Concurrent Session:
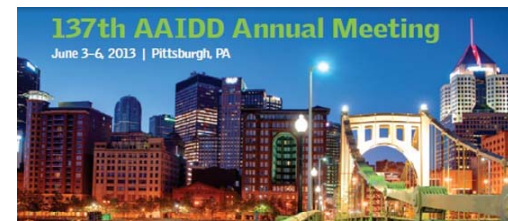## Finally...an Adaptive Behavior Scale Focused on Providing Precision at the Diagnostic Cut-Off

Psychometric Qualities of the DABS

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Psychometric Qualities of the DABS

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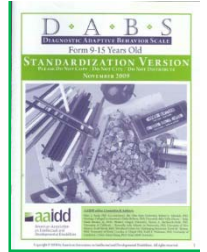University of North Carolina -
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Texas A&M University

Background

DABS was developed to

❖ facilitate the diagnosis of ID of 4-21 y.o. individuals

❖ allow to determine if the individual presents significant limitations in AB necessary for an ID diagnosis

Background

❖ **Significant limitations** in AB are operationally defined as performance that is approximately 2 SDs below the mean of either

(a) **one** of the following three types of AB:
- Conceptual
- Social
- Practical

(b) or an **overall score** on a standardized measure
- Conceptual
- Social
- Practical

❖ **Standard Error of Measurement** of the AB scale must be considered in the determination of the cut-off point
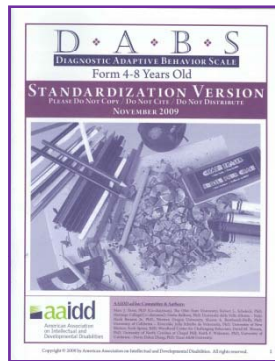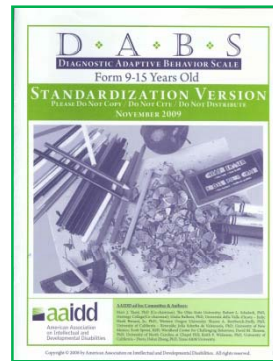
Background
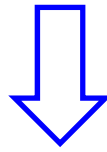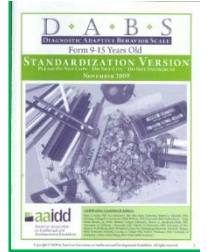
DABS should be **valid** to assess conceptual, social, and practical AB skills that, in individuals aged 4-21, are around **2 SDs below** the mean of the general population

Background

4-8   9-15   16-21 y.o.
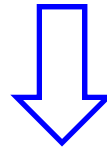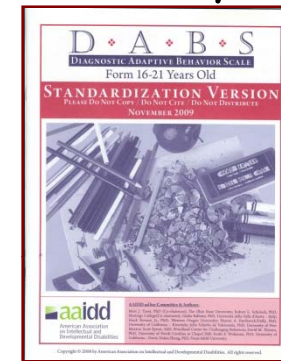
3 DABS forms should allow to correctly **identify** and discriminate between persons **with** and **without ID**

Purposes
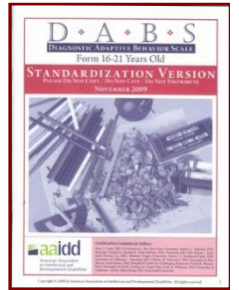
Verify:

(1) DABS **accuracy** to correctly identify

- persons with an **ID** diagnosis

- and discriminate them from those

  (a) who do **not** have an ID diagnosis or

  (b) have another **non-ID** verified conditions

(2) if DABS accuracy is **consistent** regardless of the individual's **age**

⟹ if 3 DABS forms show the same accuracy

Participants

	TOTAL (n = 1,058)
Age	
Mean (SD)	11.1 (4.9)
Range	4-21
Gender (%)	
Male - Female	50 - 50

Individuals recruited during the standardization phase of DABS

Participants

DIAGNOSIS	n	%
ID-related	**125**	**12**
Non-ID	**933**	**88**
Typically developing		80
Other verified conditions		20
Prevalence (non-cumulative)		
ADHD		6
Autism Spectrum Disorder		4
Learning disability		4
Language impairment		3
Emotional disturbance		3
Hearing impairment		1
Visual impairment		1
Other health impairment		3

Participants

	DABS FORM		
	4-8	**9-15**	**16-21**
	(n = 388)	(n = 432)	(n = 238)
Age			
Mean (SD)	6.00 (1.41)	11.69 (2.00)	18.19 (1.63)
Gender (%)			
Male - Female	50 - 50	50 – 50	51 - 49
Conditions (%)			
ID related – Non ID	8 – 92	9 – 91	21 -79

Instrument

4-8	9-15	16-21 y.o.

D · A · B · S
DIAGNOSTIC ADAPTIVE BEHAVIOR SCALE
Form 4-8 Years Old
STANDARDIZATION VERSION
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NOVEMBER 2009

D · A · B · S
DIAGNOSTIC ADAPTIVE BEHAVIOR SCALE
Form 9-15 Years Old
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D · A · B · S
DIAGNOSTIC ADAPTIVE BEHAVIOR SCALE
Form 16-21 Years Old
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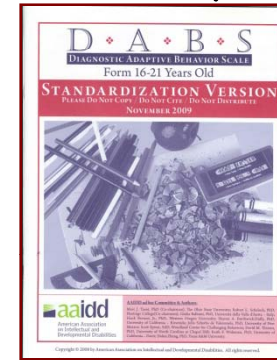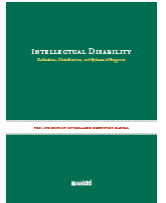
- **Conceptual**
- **Social**
- **Practical Skills**

