Assessment of language skills in deaf children

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Presentation for Symposium Sign Bilingualism and Deaf Education
Language Assessment

Language is essential for many other school skills.

*Why do assessment?*
To evaluate development :-
  a. In an individual child over time
  b. In an individual child in comparison to the group
  c. In an individual child to determine if a language problem
  d. In a group to evaluate the efficacy of a program
Language Assessment

The **purpose** of assessment will determine which measures you choose to use. For example:

- to determine if a language problem is present, measures are needed that are normed and can discriminate.
- to evaluate the efficacy of a program general measures are more useful than very detailed descriptions and clearer.
Language Assessment

Important **criteria** for assessment tools:

- **Validity**: test what they say they test
- **Reliability**: test always in the same way
- **Practicality**: can be done efficiently
Language assessment in bilingual children

Bilingualism or multilingualism is common in many countries but a monolingual model is often adopted in creating assessment tools.

Very few instruments specifically address the bilingual situation of children:
- language input
- language dominance
- norms

Tests should take into account children’s social and cultural background e.g. identity, attitude, preferences.
Language assessment in bilingual children

Results form BISLI children on 4 tests (French)

<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVIP</td>
<td>Vocabulary</td>
</tr>
<tr>
<td>MLU</td>
<td>Sentence Imitation</td>
</tr>
<tr>
<td>NWR</td>
<td></td>
</tr>
</tbody>
</table>

Comparison to bilingual norms (same amount of exposure to French; Elin Thordardottir, 2011; in preparation)

Blue line: results of bilingual children with SLI compared to MONOLINGUAL NORM; Red line: results of bilingual children with SLI compared to BILINGUAL NORM
Language assessment in bilingual/bimodal children

• Many different types of deaf children:
  - sign language early
  - sign language late
  - no sign language
  - increased access to spoken language through a CI or hearing aids.

• Most deaf children are bilingual : bimodal
  Deaf parents speak and sign with their deaf children : more than 80% of their input in bimodal (Baker & van den Bogaerde 2012)

• Assessment procedures need to reflect this bimodal bilingualism
Language assessment in bilingual/bimodal children

The importance of the language input

What is the form of the bimodal bilingualism?

- sign with some speech? Grammar of the sign language?
- speech with some sign? Grammar of the spoken language?

Which modality is offering full information?
Language assessment in bilingual/bimodal children

Consider all these issues in the light of recent work on bilingual language assessment:

No need to reinvent the wheel.

COST ISO804 action: European network of researchers

Language Impairment in a Multilingual Society: Linguistic Patterns and the Road to Assessment
2. In some countries this is inherent.
3. These bilingual children form the majority of the school population.
4. Teachers and practitioners face a diagnostic dilemma.
5. Emphasis on finding language disorders
6. The linguistic manifestations of child second language acquisition and development language disorder are similar.

More than 200 researchers from 27 countries including USA, Canada, South Africa, Middle East, Far East.
Instrument development for bilingual populations

LITMUS = Language Impairment Testing in Multilingual Settings:

a. Parental questionnaires
b. Narrative and Discourse tasks
c. Grammatical tasks
d. Lexical tasks
e. Non Word Repetition tasks
f. Non-verbal cognitive tasks
Definitions

1. **Bilingual children**
   Children functioning in two (or more) languages: **including sign languages** (production/comprehension) including simultaneous and sequential bilinguals.

2. **Bilingual language impairment**
   Children below chronological age in **both** languages. Must have enough input in both.
LITMUS tasks

Instrument development:

a. Parental questionnaires
b. Narrative and Discourse tasks
c. Grammatical tasks, in particular Wh-Questions task & Sentence Repetition Task
d. Lexical tasks
e. Non Word Repetition tasks
f. Non-verbal cognitive tasks
Parents Bilingual Questionnaires
PaBiQ *(Tuller 2013)*

1. Was the child late in language development?
2. Is there a family history of language difficulties?
3. How rich has language exposure and use been?
4. How rich is current language use and exposure?
# Parents Bilingual Questionnaires

