Data quality in longitudinal research that involves multiple sites: Lessons learned from the first 5 years of the LOCHI study

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Some LOCHI numbers

- 11 assessing agencies
- 5767 questionnaires completed
- 2646 tests administered
- 14393 data entries
- 3 States
- 562 recruited children
- 36 examiners
AIM

accurate  valid  replicable
HOW?

1) Data checking/auditing processes
   - All data checked up to 3 times

2) Double scoring
   - Reliability testing
Reliability

Video / audio recording of all assessments

- Sony Digital video camera recorder (DCR-SR100E)
- AKG microphone headset (C555L)
- H4n digital recorder (240GL)

<table>
<thead>
<tr>
<th>Video</th>
<th>Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>All directly administered assessments</td>
<td>DEAP, digit span, non-word repetition, Beginners Intelligibility Test</td>
</tr>
</tbody>
</table>

(Zimmerman, Steiner & Pond, 2002)

Reliability method

• Random 10% from 2005, 2006, 2007

• Allocated to current assessors for double scoring

• All items agreed or disagreed with

\[
\text{RELIABILITY} = \frac{\text{Number of items in disagreement}}{\text{Number of items administered}} \times 100
\]
PLS4 reliability results
2005 - 2007

Expressive communication: 96.5%
Auditory comprehension: 96.9%

n = 49
## PLS4 administration quality

### RATING SCALE

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Repetitions</strong></td>
<td>Only one repetition provided per item</td>
<td>Additional repetition provided for 1 or 2 items</td>
<td>Additional repetition provided for 3 items</td>
<td>Additional repetition provided for 4 or more items</td>
</tr>
<tr>
<td><strong>Minor word changes</strong></td>
<td>Less than 5 minor word changes</td>
<td>Between 5-10 minor word changes</td>
<td>Consistent word changes throughout assessment with some impact on assessment outcome</td>
<td>Consistent word changes with significant impact on assessment outcome</td>
</tr>
<tr>
<td>(contractions, changes to single words – not key words)</td>
<td>Wording as per manual</td>
<td>Major word change on 1-2 items</td>
<td>Major word change on 3-4 items</td>
<td>Major word change on 5 + items</td>
</tr>
<tr>
<td><strong>Major word changes</strong></td>
<td>[Star] Wording as per manual</td>
<td>Major word change on 1-2 items</td>
<td>Major word change on 3-4 items</td>
<td>Major word change on 5 + items</td>
</tr>
<tr>
<td>(changes to phrases/key words that impact on meaning/processing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gestures</strong></td>
<td>No additional gestures used</td>
<td>Additional gestures provided for 1 or 2 items</td>
<td>Additional gestures provided for 3 items</td>
<td>Additional gestures provided for 4 or more items</td>
</tr>
<tr>
<td><strong>Manipulatives</strong></td>
<td>Correct manipulative used for all items</td>
<td>Incorrect manipulatives used for 1 or 2 items</td>
<td>Incorrect manipulatives provided for 3 items</td>
<td>Incorrect manipulatives provided for 4 or more items</td>
</tr>
<tr>
<td><strong>Other area (not listed above). If rating 3 or less please detail concern here:</strong></td>
<td>[No other test administration concern (other than detailed above)]</td>
<td>Minor test administration concern. Minimal impact on assessment outcome.</td>
<td>Moderate test administration concern. Moderate impact on assessment outcome.</td>
<td>Significant test administration concern. Significant impact on assessment outcome.</td>
</tr>
</tbody>
</table>

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**Note:**
- A rating of 4 indicates the highest level of quality, while 1 indicates the lowest.
- Additional repetition and gestures provide additional points towards a higher rating.
- Wording changes and manipulatives have a significant impact on the assessment outcome.
- Other areas should be detailed if the rating is 3 or less.
Rating scale results

- Other: 3.42
- Manipulatives: 3.69
- Gestures: 3.55
- Word changes - major: 3.22
- Word changes - Minor: 3.18
- Repetitions: 3.08
HOW?

- Use of standardised/norm referenced measures
- Correlations between measures
- Comparisons with functional performance
Correlations
(n = 54 HA users at 3 years)

<table>
<thead>
<tr>
<th></th>
<th>PLS - AC</th>
<th>PLS - EC</th>
<th>PPVT</th>
<th>CDI - ELQ</th>
<th>CDI - LCQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLS - AC</td>
<td>0.80</td>
<td>0.81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLS - EC</td>
<td>0.81</td>
<td></td>
<td>0.71</td>
<td>0.32</td>
<td>0.34</td>
</tr>
<tr>
<td>PPVT</td>
<td>0.80</td>
<td>0.71</td>
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<tr>
<td>CDI - ELQ</td>
<td>0.32</td>
<td></td>
<td></td>
<td></td>
<td>0.85</td>
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<td>CDI - LCQ</td>
<td>0.34</td>
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</tbody>
</table>

- Parents observe and record children’s functioning in real-world situations in a diary


- Early intervention teachers observe and record children’s functioning in real-world situations in a diary
Functional performance correlated with PLS-4 scores

![Graph showing correlation between PLS-4 Language score and functional performance score.](image)

- **r = 0.52, p < 0.0001**
- **n = 104**
- **3 years of age (n= 104)**

A36PEACH A36TEACH
Functional performance correlated with PLS-4 scores

- A36PEACH
- A36TEACH

\[ r = 0.52, \ p < 0.0001 \]
\[ r = 0.41, \ p < 0.0001 \]

3 years of age (n= 104)
HOW?

- Clearly defined methodology
- Strict protocols
- Additional protocols
1. NESB protocols

Specific criteria for English language exposure

English language development over time

2. Protocols for children with additional needs

Adapted protocols

Communication Matrix
www.communicationmatrix.com

3. Simultaneous Communication Protocols

Adapted protocols

Assessed using simultaneous communication
What lessons have we learned over the past five years?

1. Include standardised measures for use with targeted population
2. Develop detailed protocols to cater for needs of all children
3. Clarify scoring methods with test publishers and monitor consistency in application
4. Structure regular opportunities for communication between assessors
5. Develop processes for auditing all assessors and provide feedback
6. Monitor data entry accuracy
7. Start double scoring (reliability) early
Implications for the clinician

• Standardised assessment tools
  – Watch administration
  – Ask questions

• Reading research
  – Data quality/reliability/replication
  – www.speechbite.com
The LOCHI quality processes detailed in this presentation are designed to ensure accuracy, validity and replicability of evaluation data.
Acknowledgements

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Or visit
www.outcomes.nal.gov.au

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