Total Adaptive Behavior score

ID Diagnosis Cut-off Point

- ## 3 DABS Domains, Total Adaptive Behavior

  Standard Score

  - obtained with IRT model

  - Mean = 100   SD = 15
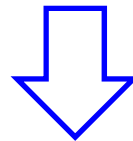
- "2 SDs below the mean" cut-off = 70 ss

ID Diagnosis Cut-off Point

- To take into account the variability of the individual's score caused by several potential sources of measurement errors

- 2 SEM must be added to this ID diagnosis cut-off Standard Score

3 DABS FORMS	Average SEM	ID Diagnosis Cut-off SS
Domain		
Conceptual SS	3	76
Social SS	3	76
Practical SS	3	76
Total Adaptive Behavior SS	2	74

Results:

1. Standard scores obtained on the DABS domains and on the Total Adaptive Behavior by the participants with and without an ID-related diagnosis

DABS Total Adaptive Behavior
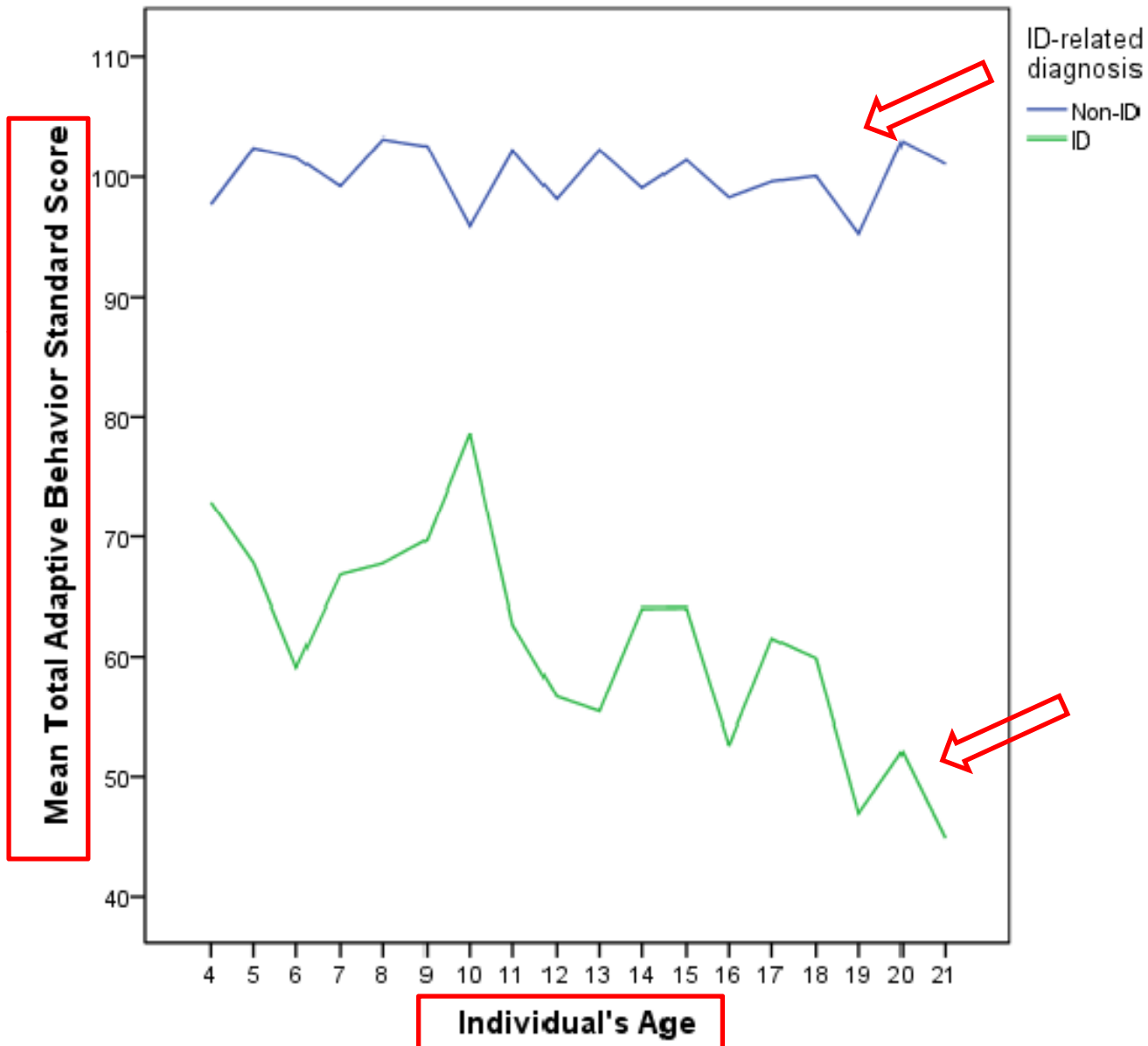
DABS Total Adaptive Behavior
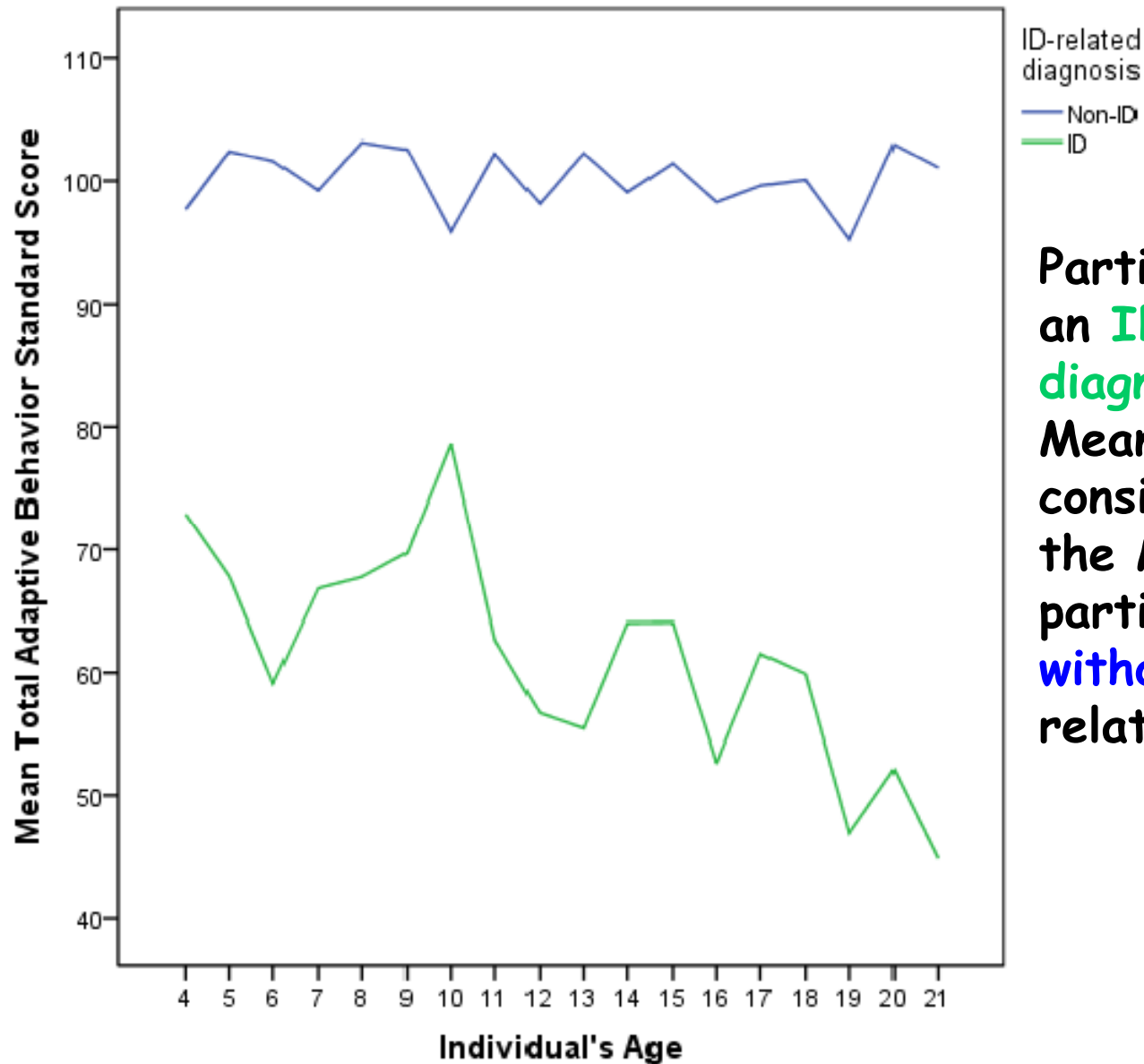
Participants **with** an **ID-related diagnosis** had a Mean SS consistently **below** the Mean SS of participants **without** an ID-related diagnosis