**PaBiQ: Sections**

<table>
<thead>
<tr>
<th>Sections</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General info. about the child</td>
<td>Birth date, country of birth, languages currently spoken, Lg. most at home in.</td>
</tr>
<tr>
<td>2. Child’s early history</td>
<td>1st word, 1st sentence, early Lg. concerns, hearing problems, Lg. exposition &lt; age 4 (frequency—never/rarely/ sometimes/ usually/ always, age of onset, contexts)</td>
</tr>
<tr>
<td>3. Current Skills</td>
<td>5 Items: How child expresses him/herself compared to children same age, Whether child speaks like a monolingual child of same age, Difficulties making correct sentences, Satisfaction child’s ability to express him/herself, Whether child feels frustrated when unable to communicate.</td>
</tr>
<tr>
<td>4. Languages used at home</td>
<td>Lg. used between child and parents/other adult/siblings, Lg.-related activities.</td>
</tr>
<tr>
<td>5. Language richness</td>
<td>Weekly extra-curricular activities in each Lg., Lg. with playmates, Lg. with family friends</td>
</tr>
<tr>
<td>6. Information about the mother and the father</td>
<td>Country of birth, Lg. at workplace, years of education, self-assessment of each Lg.</td>
</tr>
<tr>
<td>7. Difficulties</td>
<td>with reading and spelling, understanding, expressing oneself (siblings, mother, father)</td>
</tr>
</tbody>
</table>
Parents Bilingual Questionnaires
PaBiQ

Summary of research findings
(Tuller 2013)

1. PaBiQ has been shown to identify bilingual children (spoken languages) with a language problem.

2. **Questionnaire use** has to be explored more with parents and teachers of deaf children.

3. Strength of identification of language problems
Narrative and Discourse Assessment

- **LITMUS-MAIN**: multilingual assessment for testing narratives
- Common elicitation procedures and scoring schemas
- For pre-school and young school aged children (3-10 years)
- Simple 6-picture stories (much shorter than Frog Story).
Narrative and Discourse Assessment

Six different stories - with several protagonists

The structure:
- something happens to a protagonist ---> goal problem solving behaviour coupled with the result of problem solving
Narrative and Discourse Assessment

- Available via COST-webpage and ZAS Working Papers in Linguistics
- Scoring system available for many spoken languages incl. English
- Not yet developed for any sign language.
Grammar Tasks

1. Clitics
2. Case
3. Verb agreement
4. Relative clauses
5. Exhaustive Wh-questions (comprehension)
6. Sentence repetition
Exhaustive Wh-questions

Who is sitting where?
Exhaustive Wh-questions

Single questions?
Who is sitting on a chair?
*Answer: father and grandma*

Multiple questions
Who is sitting where?
Who is doing what to whom?

Test available in English and many other spoken languages
No test yet developed for any sign language.
### Sentence Repetition

**Sensitivity**: how many disordered children are identified as disordered?

**Specificity**: how many non-disordered children are identified as non-disordered?

<table>
<thead>
<tr>
<th>Task</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Accuracy</th>
</tr>
</thead>
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<tr>
<td><em>Sentence Recall</em></td>
<td>90%</td>
<td>85%</td>
<td>88%</td>
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<tr>
<td>Non-word Repetition</td>
<td>78%</td>
<td>87%</td>
<td>82%</td>
</tr>
<tr>
<td>Past tense</td>
<td>74%</td>
<td>89%</td>
<td>80%</td>
</tr>
<tr>
<td>Third person</td>
<td>63%</td>
<td>90%</td>
<td>74%</td>
</tr>
</tbody>
</table>

As a clinical marker in English

*Conti-Ramsden, Botting & Faragher 2001*
Sentence Repetition Task
LITMUS-SRT

• Must use language structures that discriminate development in monolingual and bilingual settings (avoid ceiling or floor effects)

• Developed in more than 20 spoken languages
Sentence Repetition Task
LITMUS-SRT

Specific for the LITMUS-SRT test:

1. Sentences increase in complexity (3 levels)
2. Movement and embedding are complex in all languages
   a. No embedding, simple canonical sentences
   b. Simple sentences with embedding
   c. No embedding but movement
   d. Embedding and movement
Sentence Repetition Task

LITMUS-SRT

Example of 3 levels in LITMUS – SRT- English

Level 1
- Simple sentences, one auxiliary or modal
- Simple sentences, het-condition
- Short actional passives
- Who/what wh-questions
- Bi-clausal sentences, coordination and complement sentences

Level 2
- Simple sentences, auxiliary + modal and simple negations
- Complex Negations (two auxiliary/modal + negation and Satzklammer)
- Long actional and reversible passives
- Wh-object which questions, indirect object wh-questions
- Bi-clausal sentences, complement clauses and adjunct clauses

