Predicting gaze behavior in children with hearing impairment from cognitive and linguistic ability

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Research question
To what extent do hearing impairment and cognitive and linguistic ability influence gaze behavior in referential communication?

Conclusions

- Increased probability of gaze-to-partner for children with mild-to-moderate sensorineural hearing impairment (SNHI)
- Effect of SNHI withstands control for receptive grammar, expressive vocabulary, and complex working memory
- Phonological short term memory (PSTM) removes effect of SNHI, revealing SNHI x PSTM interaction
- SNHI and low PSTM = twofold increase of gaze-to-partner
- SNHI and high PSTM = decreased probability of gaze-to-partner
- NWrep to identify children with SNHI in need of language intervention

Participants
HI-NH (10) and NH-NH (10) dyads
HI: M_Age = 12:6; M_PTA = 33.0 dB HL
Question-answer task
Eye tracking

Analysis
Cox regression estimating probability of gaze-to-partner
Covariates: SNHI, receptive grammar (TROG-2), expressive vocabulary (BNT), complex working memory (CLPT), phonological short term memory (NWrep)

Results

<table>
<thead>
<tr>
<th>Cox regression model</th>
<th>HR (95 % CI)</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNHI</td>
<td>1.51 (1.34-1.70) ***</td>
<td>Children with SNHI display a 51 percent increased probability of gaze-to-partner compared to NH peers</td>
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<tr>
<td>SNHI TROG-2, BNT, CLPT</td>
<td>1.45 (1.24-1.70) ***</td>
<td>Controlling for performance on TROG-2, BNT, and CLPT only marginally affects the effect of SNHI</td>
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<tr>
<td>SNHI NWrep, SNHI x NWRep</td>
<td>3.16 (1.73-5.78) ***</td>
<td>Controlling for interaction between SNHI and PSTM increases effect of SNHI...</td>
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<tr>
<td>SNHI TROG-2, BNT, CLPT, NWrep, SNHI x NWrep</td>
<td>2.86 (1.49-5.47) ***</td>
<td>...again withstanding influence from other cognitive and linguistic abilities</td>
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<tr>
<td>Low NWrep</td>
<td>2.17 (1.58-2.98) ***</td>
<td>Split on PSTM ability (-1.25 SD = 60%), twofold increase of gaze-to-partner for children with SNHI and low PSTM ability...</td>
</tr>
<tr>
<td>High NWrep</td>
<td>0.67 (0.50-0.90) ***</td>
<td>...but decreased probability among children with SNHI with high PSTM ability</td>
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</tbody>
</table>

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