Abstract

Phonemic awareness (PA) is a robust predictor of literacy in typically developing (TD) children. Despite primacy of literacy as fundamental to learning, little information exists documenting reading skills of children with cerebral palsy (CP), the most common condition associated with childhood physical disability. Traditional standardized tests of PA require either clear speech or consistent pointing ability. The current study demonstrates the need for accessible assessment methods of literacy for children with severe speech and physical impairment (SSPI). Pilot data associated with aspects of PA are presented, and adapted measures of PA are proposed and discussed.

Methods

Instruments and Procedures

CTOPP Elision - provides information on phonemic awareness, an important predictor of reading acquisition. PIAT-R/N and Modified Tests by Group

PPVT-III - provides estimation of overall intellectual ability.

Modified CTOPP Elision: The test is presented on a computer screen using BoardMakerTM software. A force-choice format is used to select the picture of the target word. Children were randomly assigned to either a HeadMouse® or switch for the Adapted versions of tests. Participants: Our sample was comprised of two groups of children (total n=48) aged 6-12 years who were matched by scores on the PPVT-III (SS within 1.3), age (within two years), and gender.

Demographic and Developmental Characteristics by Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>CP</th>
<th>SSPI</th>
<th>TD</th>
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</thead>
<tbody>
<tr>
<td>Gender (% female)</td>
<td>54.2%</td>
<td>57.1%</td>
<td>62.8%</td>
</tr>
<tr>
<td>Birth weight (lbs)</td>
<td>3.8 (0.2)**</td>
<td>3.0 (0.2)</td>
<td>3.3 (0.2)***</td>
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<tr>
<td>Gestation if premature (weeks)</td>
<td>28.9 (3.2)*</td>
<td>33.8 (4.3)***</td>
<td></td>
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<tr>
<td>Socioeconomic Status</td>
<td>2.8 (7.9)</td>
<td>3.5 (7.7)</td>
<td></td>
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<tr>
<td>History of seizure</td>
<td>21%</td>
<td>0.0%</td>
<td>0.0%</td>
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</tbody>
</table>

Note: Standard deviation above the diagonal and modified version below the diagonal.

° p < 0.01
** p < 0.001

Findings

The CTOPP Elision-Adapted generated inflated scores in both TD children and children with CP. While CTOPP Elision-Adapted scores were NOT significantly correlated with scores on Reading Comprehension in both the TD group and the CP group. Type of assistive technology access (HeadMouse® v. switch) did not affect scores.

Conclusions

Initial results from the study suggest that while adapted measures of intellect and reading comprehension were psychometrically comparable to standard versions, the CTOPP Elision-Adapted generated inflated scores in both TD children and children with CP. Nonetheless, significant correlation was found between both the standard and adapted version of CTOPP Elision and Reading Comprehension in TD group and the group with CP. This may suggest that while the adaptations made to CTOPP Elision render the test unacceptable as a proxy for the standard CTOPP Elision, the technique of using pictorial, multiple choice items to measure PA among children with SSPI holds promise.

Although our sample was small, findings to date suggest that PA may be a reliable predictor of literacy outcome in children with CP. This question warrants further investigation, as the creation of valid, reliable adapted measures of PA will further our understanding of the complex nature of literacy in children with CP and SSPI, and contribute to the development of optimal teaching and learning strategies for these children.

Future Directions

Novel and adapted measures of PA that follow a hierarchy of difficulty corresponding to that accepted in the literature on PA: (Identification, segmentation, and manipulation)

Accessible Elision – Uses forced choice format

Requires isolation and manipulation of phonemes in words

Uses novel prompt and target words for all items.

Accessible Phonemic Awareness

Assesses PA at levels of identification, segmentation, and manipulation

Uses colored squares to represent phonemes

Presents squares in virtual buttons using computer software

Requires no verbal response

Acknowledgements

This work was supported by a U.S. Department of Education, Office of Special Education Programs (OSEP) Model Demonstration Project award H234M020077, NIH R21 HD052592-01A, and NIDRR FI H133G070044.