Level 3
- Object relative clause, right branching
- Subject relative clause, centre embedding
- Sentence with conditionals
- Object clefts with actives, subject clefts with passives
- Sentences with nouns taking complements
Sentence Repetition Task
LITMUS-SRT

1. Tests all linguistic levels (syntax, morphology, phonology, semantics) and phonological memory
2. Good information as a screening tool or progress tool for group results
3. Also information of strengths and weaknesses of a child.
4. Quick to administer
5. Has been developed or in development for several sign languages, e.g. ASL, BSL, DGS, NGT.
Cross-linguistic lexical tasks

Vocabulary is very important:

• Indicator of language problems
• Predictor of reading skills
• Needs to be measured in both languages
• Bilingual norms needed
Cross-linguistic lexical tasks

Cross-linguistic Lexical Tasks (CLT)

picture tasks

Comprehension: picture choice

Production: picture naming

Versions: paper & pencil or electronic (touch screen)

Iconicity!
Cross-linguistic lexical tasks

Focus: Accuracy

Accuracy measured in lexical tasks (number of correct answers)

→ Can show language dominance (when comparing results between the languages of the child)
→ Can show lexical deficits in one or both languages (when comparing to monolingual or bilingual children)
→ Can show general language problem if deficits in both languages are identified

To what extent should bilingual/bimodal presentation be used? Giezen et al. In press
Cross-linguistic lexical tasks

Focus: Processing

Processing speed (reaction time RT)

Restricted processing capabilities (overall higher RT) are attested both in bilinguals


and SLI children

Lahey, Edwards, & Munson, 2001; Lahey & Edwards, 1996; Montgomery, 2002

Thus, to distinguish between the effects of bilingualism vs language impairment we need to look for specific profile of processing slow down

→ Relative lag between nouns and verbs can indicate language specific problems (SLI?)

Andreu, Sanz-Torrent, & Guàrdia-Olmos, 2012
Cross-linguistic lexical tasks

Steps to accomplish the goal

PHASE 1
Picture naming & rating procedure

PHASE 2
Best Words characteristics

PHASE 3
Age of Acquisition study

PHASE 4
Tasks composition for each language

The outcomes of PHASE 1 influenced all next phases (300 potential target words were selected shared across all languages)
Cross-linguistic lexical tasks

Steps to accomplish the goal / 1

PHASE 1
Picture naming & rating procedure

• To find out a set of words shared across all languages involved
• To establish the most universal type of pictures
Cross-linguistic lexical tasks

PICTURE DATABASE
© University of Warsaw

All pictures designed exclusively for CLT

- Reviewed by international panel
- Corrected
- Balanced for ethnicity & gender: include ethnic & gender variants
Cross-linguistic lexical tasks

Steps to accomplish the goal / 3

PHASE 3
Age of Acquisition study

• To assess the age of acquisition of CLT-candidate words in each of the languages in a comparable way across all languages involved
## Cross-linguistic lexical tasks

### PHASE 4
Lexical tasks composition:
Why word selection in CLT should be language specific?

<table>
<thead>
<tr>
<th>Language</th>
<th>Mean AoA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hebrew</td>
<td>2,08</td>
</tr>
<tr>
<td>Turkish</td>
<td>2,97</td>
</tr>
<tr>
<td>Polish</td>
<td>3,06</td>
</tr>
<tr>
<td>Lithuanian</td>
<td>3,28</td>
</tr>
<tr>
<td>Slovak</td>
<td>3,31</td>
</tr>
<tr>
<td>Lebanese</td>
<td>3,57</td>
</tr>
<tr>
<td>South African English</td>
<td>3,90</td>
</tr>
<tr>
<td>Norwegian</td>
<td>4,21</td>
</tr>
<tr>
<td>Afrikaans</td>
<td>4,37</td>
</tr>
<tr>
<td>Serbian</td>
<td>4,40</td>
</tr>
<tr>
<td>English</td>
<td>4,68</td>
</tr>
<tr>
<td>Italian</td>
<td>5,08</td>
</tr>
<tr>
<td>Spanish</td>
<td>5,20</td>
</tr>
<tr>
<td>Maltese</td>
<td>5,93</td>
</tr>
<tr>
<td>Catalan</td>
<td>7,48</td>
</tr>
<tr>
<td>Irish</td>
<td>10,50</td>
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</table>

Words may differ significantly across languages in terms of Age of Acquisition (AoA).
Cross-linguistic lexical tasks

Cross-linguistic Lexical Tasks (CLT)

Comprehension: NOUNS
- Where is a horse?

