Competing strategies for listening and learning in children with hearing loss
Which children are we talking about?

Grade-school children

5 to 12 years of age

Mainstreamed or home-schooled

No physical or cognitive barriers to education
What’s the problem?

(Latto & Pittman, in prep)
How do children learn new information?

Detection
- Detection of a new word

Configuration
- Forming a stable acoustic representation
- Forming a stable semantic representation

Engagement
- Using the new word with other words

(Gray, Pittman & Weinhold, JSLHR, in press)
(Storkel & Lee, Lang Cog Proc, 2011)
(Leach & Samuel, Cog Psych, 2007)
Non-Word Detection Task

Cooks make hot foo\textit{m}.

\textit{(Pittman & Schuett, Ear and Hearing, 2013)}
Non-Word Detection - Results

Overall performance

Counting too many nonsense words

Counted too few nonsense words

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Do adults with hearing loss under-detect too?

(Pittman, Pederson & Rash, in prep)
Are detection errors related to the quality of the acoustic signal?

Over-Detection Errors

<table>
<thead>
<tr>
<th>% ERRORS</th>
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<tr>
<td>40</td>
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LISTENING CONDITION

- Quiet Free Field (Unaided)
- Narrowband Ear Phones (Aided)
- Wideband Ear Phones (Aided)

HIC - NHC

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Are detection errors related to the quality of the acoustic signal?

Under-Detection Errors

% ERRORS
0 5 10 15 20 25 30 35 40

Quiet Free Field (Unaided)  Narrowband Ear Phones (Aided)  Wideband Ear Phones (Aided)

LISTENING CONDITION

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Lexical Decision Task

(Rash & Pittman, in prep)
Lexical Decision Task - Results

Group (p=.001)
Condition (p=.003)
Interaction (p=.987)

Group (p=.001)
Condition (p=.003)
Interaction (p=.987)

(Rash & Pittman, in prep)
Lexical Decision Task - Errors

RESPONSE TO NONSENSE WORDS - QUIET

Normal Hearing

- Correct: 3%
- Real: 2%
- Lexical/Category: 3%

Hearing Loss

- Correct: 25%
- Real: 3%
- Lexical/Category: 3%

(Rash & Pittman, in prep)
Lexical Decision Task - Errors

RESPONSE TO NONSENSE WORDS - BABBLE

Normal Hearing
- 17% Correct
- 1% Real
- 82% Lexical/Category

Hearing Loss
- 28% Correct
- 6% Real
- 66% Lexical/Category

(Rash & Pittman, in prep)
Conclusions

Hearing loss may reduce children’s ability to learn new words because they tend to change words they don’t know into words they do know.
Good news

This listening strategy may optimize their perception of familiar speech, particularly in adverse listening conditions.
Bad news

This listening strategy may cause them to miss opportunities to learn new words.
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