.4	2.00	11.8	2.6	-2.93*	-.66
Picture Arrangement	14.1	2.6	10.6	2.8	-6.4*	-1.30
Symbol Search	13.4	2.8	11.2	3.2	-3.27*	<b>-.71</b>

\*  $p < 0.01$



Intellectual Quotients	Mean	SD	MCG Mean	SD	t Value	Effect Size
Verbal IQ	123.82	10.58	109.71	14.47	-5.51*	-1.11
Performance IQ	123.42	11.45	106.18	13.30	-6.68*	-1.39
Full Scale IQ	124.71	10.24	108.56	13.41	-6.69*	-1.35

\*  $p < 0.01$



Indexes	Mean	SD	MCG Mean	SD	t Value	Effect Size
VCI	124.22	9.89	109.11	13.27	-6.04*	-1.29
POI	120.18	10.09	106.16	13.26	-5.61*	-1.19
WMI	117.78	14.54	109.11	15.77	-2.88*	-.57
PSI	119.38	15.62	106.58	15.67	-3.71*	-.82

\*  $p < 0.01$



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## Conclusion Slide

- The EIWA-III appears to be a valid and reliable instruments to assess ID in Puerto Rican adults and adolescents.
- The test discrimination power is well within the expectations.







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## Thank You

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