Predictors of use of complex syntax by six-year-old children with hearing loss and their normal hearing peers: Data from the Outcomes of Children with Hearing Loss (OCHL) project

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Introduction

Children who are Hard of Hearing (HH) have been shown to have poorer outcomes as compared to their normal hearing (NH) peers across domains of language.

• Children who are HH are less accurate at inaudible grammatical morphemes

McGuckian & Henry, 2007

• Children who are HH produce more errors with simple clausal structure and less likely to produce utterances with 2+ clauses.

Eiffeland, Hardin-Jones, and Davis, 1994

• Evidence is often from children with more severe hearing losses/different populations and focuses exclusively on complement clauses and Theory of Mind.

• Research on syntactic development is still scarce.

Data Collection & Analysis

• 20 min spontaneous language samples were collected at three sites for the Outcomes of Children with Hearing Loss (OCHL) project

• Language samples were transcribed and coded following the BEPTA

Participants

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<th>NH</th>
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<tr>
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<td>70.61 - 70.70 mos</td>
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<tr>
<td>mean PTA</td>
<td>45.61</td>
<td>70.00</td>
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<td>range of PTA</td>
<td>22.76-25</td>
<td>1-20</td>
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<tr>
<td>Mean aided SII</td>
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Measuring Speech Intelligibility Index (SII)

A count-the-dot audiogram is one way to represent speech audibility, now known as SII. Each column of dots is 1/3 octave wide. The more dots there are in a column, the more important that frequency is in the speech stream. For each octave band, audibility is calculated as the proportion of audible speech after accounting for noise, hearing loss, and amplification (if worn).

Trends Adapted from Otis, Warren, & McKnight, 2012

To what extent is syntactic ability attributed to degree of hearing loss or access to the speech stream?

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Conclusions

Syntactic Differences

• Children who are HH perform below their NH peers in terms of syntactic abilities

Effect of degree of HL

• The effect size is small due to large variability in the HH group

- Like MLU and FVMC, the majority of children who are HH have a subordination index that falls below the 25 percentile of NH children’s scores.

- Clinicians should monitor syntactic skills – all HH children should be considered at risk for poorer use of complex syntax

- Therapy for children with difficulties should focus on increasing practice with sentences that contain 2+ clauses and include situations that increase exposure to such sentences.

- Aided SII, which measures access to speech when children wear their hearing aid, predicts Subordination Index scores, but PTA, which reflects unaided hearing loss does not.
• Children with unilateral hearing loss were less likely to use complex syntax in narratives

• Children with moderate-to-profound HL have difficulties in producing and comprehending sentences with phrasal movement.

• Children with mild-moderate losses performed similarly to their age-matched peers on tests of complex syntax


Questions:

1. Do children with mild-severe hearing loss differ from NH peers on expressive syntactic abilities?

2. To what extent is syntactic ability attributed to degree of hearing loss or access to the speech stream?

3. To what degree does examiner constrain a child’s output based on their knowledge of hearing abilities?

Rules for Subordination Index (SI) as indicated by SALT

Utterances containing at least one main verb were given an Subordination Index (SI) code.

- Missing subject or main verb 0
- I want to go home, He/She/It means to me 1
- All single clause utterations that the playdough utterances containing infinitival clauses She tried to offer to her other friend 2
- 2 main finite clauses meant the blue playdough because that’s my favorite color 3
- 3 main finite clauses And (‘s) oh Callie says/’s, ‘Rose, (she/it) let me have the car/it back because that one/’s really bad. 4

For 25 HH children and 25 NH children utterances containing a code of [SI], one word utterance or no SI code were hand coded for the degree to which the examiner influenced the child’s responses.

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<th>Leading Uterances</th>
<th>Response to Questions</th>
<th>Response to Statement</th>
<th>Spontaneous Utterance</th>
<th>Uterances missing copulas</th>
<th>Clarification Utterance</th>
</tr>
</thead>
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<tr>
<td>Examiners’ produce the same proportion of leading</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
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For children who are HH: 2006; for children who are NH: 2006.

References & Acknowledgements

To what degree does examiner constrain a child’s output based on their knowledge of hearing abilities?

\[ X^2 = 3.99, p < .05, N = 3659 \]