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Evidence-Based Practices in Selecting and Using Standardized Tests: Diagnostic Accuracy

Presenter: Dr. Stacey Pavelko, CCC-SLP

Moderated by:

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Peer Review Process

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3+ years SLP Professional Experience Required

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Evidence-Based Practices in Selecting & Using Standardized Tests: Diagnostic Accuracy

Dr. Stacey Pavelko, CCC-SLP

Learner Outcomes

1. Define Diagnostic Accuracy
2. Define sensitivity and specificity
3. Describe how diagnostic accuracy relates to standardized test selection

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Advance Organizer

- Best Practices in Assessment
- How to use tests
- How to pick tests
  - Diagnostic Accuracy
  - Test Content
  - Considerations for Dialect and ELL
  - Cultural/Linguistic Load

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SLP Goals for Assessment

1. Children with *Speech-Language Impairment* correctly identified as SLI
2. Children with *Speech-Language Impairment* inappropriately found “not impaired”
3. Children inappropriately identified as *Speech-Language Impairment*
4. Children without impairment found “not impaired”

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What is a “good” test?

- Psychometrically Adequate
- Diagnostically Accurate
- Appropriate for your client and purpose of testing
  - Purpose of the test
  - Culturally/Linguistically Appropriate
  - Norming Sample

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Test Considerations

Diagnostic Accuracy

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Diagnostic Accuracy

- Sensitivity: “True Positive”
- Specificity: “True Negative”

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Sensitivity = a/(a+b)
Specificity = d/(c+d)

a) Children with language impairment correctly identified as language impaired	c) Normal children incorrectly identified as language impaired
b) Children with impaired language incorrectly identified as normal	d) Normal children correctly identified as normal

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Recommendations for Diagnostic Accuracy

90%	Good Discriminant Accuracy
80%-89%**	Fair Discriminant Accuracy
Below 80%	Misidentifications occur at unacceptably high rates

Plante & Vance, 1994
Spaulding, Plante, & Farinella, 2006

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Do Current Tests Have Adequate Sensitivity & Specificity

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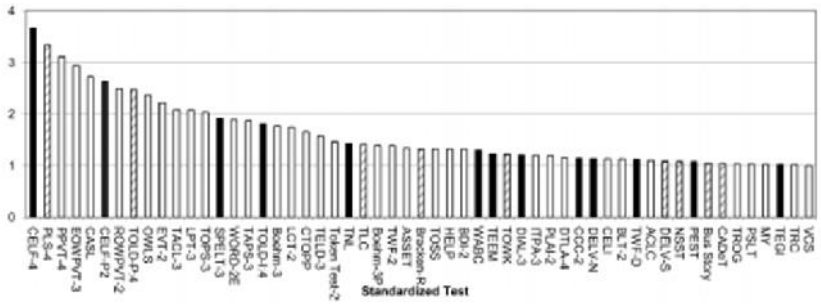
Black bars: >80% sensitivity & specificity
Hashed bars: <80%
White bars: unknown



Betz, Eickhoff, & Sullivan, 2013

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Identifying a Cutscore

- What score do you use?
  - Cutscore = the score you will use to decide whether a child has typical or impaired language
    - Not the same as IDEA eligibility

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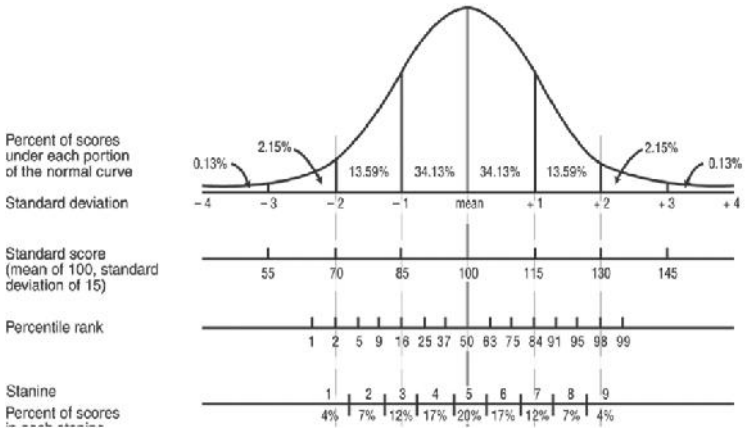
The Normal Distribution