DABS Total Adaptive Behavior
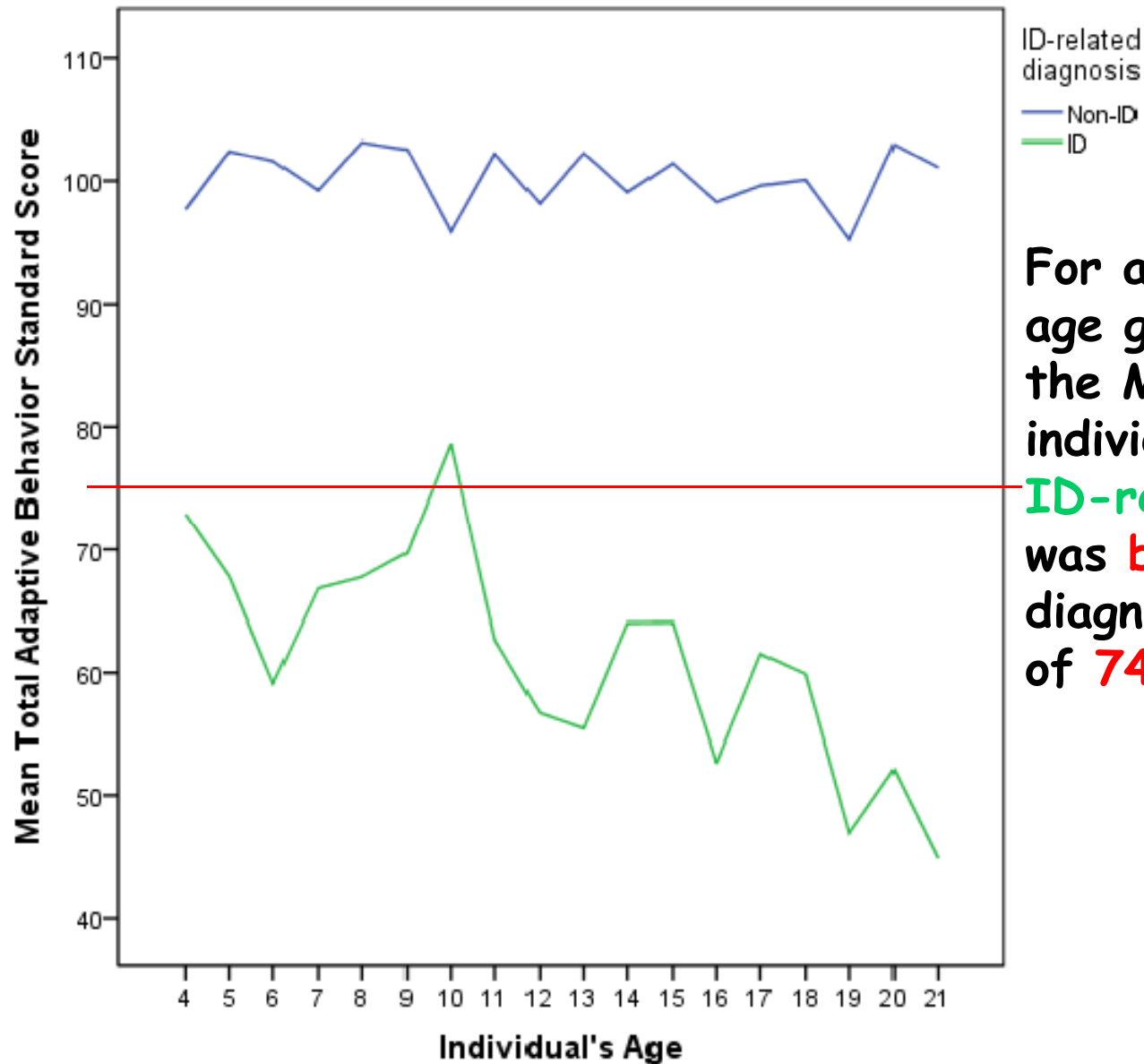
For almost all the age groups, the Mean SS of individuals with an **ID-related diagnosis** was **below** the ID diagnosis cut-off SS of **74**

