Investigation of Differences in Performance on a Language Screener by Early and Late 4-Year-Olds

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Disclosure Statement: Investigation of Differences in Performance on a Language Screener by Early and Late 4-Year-Olds

Disclosure:
Samantha Ward has no relevant financial or nonfinancial relationships to disclose.

Rachel Well is associate professor at East Stroudsburg University and supervised Samantha Ward on this project as part of her Honor's thesis requirements. Partial retrospective data was initially collected as part of a Blue Ribbon Foundation grant to perform speech-language, and hearing screenings for local low-income families titled Speech–Language–Hearing Screenings for Monroe County Head Start.

Background

- Speech and language screeners are hypothetically designed as a preventative measure for early identification and with at risk children.
- Speech and language delays and disorders have been shown to negatively impact social skills, school success, and behavior (Nelson, Nygren, Walker, & Pancoska, 2006; Vinson, 1999/american Speech-Language-Hearing Association, n.d.).
- Early identification of speech and language disorders provides opportunities for intervention to begin when it is most beneficial during earlier ages (Nelson, Nygren, Walker, & Pancoska, 2006).
- Evidence is limited regarding the validity of screening tools, and particularly the differences in performance within age groups.
Study Impetus and Questions

Cursory observations over years of screening preschool children suggested that children who were marginally qualifying for an age classification were more likely to fail the assigned screener.

Do significant differences in competency exist within age groups when using the PLS-5 screener?

Should additional considerations be made if a child marginally fits into a designated age group?

Study Focus

1. Investigate how performance varies within age groups on the PLS-5 screener
2. Identify skills which impact performance on the screener
3. Support current research which suggests current screening tools have reduced validity
4. Determine the clinical implications of findings which will inform speech language pathologists regarding accommodations to testing protocols when using screener with younger children within a scoring age category

Rationale and Hypothesis

- **Rationale**: There is limited research on the validity of the PLS-5 screener, specifically investigations into how results vary within age groups. It was observed that younger children within a scoring age category were failing the screener.

- **Hypothesis**: It was hypothesized that a significantly higher number of children in the oldest 4-year-old age group would pass the screener when compared to the youngest 4-year-old age group.
Method

- Subjects: Screen test forms from 4-year-old children attending Monroe County Head Start classrooms.
- Testing was completed using the PLS-5 screeners by graduate students in the Department of Communication Sciences and Disorders and supervised by ASHA certified SLPs between 2015 and 2017.
- Parental consent was obtained for the screening and an IRB was in place to use the data for research purposes.
- Analysis of pass/fail rates was collected for the overall language screen, subtest 1, subtest 3, subtest 5, and parts a, b, and c for each subtest.
- Information was only analyzed for children in the 4-year-old age group, and
- Children who did not pass the hearing screening were excluded.

Methods Cont.

- Scores were divided into three groups based on specific age details: group A (40-44), group B (44-48), and group C (48-50).
- Data was compiled for 173 students. Following inclusionary/exclusionary criteria, a final count of N=129 was analyzed.
- Each age group was matched to lowest group count (N = 43 per group). Elimination of excessive counts across groups was performed with a randomization measure.
- Results were statistically compared for significant differences between group and subtest scores.

Subtest Information

- Subtest 1: I understand your name and address (subtest 1, 2, 3, 4, 5, 6, 7, 8, 9, 10)
  - The teacher is in the room
  - The teacher is not in the room
  - The child is in the room
  - The child is not in the room

- Subtest 2: The teacher's name
  - The teacher is in the room
  - The teacher is not in the room
  - The child is in the room
  - The child is not in the room

- Subtest 3: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 4: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 5: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 6: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 7: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 8: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 9: I answer questions about hypothetical events
  - You answer 10 questions correctly

- Subtest 10: I answer questions about hypothetical events
  - You answer 10 questions correctly
Table 1: Age Group Pass Rate Percentage: Across Subtests

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Pass* age Subtest 1</th>
<th>Pass* age Subtest 3</th>
<th>Pass* age Subtest 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4.0-4.4</td>
<td>78%</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>2.4.4-4.8</td>
<td>90%</td>
<td>60%</td>
<td>80%</td>
</tr>
<tr>
<td>3.4.6-5.0</td>
<td>90%</td>
<td>60%</td>
<td>80%</td>
</tr>
</tbody>
</table>

Note: Subtest 1: Understands sentences with post-noun elaboration; Subtest 3: Tells how to use an object; Subtest 3: Answers questions about hypothetical events. *Significantly lower pass rate percentage compared to other groups.
Results

- Two sample t-tests were run to analyze differences in pass rate percentages between each age group.
- 8 out of 39 t-tests performed were significant.
- A significantly higher number of children in the oldest 4-year-old age group did pass the screener when compared to the youngest 4-year-old age group (Z(84)=2.055, p=.0155).
- Significant difference was identified on Subtest 1 (Understands sentences with post-noun elaboration): (Z(84)=3.111, p=.0023) between oldest and youngest 4-year-old groups.
- Subtest 1 parts a and b had significant differences between the oldest and youngest 4-year-old age groups.

Discussion

- The findings support the hypothesis that a significantly higher number of children in the oldest 4-year-old age group would pass the screener in comparison to the youngest 4-year-old age group.
- Analysis of subtests and component questions revealed significant differences were noted for overall pass rate on Subtest 1 and components a and b.

Discussion

- Significantly higher number of younger 4-year-olds failed the screener and were subsequently referred for complete speech and language evaluation.
- Results call into question the validity of the sensitivity and specificity of the screener.
- Findings suggest that speech-language pathologists should consider accommodations to testing protocol to enhance accuracy of findings, specifically when younger children within a scoring age category are being assessed.
- Accommodations include use of additional screening protocols (e.g., age below) and consideration of teacher and family input.
- If accommodated protocols do not suggest concern, consideration should be for postponing a full evaluation, and re-screening the child when he/she reaches the age where a significant difference in pass rates was identified.
Limitations

- The entire language portion of the screener was not analyzed nor was the speech portion of the screener, due to time constraints.
- Data was collected from distinct population of children attending Head Start classrooms.
- Data was only analyzed for children in the 4-year-old age range and may not apply to additional age groups.

Future Research

- Analyzing the results of all five subscores within the language portion of the PLS-5 screener and speech screener.
- Comparing current results for children across differentiated settings.
- Analyzing differences in performance for all age ranges.
- Apply accommodations and determine accuracy of referral with regard to sensitivity and specificity measures.

References

References continued


