Why it’s important for children and adults to learn new information and how hearing loss interferes with that learning

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Children
5-14 years of age
116 Normal Hearing
99 Mild to Moderate Hearing Loss

College Students
97 Normal Hearing
93 Mild to Profound Hearing Loss

Vocabulary Knowledge and Hearing Loss

Vocabulary Knowledge and Hearing Loss

College Students
- 89 Normal Hearing
- 25 w/Cochlear Implants <3.5 yrs
- 68 w/Cochlear Implants >3.5 yrs

Covertino et al (2014) Word and World Knowledge Among Deaf Learners With and Without Cochlear Implants, J Deaf Studies and Deaf Ed, 19;4
How many words should a college student know?

The average undergraduate student knows between 15,000 and 200,000 words. (D’Anna et al, 1991)

Oxford Dictionary of American English:
- ~430,000 total entries
- 1000+ new entries each year
  - new words
  - new definitions to existing words

What does this mean?

Children have a lot of word-learning to do.

50,000 words
learned over 18 years (3 to 22 years)
= 7 new words everyday

Adults need to update their vocabularies too.

1,000 words per year
= 3 new words every day
52% of the words we read in books are lexical “dark matter”; they aren’t documented in conventional dictionaries.

(A) The size of the English lexicon over time. Tick marks show the number of single words in three dictionaries. p. 177

What does this mean?

Vocabulary is dynamic.

We can’t depend on formal education to teach children all the words they will need to know and use throughout their lifetimes.

The ability to learn new words must be a life-long skill.
When do we learn new words?

<table>
<thead>
<tr>
<th>Children</th>
<th>Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>On-the-job training</td>
</tr>
<tr>
<td>Home</td>
<td>Learning a second language</td>
</tr>
<tr>
<td>Friends</td>
<td>Medical terminology</td>
</tr>
<tr>
<td>Activities</td>
<td>Meeting new people</td>
</tr>
<tr>
<td>Social Media</td>
<td>Traveling to new places</td>
</tr>
<tr>
<td></td>
<td>Scientific meetings</td>
</tr>
</tbody>
</table>
Auditory Learning Tasks

Word Recognition: How well they can recognize words they already know

Lexical Decision: How well they can recognize words they don’t know

Non-Word Detection: How well they can detect words they don’t know in context

Rapid Word Learning: How rapidly they can learn new words
## Non-Word Detection 2.0

<table>
<thead>
<tr>
<th># of nonsense words</th>
<th>Example phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Clocks tick on time.</td>
</tr>
<tr>
<td>1</td>
<td>Birds <em>rike</em> long worms.</td>
</tr>
<tr>
<td>2</td>
<td><em>Dats</em> catch slow <em>bice</em>.</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>
Non-Word Detection 2.0

Rapid Word Learning

\[ P_c = 1 - 0.80 e^{-n/c} \]

Learning Speed:
3 = 1 trial (perfect learning)
2 = 10 trials
1 = 100 trials
0 = 1000 trials (no learning)
Rapid Word Learning

Rapid Word Learning

Summary

Learning new information is as important to adults as it is to children.

There are more words in a language than a person can possibly learn in a lifetime.

Because new words are created rapidly, learning new words is essential to everyday communication.
Summary

Word learning is like riding a bike. Older adults with normal hearing can learn new words as well as children with normal hearing.

Uncorrected hearing loss breaks the bike.
- Impedes the learning process
- Limits vocabulary size
- Reduces world knowledge

Correcting hearing loss with amplification fixes the bike for children and adults.