DABS Domains

Non-ID
ID-related diagnosis

Conceptual Skills

Social Skills

Practical Skills

Mean Domain Standard Score
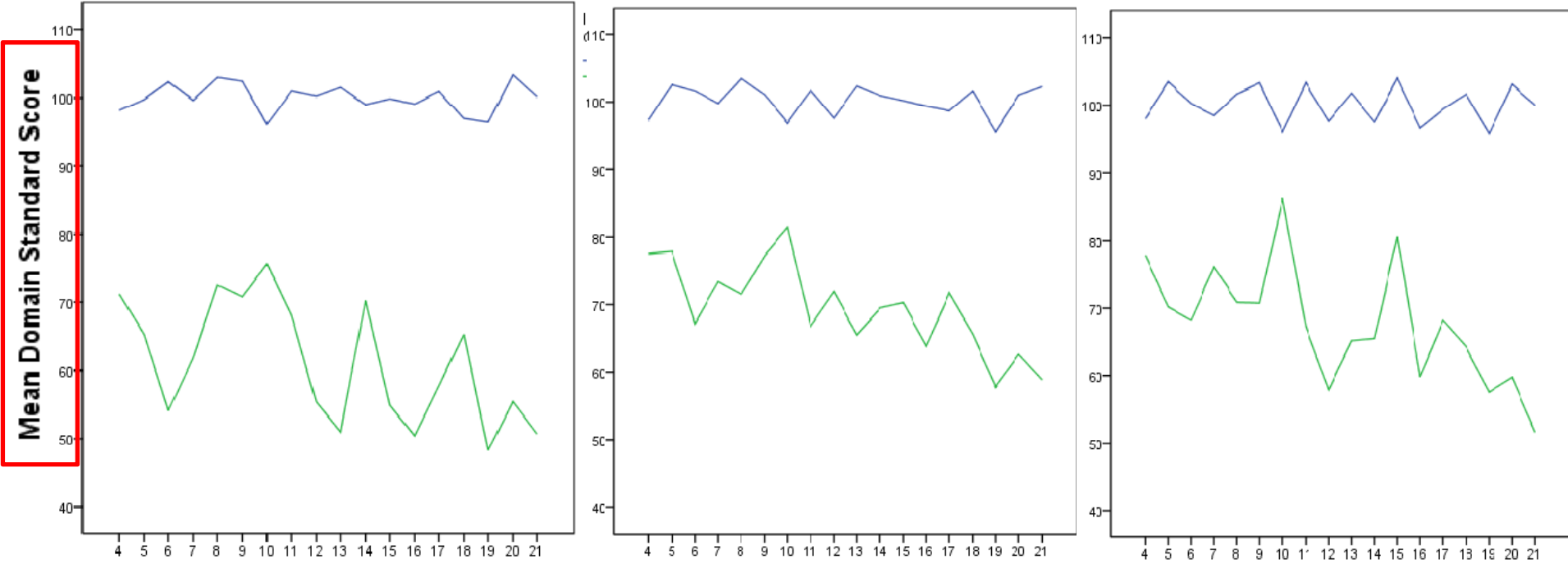
Individual's Age