VERBS
- Who is sweeping?

Production: NOUNS
- What is this?

VERBS
- What is she doing?

Testing time total: 10 minutes
Non-Word Repetition Tasks

• Construction based on the same principles for all languages.

• **Phonotactic patterns** of the target language: e.g. for English *tlup* not possible; *trup* possible.

• **Syllable length**: 1 to 6 syllables can be included. Most discrimination between 4-5 syllable words in 5 year olds.

• **Procedure**: standard presentation via computer or recorder.
Performance on **Non-Word Repetition** as a clinical marker in English

*Conti-Ramsden, Botting & Faragher 2001*

**Sensitivity**: how many disordered children are identified as disordered?

**Specificity**: how many non-disordered children are identified as non-disordered?

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Non-Word/Sign Repetition Tasks

• Non-sign tasks designed for BSL.

• Length equated with complexity of movement.

• More work needed on their discriminatory power.
Non-Verbal Cognition Tasks

• Aim to find an area of non-verbal cognition as a marker of language impairment (independent of bilingualism).

• Multilingual children with Language impairment
  – The study of executive functions may help disentangle the effects of bilingualism and LI.
Non-Verbal Cognition Tasks

• Executive functions: “processes that control and regulate thought and action” (Freidman et al., 2006)
• Five main components of executive functions are:
  – flexibility/switching
  – fluency
  – planning
  – inhibition (response inhibition and information conflict)
  – working memory Pennington & Ozonoff (1996)
Non-Verbal Cognition Tasks

- **Summary of results to date:**

<table>
<thead>
<tr>
<th>Component of EF</th>
<th>distinguishes language problem?</th>
</tr>
</thead>
<tbody>
<tr>
<td>flexibility/switching</td>
<td>NO</td>
</tr>
<tr>
<td>fluency</td>
<td>YES/NO</td>
</tr>
<tr>
<td>planning</td>
<td>YES</td>
</tr>
<tr>
<td>inhibition</td>
<td>YES</td>
</tr>
<tr>
<td>response inhibition</td>
<td>YES</td>
</tr>
<tr>
<td>information conflict</td>
<td>NO</td>
</tr>
<tr>
<td>working memory</td>
<td>YES/NO</td>
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Non-Verbal Cognition Tasks

• Examples of tests used:

  Working Memory: visual-spatial

*Odd One out* (Henry 2001)
Non-Verbal Cognition Tasks

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  Working Memory: visual-spatial

  *Odd One out* (Henry 2001)
Non-Verbal Cognition Tasks

• Examples of tests used:

  Working Memory: visual-spatial

  *Odd One out* (Henry 2001)
Non-Verbal Cognition Tasks

• Examples of tests used:
  Inhibition: response

*Luria Hand Fist task* (Henry et al. 2012)

Child 1. copies researcher: a fist or flat hand
  a point or flat hand

  2. does reverse of researcher
Non-Verbal Cognition Tasks

- Examples of tests used:

  Planning:

  *Tower of London task* (Philips et al. 1999)
Non-Verbal Cognition Tasks

• Recommendations for bimodal bilinguals

1. Test **response Inhibition - SLI effect.**

2. BUT in every case the test used is crucial.

3. Evidence of an EF weakness in a bilingual (and monolingual) child might be a clue to a language problem, but **it is not a diagnostic.**

4. Weaknesses in EF must be taken into consideration because they affect language and nonlinguistic problem solving.
Reflections and Summary

• Assessment of both the signed and spoken language necessary – in the child and in the input.
• Goals of assessment need to be clear.
• Non-word/sign tests and sentence repetition seem to be good investments for quick measures.
More Information

• COST action website:  www.bi-sli.org
• Including FAQ for parents and clinicians (in many languages)
• LITMUS materials will become available here
• My contact details: a.e.baker@uva.nl
All COST IS0804 colleagues

In particular:
Sharon Armon-Lotem (Bar-Illel, Israel)
Shula Chiat (City, UK)
Jan de Jong (Amsterdam, Netherlands)
Ewa Hamann (Krakow, Poland)
Agnes Lukacz (Budapest, Hungary)
Petra Schulz (Frankfurt, Germany)
Elin Thordardottir (McGill, Canada)
Thank you

Dank je wel!
International Conference on Sign Language Acquisition
Amsterdam, July 1st-3rd, 2015.

Abstract submission deadline **October 1st 2014**

www.icsla2015.nl