SPEECHREADING 101 (.1 CEU)

11-14-13

ASHA Conference
Chicago, IL

Seal, Wilson, & Gaul
ASHA 2013
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               Erin Gaul, SLP Student

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Office Hrs: 8:00 pm at the bar
Disclaimer Statements:

No financial ties beyond:
Dr. Seal’s salary from Gallaudet University;
HSL 210, Speechreading, is part of the teaching load.

Erin Gaul and Nichelle Wilson received travel support from the Graduate Student Association at Gallaudet University.
Course Description:

This course is designed for both oral/aural students and those who use sign language as a primary communication mode. Students will gain an understanding of the principles and techniques of speechreading and have the opportunity to improve their receptive communication skills. The course explores analytical and synthetic approaches to speechreading, effective communication approaches, and strategies used to maximize receptive communication abilities.

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Learner Outcomes:

Students should leave this course, able to:

• Define *speechreading* and associated terminology
• Identify common strategies that facilitate speechreading and contrast them with situations that make speechreading difficult
• Explain how speechreading parallels reading fingerspelling
• Show progress in meeting speechreading goals

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Lecture 1: Speechreading Basics

Terminology
Definitions
The *What’s, Who’s, When’s, Where’s, Why’s* and *How’s of Speechreading*
What is it?

The improved recognition of spoken language and sign language from visible movements of the face, mouth, and supportive gestures (Seal)
The integration of visual information with auditory information for enhanced understanding of speech (Sumby & Pollack, 1954; Tye-Murray et al., 2010)

Also referred to as lipreading, “the perception of speech by interpreting visually available movements of the face, mouth, and tongue” (Feld & Sommers, 2009, p. 1555).
When and where do we do it?

In all face-to-face human communication (here and now)

In degraded (and altered) auditory settings (noisy restaurants, sports arenas, with individuals who have different dialects)

In degraded (and altered) visual settings (large classrooms, poor lighting, with 2-dimensional viewings, like watching TV)

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And, possibly,

Our vigilance to the speaker’s visual (and auditory) communication of that message is raised.

In settings/situations when our comfort with the cognitive load of the communication message is lowered.

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Who does it?

Everybody:
hearing, hard-of-hearing, and deaf

Between 4 and 8 months of age, typically-developing infants shift their focus from a speaker’s eyes to the speaker’s mouth (and eyes), returning to the speaker’s eyes at around 12 months of age.

This gaze shift is believed to have an important role in the audiovisual foundations of the speech signal or the beginnings of speechreading. This gaze shift is also observed across all ages when the auditory signal is obscured or degraded (Lewkowicz & Hansen-Tift, 2012).

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How do we do it?

Just like we read text and different handwriting:

Mary’s father dropped off a bucket of potatoes.
Mary’s father dropped off a bucket of potatoes.
Mary’s father dropped off a bucket of potatoes.

Mary’s father dropped off a bucket of potatoes.

Just like we read fingerspelling:

M-A-R-Y (HER) FATHER DROPPED-OFF A ________
O-F POTATO __________.

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ASHA 2013
Mary’s father dropped off a bucket of tomatoes.

Barry’s father dropped off a bucket of potatoes.

Perry’s mother dropped a bucket of rutabagas.
We use “The 3 Cs”

**Context:** the language
the topic, setting, register, familiarity of communication partners

**Configuration:** articulatory shapes or (more accurately) coarticulatory shape change

**Cloze:** the brain’s ability to “read between the lines,” to capitalize on context and configuration for comprehension

Seal et al. ASHA 2013
Speechreading requires the eyes (and ears) but meaning occurs in the brain.

Linguistic knowledge is necessary for speechreading.

Speechreading requires linguistic literacy.
Lecture 2: Where’s the evidence to support speechreading and speechreading training?

To date: no experimental research with randomly assigned participants, no meta-analysis of the literature.

Descriptive reports suggest:

1. Speechreading performance varies broadly across individuals (children and adults, those with hearing loss and those with normal hearing [Erber, 1969; Lyxell & Holmberg, 2000]; males and females, and across education levels [Dancer et al., 1994]).
2. Young adults (avg. age = 21) perform better than older adults (avg. age = 76) on measures of speechreading (Feld & Sommers, 2009).

