The Amplification of New Information

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Statement of Support

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Hearing Loss and Vocabulary

(Pittman (1998-2012)
(Blamey et al, 2001)

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Purpose

...to evaluate the benefits of amplification for auditory tasks that involve the detection and learning of new information.
Participants

19 children with normal hearing
22 children with hearing loss
8 to 12 years of age
Mainstreamed at grade level
Native speakers of English
Participants

15 adults with normal hearing
11 adults with hearing loss
50 to 78 years of age
Hearing aid users or candidates
Methodology

Testing
  52 dB SPL in quiet
  0° azimuth

Data collection
  Computer interface
  Digital audio recordings

Three visits
  1 Unaided session
  2 Aided sessions
Word Recognition

Children

- Aided-WB
- Aided-NB
- Unaided

Adults

- Aided-WB
- Aided-NB
- Unaided

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Word Recognition

**Children**

- Wideband (% Correct) vs. Narrowband (% Correct)

**Adults**

- Wideband (% Correct) vs. Narrowband (% Correct)
Auditory Lexical Decision
Auditory Lexical Decision

Children

- Word Recognition
- Lexical Decision

- Aided-WB
- Aided-NB
- Unaided

Adults

- Word Recognition
- Lexical Decision

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Auditory Lexical Decision

Children

Wideband (% Correct)

Narrowband (% Correct)

Adults

Wideband (% Correct)

Narrowband (% Correct)
Rapid Word Learning
Data Reduction

\[ P_c = 1 - 0.8e^{-n/c} \]
Rapid Word Learning

**Children**

- **Word Recognition**
  - Aided-WB
  - Aided-NB
  - Unaided

- **Lexical Decision**

**Adults**

- **Word Recognition**
  - Aided-WB
  - Aided-NB
  - Unaided

- **Lexical Decision**

**Task**

- **Word Learning Speed** (log 1000/n)

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Rapid Word Learning

**Children**

![Graph showing scatter plots for children's data]

**Adults**

![Graph showing scatter plots for adults' data]
What have we learned?

1. Listening and learning are significantly improved with amplification.

2. Maximizing the bandwidth improves listening and learning further.

3. Benefit of bandwidth increases as the difficulty of the task increases.

4. Potential for benefit can go undetected if judged by word recognition alone.
Thanks for listening!
(and learning)
Q&A

Why is the benefit of wideband amplification greater for more cognitively demanding tasks?

A. Chance performance is higher for these tasks
B. Subtle features in the acoustic signal become more important in more difficult tasks
C. More cognitively demanding tasks occur less frequently than easier tasks
D. Because the experiment was rigged

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