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Dr. Stacey Pavelko, CCC-SLP

Learner Outcomes

- Describe how considerations such as reliability, validity and diagnostic accuracy can impact speech test selection.
- Describe testing considerations for coverage of speech sounds and phonological processing.
- Describe how consideration of dialect can impact speech test selection.
Advance Organizer

- Reliability, validity, and diagnostic accuracy
- Coverage
- Dialect
- Case Study

Test Considerations

The Science...
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

Improvements in Reliability & Validity?
McCauley & Swisher (1984)
- 30 Tests of Language and Articulation

<table>
<thead>
<tr>
<th>Number of Criteria Met</th>
<th>Number of Tests</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
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<tr>
<td>6</td>
<td>1</td>
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<tr>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
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<td>10</td>
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Improvements in Reliability & Validity?

Kirk & Vigeland (2014)
6 Tests of Single-Word Tests of Children’s Phonological Error Patterns

12 criteria

<table>
<thead>
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<th>Number of Tests</th>
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<td>2</td>
<td>5</td>
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<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4 or more</td>
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Improvements in Reliability & Validity?
Flipsen & Ogiela (2015)
10 Tests of Single-Word Tests of Children's Speech Sound Production
McCaulley & Swisher Criteria AND 7 additional criteria

<table>
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<th>Number of Tests</th>
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<td>1</td>
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<td>4</td>
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<td>6</td>
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<tr>
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<td>2</td>
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Improvements in Reliability & Validity?
Flipsen & Ogiela (2015)
McCaulley & Swisher Criteria

Continued
Diagnostic Accuracy

Flipsen & Ogiela (2015)

10 Tests of Single-Word Tests of Children's Speech Sound Production

- Data available for 6 tests
- Only 2 tests provided sensitivity and specificity data
Diagnostic Accuracy
Kirk & Vigeland (2014)
6 Tests of Single-Word Tests of Children’s Phonological Error Patterns
  • Only 2 tests provided sensitivity and specificity data
  • Same 2 tests as reported by Flipsen & Ogiela (2015)

Coverage
What can impact ability to produce a sound?

Word Familiarity
Syllabic Complexity
Ability to produce other sounds in the word
Stress Pattern
Phonetic Context

Coverage
Sounds
- What sounds are tested?
- In what position of the word?
- What is the phonetic context of the word?
- How many opportunities?
Coverage

Eisenberg & Hitchcock (2010)
11 Tests of Articulation and Phonology

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<thead>
<tr>
<th>Number of sounds</th>
<th>Number of tests</th>
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<tbody>
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<td>3</td>
</tr>
<tr>
<td>21</td>
<td>4</td>
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<tr>
<td>22</td>
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Coverage

Eisenberg & Hitchcock (2010)
11 Tests of Articulation and Phonology

One phonetically controlled word

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<th>Number of Tests</th>
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<tbody>
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<td>16</td>
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<td>17</td>
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<td>2</td>
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<td>19</td>
<td>2</td>
</tr>
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<td>20</td>
<td>1</td>
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</table>

Coverage

Eisenberg & Hitchcock (2010)

2 phonetically controlled words with different vowels

<table>
<thead>
<tr>
<th>Number of sounds</th>
<th>Number of tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
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<td>6</td>
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<td>2</td>
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<tr>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
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</tbody>
</table>
Coverage

Eisenberg & Hitchcock (2010)

2 phonetically controlled words with different vowels

<table>
<thead>
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<th>Number of sounds</th>
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<tr>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
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</table>

Diagnostic Accuracy + Coverage

- Diagnostic Evaluation of Articulation and Phonology (DEAP)
  - One phonetically controlled word
    - 22 initial
    - 17 final
  - Two phonetically controlled words
    - 2 initial
    - 6 final
Diagnostic Accuracy + Coverage

Clinical Assessment of Articulation & Phonology (CAAP)
- One phonetically controlled word
  - 20 initial
  - 19 final
- Two phonetically controlled words
  - 4 initial
  - 6 final
- CAAP-2

Coverage
Phonological Processes
- What Processes are tested?
- How many opportunities?
Kirk & Vigeland (2015)

- 11 Error Patterns
- Initial and final position (total of 15)