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Identifying a Cutscore

- Depends on the individual test
- Is not an arbitrary number

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Test	*Cut-score (standard score)*	*Identification accuracy*	
		Sensitivity	*Specificity*
TEEM	-1 SD	.9	.6
TEEM	- 2 SD	.9	.95
PLS-5	-1 SD	.83	.80
TOLD P4	90 SS	.74	.88

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"The practice of applying an arbitrary low cut-off score for diagnosing language impairments is frequently unsupported by the evidence that is available …in test manuals."

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Differences in Standardized Test Results

- 6-year-old African American and White children with and without language impairment
- All spoke a non-standard dialect
- Stanford-Binet Intelligence Scale – 4th Ed Comprehension Subtest
- Non-Word Repetition Task

Oetting, Cleveland, Cope III (2008)

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Differences in Standardized Test Results

Stanford-Binet Intelligence Scale 4th Ed Comprehension Subtest

Cutscore	Sensitivity	Specificity
-1 SD	.44	.98
-1.5 SD	.11	1.00
-2 SD	.06	1.00
-.5 SD	.72	.93

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What about Newer Tests?

- Some publishers do not provide sensitivity and specificity data – keep asking for it!
- Examine administration manual and ask critical questions about what is in included

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Overall, construct validity, including the reference standard, sensitivity and specificity, and likelihood ratios of the CELF-5 were determined to be unacceptable due to…"

(LEADERS p. 8)

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An Example

- PPVT-III and PPVT-IV

Test	Cutscore	Sensitivity	Specificity
PPVT-III	103	80%	75%
PPVT-IV	103	80%	70%

(Spaulding, Hosmer, & Schechtman, 2013)

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An Example

- OWLS-2
- No explicit mention of sensitivity and specificity

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An Omnibus Example

Type of Impairment	Composite	Mean Standard Score (LI)
Receptive Language	Listening Comprehension Composite	86.9
Expressive Language	Oral Expression Composite	83.4

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A Vocabulary Example

Test Name	Cutscore	Sensitivity	Specificity
PPVT-III	104	74%	71%
EVT	97	71%	68%
ROWPVT	97	77%	77%
EOWPVT-R	96	71%	71%

(Gray, Plante, Vance & Henrichsen, 1999)

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CASL-2

Cut-score (standard score)	*Identification accuracy*	
	Sensitivity	*Specificity*
70	.41	.99
75	.47	.96
80	.64	.91
85	.74	.84
90	.86	.76

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Resources

- Betz, Eickhoff, & Sullivan (2013). Factors influencing the selection of standardized tests for the diagnosis of specific language impairment. *Language, Speech, and Hearing Services in Schools, 44,* 133-146.
- Gray, S., Plante, E., Vance, R., & Henrichsen, M. (1999). The diagnostic accuracy of four vocabulary tests administered to preschool-age children. *Language, Speech, and Hearing Services in Schools, 30,* 196-206.
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Resources

- Spaulding, T., Hosmer, S., & Schechtman, C. (2013). Investigating the interchageability and diagnostic utility of the PPVT-III and PPVT-IV for children with and without SLI. *International Journal of Speech Language Pathology, 15,* 453-462.
- Spaulding, Plante, Farinella (2006). Eligibility Criteria for Language Impairment -Is the Low End of Normal Always Appropriate? *Language, Speech, and Hearing Services in Schools, 37,* 61-72.
- http://www.leadersproject.org/
- http://www.doe.virginia.gov/special_ed/disabilities/speech_language_impairment/slp-comprehensive-assessment-card.pdf

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What's Next?

Other Testing Considerations

- Test Content
- Considerations for Dialect and ELL
- Cultural/Linguistic Load

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