DABS Domains

Non-ID
ID-related diagnosis
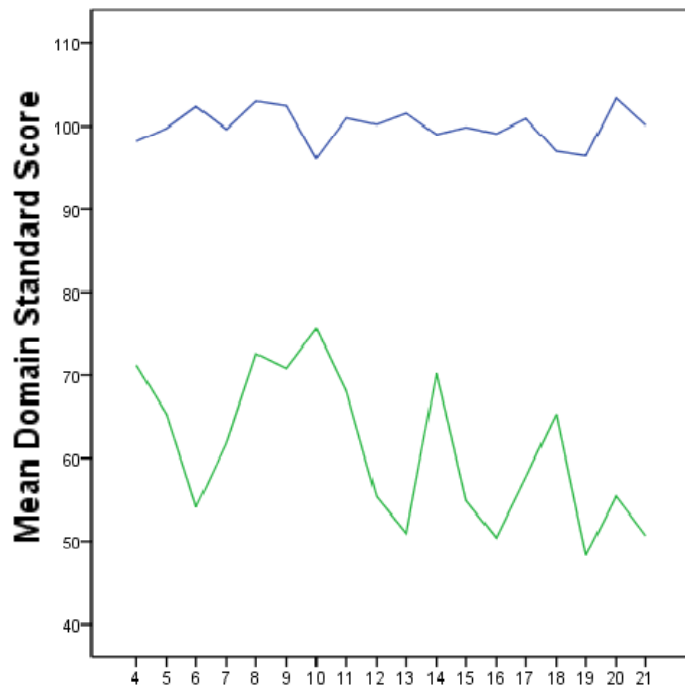
Conceptual Skills
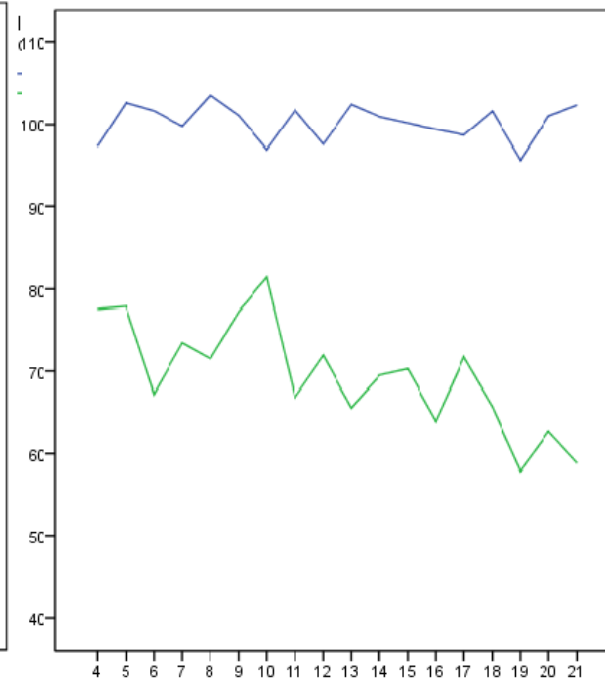
Social Skills
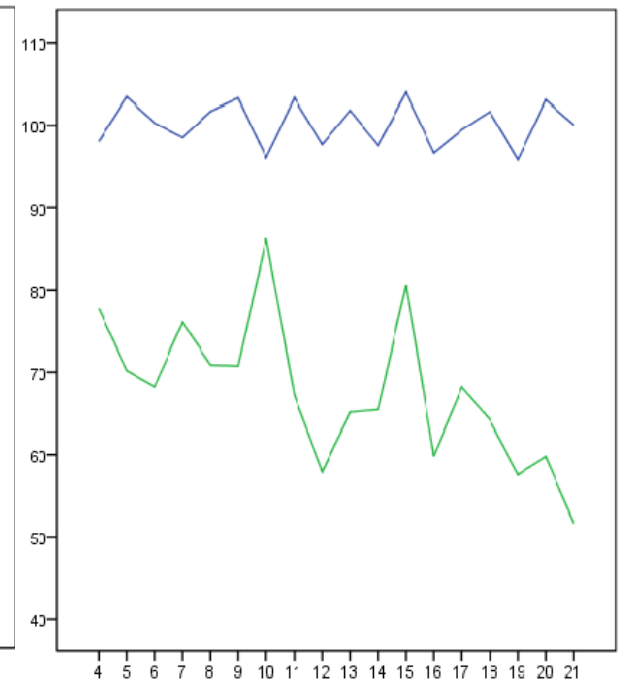
Practical Skills

Also for DABS domains, participants with an ID-related diagnosis had Mean SSs consistently below the Mean SS of participants without an ID-related diagnosis