<table>
<thead>
<tr>
<th>Error Pattern</th>
<th>Number of opportunities</th>
<th>Number of tests</th>
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</thead>
<tbody>
<tr>
<td>Final Consonant Deletion</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Palatal Fronting</td>
<td>9</td>
<td>3</td>
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<tr>
<td>Weak Syllable Deletion</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Stopping of Fricatives &amp; Affricates*</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Cluster Reduction*</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Gliding of Liquids (/l/ &amp; /r/)</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Prevocalic Voicing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Derhoticization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Velar Fronting*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deaffrication</td>
<td></td>
<td></td>
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<tr>
<td>Postvocalic Devoicing</td>
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</tbody>
</table>
Diagnostic Accuracy + Coverage

- Diagnostic Evaluation of Articulation and Phonology (DEAP)
  - 9 error patterns
  - Less than 4 opportunities
    - Cluster reduction - word final position
    - Velar fronting - word initial position
    - Gliding of /l/ & /r/
    - Derhoticization
    - Deaffrication

Diagnostic Accuracy + Coverage

Clinical Assessment of Articulation & Phonology-2 (CAAP-2)
- 9 error patterns
- Less than 4 opportunities
  - Cluster reduction - word final position
  - Velar fronting - word initial position
  - Gliding of /l/ & /r/
  - Derhoticization
  - Deaffrication
Language Variation

Dialect Considerations
Flipsen & Ogiela (2015)

- Did the test developer discuss the issue of dialect and its potential influence on test scores?
- 10 tests of single-word production
  - 4 did not address the issue with regard to test administration or scoring at all.
Dialect Considerations
Flipsen & Ogiela (2015)

- 5 manuals stated clinicians need to be aware that dialect differences could affect scoring and interpretation
- 2 recommended examiners be aware of dialect variation in their area and take it into consideration or create local norms
- 2 provided information on how to track dialect-based variation on the test protocol

So... What is the bottom line with using standardized tests?

- Use Few
- Choose Wisely
- Know Their Limitations
- Supplement with other data

A number does not tell you how a child functions...
Quick Case Study

• Child Info
• 5;3 white female (fall, kindergarten)
• Comprehensive Language Assessment
  • Assessment of Literacy & Language
  • Appropriate for
    • Purpose of testing
    • Child is similar to standardization sample

Sample Size

• Sample Size
• 100 for each grade level, fall and spring
Item Analysis

Cronbach’s coefficient alpha
- Emergent Literacy Index: $r^2: .94$
- Language Index: $r^2: .95$
- Phonological Index: $r^2: .91$

Split-Half
- Emergent Literacy Index: $r^2: .95$
- Language Index: $r^2: .96$
- Phonological Index: $r^2: .94$

Means & SDs
- Reported for all subtests, all grade levels, fall and spring
Concurrent Validity

Correlations with CELF-P2
- Core Language: $r^2: .77$
- Receptive Language: $r^2: .75$
- Expressive Language: $r^2: .79$
- Language Content: $r^2: .74$
- Language Structure: $r^2: .79$

Correlations with PIPA
- Rhyme Awareness: $r^2: .66$
- Syllable Segmentation: $r^2: .53$
- Alliteration Awareness: $r^2: .59$
- Sound Isolation: $r^2: .72$
- Sound Segmentation: $r^2: .36$
- Letter-Sound Knowledge: $r^2: .76$

Predictive Validity
- Not Reported
Test-Retest Reliability

- Emergent Literacy Index: $r^2: .94$
- Language Index: $r^2: .91$
- Phonological Index: $r^2: .88$

Inter-examiner Reliability

- Parallel Sentence Production: $r^2: .98$
- Word Relationships: $r^2: .99$
- Listening Comprehension: $r^2: .99$
- Invented Spelling: $r^2: .97$
Diagnostic Accuracy
What cut score do you use?

a) -1. SD
   Sensitivity: .98; Specificity: .89

b) -1.5 SD
   Sensitivity: .86; Specificity: .96

c) -2 SD
   Sensitivity: .54; Specificity: .98

Do you use this test?
- What are the limitations of this test?
- What other data do you need to gather?
Resources


Thank You!