Evaluating the Accuracy of Classroom Screens for Dyslexia and Language Impairment: Replication and Extension

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Introduction

- Specific Language Impairment (SLI) and dyslexia are relatively common learning disabilities.
  - SLI affects ~7% of children (Tomblin et al., 1997)
  - Dyslexia is estimated to affect 5-10% of children (e.g., Siegel, 2006).
- Children with either SLI or dyslexia may be less likely to be identified and referred for evaluation/intervention services than children with both (Catts, Adlof, Hogan, 2005).
- Universal screening can help to improve early identification, but individually administered screenings can be costly in time and resources.
- Study Purpose: to examine the utility of brief, classroom screenings for identifying children who may have Language Impairment (LI) and/or dyslexia.

Participants

To date, 2 cohorts of children have participated.

- Cohort 1 (2013-2014 school year)
  - 737 children from 37 classrooms in two South Carolina school districts completed classroom screenings.
  - 159 children followed up assessments.
- Cohort 2 (2014-2015 school year)
  - 763 children from 40 classrooms in one South Carolina school district completed classroom screenings.
  - 252 children followed up assessments.
- Analyses from Cohort 1 and Cohort 2 revealed highly similar results. Thus, cohorts were combined and all analyses reported here include 399 children with complete data on all variables of interest.

Screeing

Each participant completed a 20-minute screening battery administered to the whole classroom. Tests included:

- Test of Silent Word Reading Fluency (TOSWRF; Mather, Hammill, & Roberts, 2004: 3 minutes)
  - "Look at the rows of words on your form. These words are run together. Draw a line clearly between the words. If you draw the line in the right place, a real word will be on each side of the line with no extra letters between them." thethegodoffunandhelphthetime lostagreatheavenandwithaworks
- GRADE Listening Comprehension (GRADE; Williams, 2003; 15 minutes)
  - "Circle the picture that shows. The sleeping cat is behind the tree."

Diagnostic

- Parent questionnaire to confirm inclusion/exclusion criteria:
  - Mono-lingual
  - No history of hearing impairment, uncorrected visual impairment, or neurological disorder
- Dyslexia was identified using the Woodcock Reading Mastery Tests-3 (WRMT-3; Woodcock, 2011), using a SS ≤ 85 criterion
- Language Impairment (LI) was identified using the Clinical Evaluation of Language Fundamentals-4 (CELF-4; Semel, Wig, & Secord, 2003), using a SS ≤ 85 criterion
- General intellectual abilities were assessed using the Test of Nonverbal Intelligence-4 (TONI-4; Brown, Sherenbou, Johnson, 2010).

Descriptive Statistics

<table>
<thead>
<tr>
<th>Screening for all children (n=1480)</th>
<th>Screening for assessment group (n=399)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyslexia-Only</td>
<td>Li Only</td>
</tr>
<tr>
<td>CELF-4 SS</td>
<td>TOSWRF</td>
</tr>
<tr>
<td>96.16 (6.10)</td>
<td>78.25 (6.50)</td>
</tr>
<tr>
<td>WRMT-1 SS</td>
<td>73.35 (8.85)</td>
</tr>
<tr>
<td>80.03 (3.48)</td>
<td>102.66 (9.31)</td>
</tr>
<tr>
<td>TONI-4 SS</td>
<td>89.96 (8.63)</td>
</tr>
<tr>
<td>100.17 (9.48)</td>
<td>95.35 (8.60)</td>
</tr>
<tr>
<td>% Parents Reporting Concern*</td>
<td>106.93 (9.06)</td>
</tr>
<tr>
<td>39.39</td>
<td>38.37</td>
</tr>
<tr>
<td>22.73</td>
<td>7.52</td>
</tr>
</tbody>
</table>

* Few children exhibited low nonverbal IQ but, DYS-LL, p<0.01; LI-DYS-LL, p<0.05; Li-DYS, p<0.09

Correlations

- Most parents of children with a language or reading impairment did not report concern for their child’s reading and/or language abilities.
- Parents of children with LI only were less likely to report concerns than parents of children with both.
- There was a strong positive correlation between dyslexia screening and assessment scores (TOSWRF and WRMT-3) and a moderate positive correlation between language screening and assessment scores (GRADE LC and CELF-4).

ROC curves suggested that the TOSWRF is a good predictor of dyslexia and that the GRADE LC is a fair predictor of LI. However, the TOSWRF performed better as a predictor of LI than the GRADE LC.

- This is due, in part, to the fact that the majority of the LI population also had dyslexia.
- The predicted probability did not substantially improve the prediction of dyslexia relative to the TOSWRF alone, but it did improve the prediction of LI, relative to either single screening.
- Overall, these findings suggest that brief classroom screens have the potential to provide a cost-effective method of flagging children with dyslexia and/or LI, but further study is needed.
- Using group-administered screenings, identification of dyslexia is good, but improvement is needed for LI. For children with LI only, achieving high sensitivity required accepting a substantially large number of false positives.
- The current sample size is from a distinct region of the country. Future research should focus on a more regionally diverse sample.


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