DABS Domains
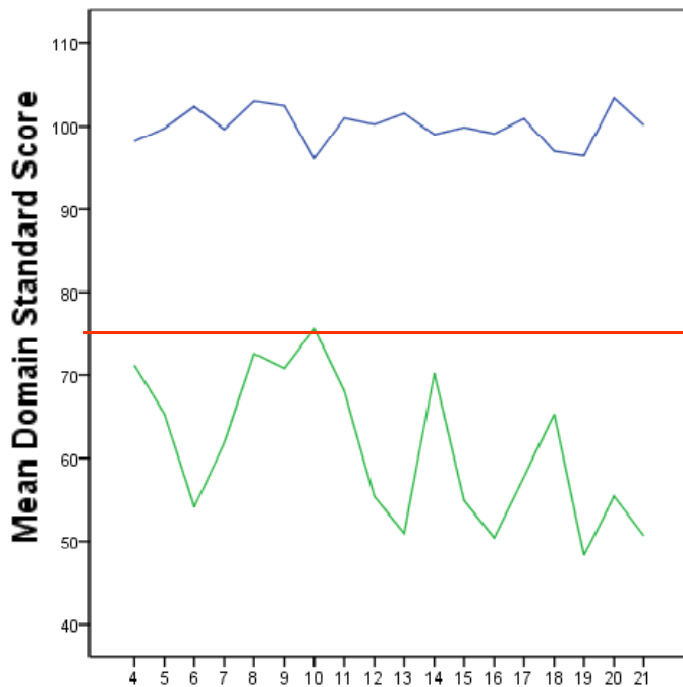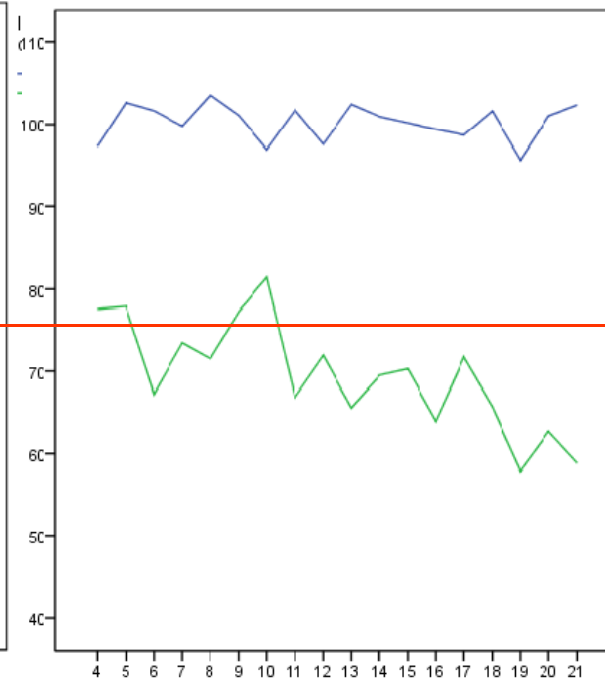
Conceptual Skills **Social Skills** **Practical Skills**
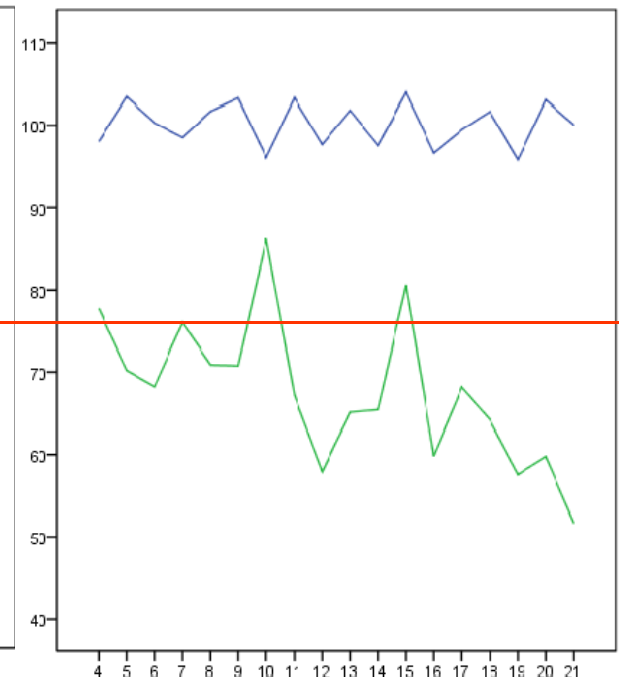
The Mean SS of the individuals with an **ID-related diagnosis** was **below** the ID diagnosis cut-off SS of **76** in all the age groups
with the exception of a few age groups for the Social and Practical skills domains

DABS Domains
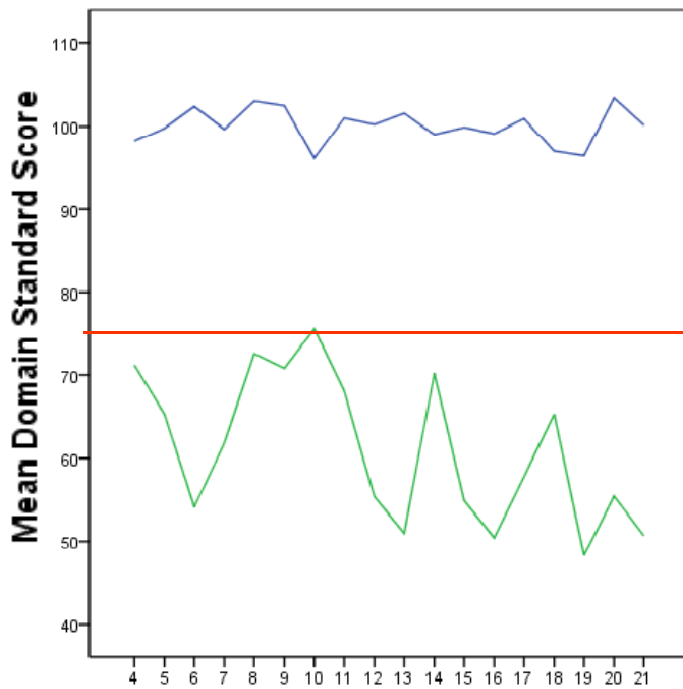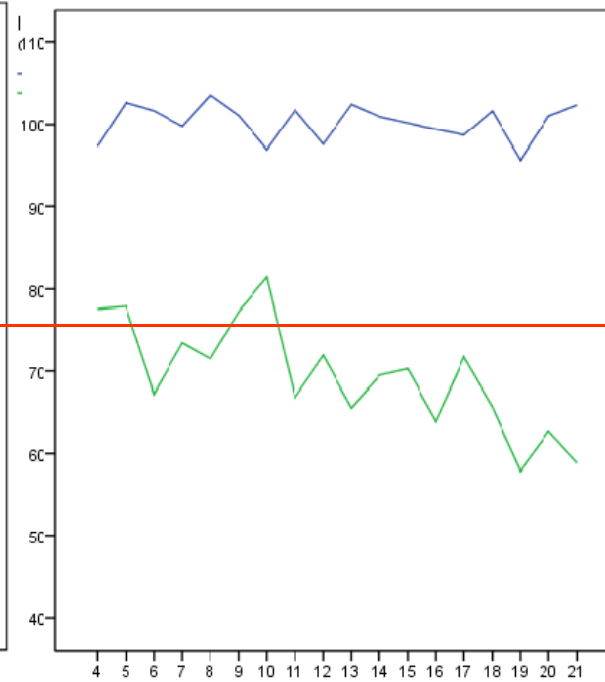
Conceptual Skills   **Social Skills**   **Practical Skills**
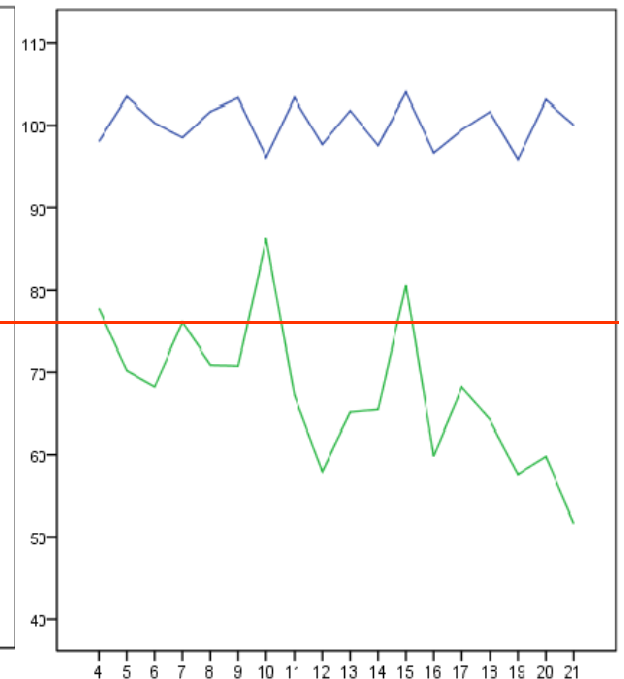
However, it is important to underline that for these age groups the **Mean Total Adaptive Behavior SS** was generally below the ID cut-off point

Results:

1. Standard scores obtained on the DABS domains and on the Total Adaptive Behavior by participants with and without an ID-related diagnosis

DABS is accurate in identifying, in individuals of different ages, the significant limitations in AB consistent with an ID diagnosis

Results:

2. Sensitivity and specificity of the three DABS forms in identifying participants with and without an ID-related diagnosis

Sensitivity & Specificity

Accuracy of DABS in correctly **classifying** individuals **with** and **without** and ID-related diagnosis, based on their results on the Scale

⇩
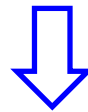
(1) Sensitivity

Using DABS SS to correctly **IDENTIFY** those WITH an ID-related diagnosis

(2) Specificity

Using DABS SS to correctly **EXCLUDE** those WITHOUT an ID-related diagnosis

Sensitivity & Specificity

Accuracy of DABS in correctly **classifying** individuals **with** and **without** and ID-related diagnosis, based on their results on the Scale

⇩
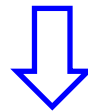
(1) Sensitivity

Percentage of all the individuals WITH an ID-related diagnosis who have a DABS SS **BELOW** the cut-off

(2) Specificity

Percentage of all the individuals WITHOUT an ID-related diagnosis who have a DABS SS **ABOVE** the cut-off

DABS Form 4-8

N = 388

	DIAGNOSIS	
DABS RESULTS	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related ($n = 32$)	Non-ID ($n = 356$)
Significant limitations in AB ($n = 57$)	26	31
Non-significant limitations in AB ($n = 331$)	6	325

- **Of all the 388 participants,**
  - **- 32 had an ID-related diagnosis**

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related ($n = 32$)	Non-ID ($n = 356$)
Significant limitations in AB ($n = 57$)	26	31
Non-significant limitations in AB ($n = 331$)	6	325

- Of all the 388 participants,
  - 32 had an ID-related diagnosis
  - 356 had typical development or a non-ID verified condition

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related ($n = 32$)	Non-ID ($n = 356$)
Significant limitations in AB ($n = 57$)	26	31
Non-significant limitations in AB ($n = 331$)	6	325

- **Of these 388 participants,**
  - **57** had a SS on the DABS Total Adaptive Behavior, or on at least one of the three domains **below** the ID diagnosis cut-off point

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 32)	Non-ID (*n* = 356)
Significant limitations in AB (*n* = 57)	26	31
Non-significant limitations in AB (*n* = 331)	6	325

- Of these 388 participants,
  - 57 had a SS on the DABS Total Adaptive Behavior, or on at least one of the three domains below the ID diagnosis cut-off point
  - 331 did not have significant limitations in AB

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- DABS form 4-8 correctly classified:
  - the 26 with an ID-related diagnosis who obtained a DABS SS below the ID diagnosis cut-off

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- DABS form 4-8 correctly classified:
  - the 26 with an ID-related diagnosis who obtained a DABS SS below the ID diagnosis cut-off
  - the 325 without an ID-related diagnosis who obtained a DABS SS above the cut-off

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- **DABS form 4-8 did not correctly classify:**
  - **6** with an **ID-related** diagnosis but who obtained a DABS SS **above** the ID diagnosis cut-off
    (i.e., did not present significant limitations)

DABS Form 4-8

N = 388

	DIAGNOSIS	
DABS RESULTS	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- DABS form 4-8 did not correctly classify:
  - 6 with an ID-related diagnosis but who obtained a DABS SS above the ID diagnosis cut-off
  - 31 without an ID-related diagnosis but who obtained a DABS SS below the cut-off (i.e., presented significant limitations)

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 32)	Non-ID (*n* = 356)
Significant limitations in AB (*n* = 57)	26	31
Non-significant limitations in AB (*n* = 331)	6	325

- **Sensitivity**
accuracy in correctly identifying persons who have an ID-related diagnosis

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = **32**)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	**26**	31
Non-significant limitations in AB (n = 331)	6	325

- **Percentage** of all the individuals with an ID-related diagnosis who were identified by the DABS

- Sensitivity = 26/(26+6) = 26/32 = 0.81 $\Rightarrow$ **81%**

$\Rightarrow$ DABS correctly classified 81% of 4-8 individuals **with** ID

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- **Specificity**
accuracy in correctly **excluding** persons who do **not** have an ID-related diagnosis

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- **Percentage** of all the individuals without an ID-related diagnosis who were excluded by the DABS

- Specificity = 325/(325+31) = 325/356 = 0.91 $\Rightarrow$ **91%**

$\Rightarrow$ DABS correctly classified 91% of 4-8 individuals **without** ID

DABS Form 4-8

N = 388

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 32)	Non-ID (*n* = 356)
Significant limitations in AB (*n* = 57)	26	31
Non-significant limitations in AB (*n* = 331)	6	325

- **Sensitivity = 81%**
- **Specificity = 91%**

DABS Form 4-8

N = 388

| | DIAGNOSIS | |
DABS RESULTS	ID-related (n = 32)	Non-ID (n = 356)
Significant limitations in AB (n = 57)	26	31
Non-significant limitations in AB (n = 331)	6	325

- Sensitivity = 81%
- Specificity = 91%

Of these 31, 48% had a non-ID verified condition (e.g., learning disability) that may explain the significant limitations in AB in absence of an ID diagnosis

DABS Form 9-15

N = 432

DABS RESULTS	DIAGNOSIS	
	ID-related ($n = 42$)	Non-ID ($n = 390$)
Significant limitations in AB ($n = 79$)	36	43
Non-significant limitations in AB ($n = 353$)	6	347

DABS Form 9-15

N = 432

DABS RESULTS	DIAGNOSIS	
	ID-related (n = **42**)	Non-ID (n = 390)
Significant limitations in AB (n = 79)	**36**	43
Non-significant limitations in AB (n = 353)	6	347

- **Sensitivity = 36/42 = 0.86 ⇒ 86%**

   ⇒ DABS correctly identified 86% of individuals 9-15 y.o. **with** an ID-related diagnosis

DABS Form 9-15

N = 432

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 42)	Non-ID (n = **390**)
Significant limitations in AB (n = 79)	36	43
Non-significant limitations in AB (n = 353)	6	**347**

- **Specificity = 347/390 = 0.89 $\Rightarrow$ 89%**

$\Rightarrow$ **DABS correctly excluded 89% of individuals 9-15 y.o. without an ID-related diagnosis**

DABS Form 9-15

N = 432

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 42)	Non-ID (*n* = 390)
Significant limitations in AB (*n* = 79)	36	43
Non-significant limitations in AB (*n* = 353)	6	347

- **Sensitivity = 86%**
- **Specificity = 89%**

DABS Form 9-15

N = 432

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 42)	Non-ID (*n* = 390)
Significant limitations in AB (*n* = 79)	36	43
Non-significant limitations in AB (*n* = 353)	6	347

- Sensitivity = 86%
- Specificity = 89%

Of these 43, 74% had a non-ID verified condition that may explain the low score on DABS in absence of an ID diagnosis

DABS Form 16-21

N = 238

	DIAGNOSIS	
DABS RESULTS	ID-related (n = 51)	Non-ID (n = 187)
Significant limitations in AB (n = 69)	50	19
Non-significant limitations in AB (n = 169)	1	168

DABS Form 16-21

N = 238

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 51)	Non-ID (n = 187)
Significant limitations in AB (n = 69)	50	19
Non-significant limitations in AB (n = 169)	1	168

- Sensitivity = 50/51 = 0.98 ⇒ **98%**

⇒ DABS correctly identified 98% of individuals 16-21 y.o. **with** an ID-related diagnosis

DABS Form 16-21

N = 238

	DIAGNOSIS	
DABS RESULTS	ID-related (*n* = 51)	Non-ID (*n* = 187)
Significant limitations in AB (*n* = 69)	50	19
Non-significant limitations in AB (*n* = 169)	1	168

- **Specificity = 168/187 = 0.90 ⇒ 90%**

  ⇒ DABS correctly excluded 90% of individuals 16-21 y.o. **without** an ID-related diagnosis

DABS Form 16-21

DABS RESULTS	DIAGNOSIS	
	ID-related (n = 51)	Non-ID (n = 187)
Significant limitations in AB (n = 69)	50	19
Non-significant limitations in AB (n = 169)	1	168

- **Sensitivity = 98%**
- **Specificity = 90%**

DABS Form 16-21

N = 238

DABS RESULTS	DIAGNOSIS	
	ID-related (*n* = 51)	Non-ID (*n* = 187)
Significant limitations in AB (*n* = 69)	50	19
Non-significant limitations in AB (*n* = 169)	1	168

- Sensitivity = 98%
- Specificity = 90%

Of these 19, 74% had a non-ID verified condition that may explain the low score on DABS in absence of an ID diagnosis

Results:

2. Sensitivity and specificity of the three DABS forms in identifying participants with and without an ID-related diagnosis

Three DABS forms are accurate

- in identifying individuals with an ID-related diagnosis

- in excluding individuals without an ID diagnosis

In Conclusion…

❖ DABS forms are accurate
in correctly classifying individuals,
aged 4-21,
with and without a formal diagnosis of ID

❖ This property is consistent regardless of the
individual's age