3. Speechreading performance declines in aging (commensurate with decreased visual acuity and auditory acuity) such that word recognition declines from 6% to 13% per decade beyond 60 yrs. of age (Sommers et al., 2005).
4. Speechreading performance appears to be influenced (predicted) by several cognitive tasks that also diminish in aging:
1. working memory (especially spatial word memory on a computer screen)
2. processing speed (classification tasks on a computer screen) (Feld & Sommers, 2009).

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5. “It remains unclear whether and how this [speechreading] ability can be significantly improved with training” (Richie & Kewley-Port, 2008, p. 1607).
Spoken language is **both auditory and visual**. Spoken language is NOT just an auditory language; it is very much a visual language. Individuals with normal hearing and individuals with hearing loss rely on the integration of auditory and visual representations of spoken language to derive meaning.

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Lecture 3: Assessment to determine if training makes a difference

1. Assess at a perceived level (self- or caregiver- or observer as informant):

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## Reliance on and Success at Speechreading

<table>
<thead>
<tr>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Minimal 25%</td>
<td>Moderate: 50%</td>
<td>A lot: 75%</td>
<td>Totally Reliant: 100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not 0%</td>
<td>Minimal 25%</td>
<td>Moderate: 50%</td>
<td>Good: 75%</td>
<td>Very Good: 100%</td>
</tr>
</tbody>
</table>

Important to improving your speechreading skills is personal awareness of how well you do in different settings and with different individuals. Choose 3 different settings/3 different individuals, and rate your reliance on and success with speechreading.

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Important to improving your speechreading skills is personal awareness of how well you do in different settings and with different individuals. Choose 5 different settings/5 different individuals, and determine AFTER your experience:

1. Your reliance on speechreading in this one setting/with this one individual:

2. Your success with speechreading in this one setting/with this one individual:

3. Explain your ratings

### Beginning of Semester:

<table>
<thead>
<tr>
<th>Setting/Date</th>
<th>Reliance on Speechreading</th>
<th>Success at Speechreading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/3/13</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Market</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Home</td>
<td></td>
<td>5</td>
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</table>

### Mid Semester:

<table>
<thead>
<tr>
<th>Setting/Date</th>
<th>Reliance on Speechreading</th>
<th>Success at Speechreading</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/7/13</td>
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<td>3</td>
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<tr>
<td>Market</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Store</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

### End of Semester:
2. At an analytical level:

The Word Intelligibility by Picture Identification

The Craig Speechreading Test: Words and Sentences—closed set pictures

The Iowa Build-a-Sentence Test (2008): Closed set, varied levels of difficulty

Seeing and Hearing Speech: vowels, consonants, syllables, words

The Binnie Viseme Test: viseme groups

Seal et al. ASHA, 2013
Each sentence has one of four syntactic structures and includes two to four words from a closed set of 36 words

The _______ watched the ______.
The _______ watched the ______ and the ______.
The _______ and the ______ watched the ______.
The _______ and the ______ watched the ______ and the ______.

bear  cat  deer  fawn  geese  men  saint  team  whale
bird  cook  dog  fish  girls  mice  seal  toad  wife
boys  cop  dove  fox  goat  mole  snail  tribe  wolf
bug  cow  duck  frog  guest  moose  son  troop  worm
3. At a synthetic level:

The CID Everyday Sentences
The CUNY Lipreading Test

Visual Tracking or
Continuous Narration, Monologue, or Discourse Tracking
Continuous Discourse Tracking
Connected Discourse Tracking

- Mimics characteristics of a lecture, story, or conversation
- Requires a prepared text, but can move to spontaneous conversations
- Usually combines both V and A for “best” situation but can occur in quiet or noise

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Continuous Discourse Tracking (% accuracy in repeating the sentences)

Story 1: My Dog

When I was a little girl, I had a pet dog. My dog was very smart, and I taught him to do many tricks. He could sit up, roll over, and bring in the newspaper. When anyone knocked on the door, the dog would bark and wag his tail. If he wanted to go outside for a walk, he would stand on his back legs and put his paws on the doorknob.

# of words repeated _____ / 72 words total = ____________%

Story 2: Swimming Lessons

A group of boys and girls are taking swimming lessons. They are learning the front crawl, back crawl, breast stroke, and side stroke. They go for two hours every morning, except Saturdays and Sundays, for three weeks. On the last day, they will be given a test, and if they pass the test, they will receive a certificate.

# of words repeated _____ / 58 words total = _____________%

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4. At a distracted, degraded, or difference level:

- Any previous test (or test form) in competing noise: Two-talker conversation, multi-talker babble, street noise, music
  With and without amplification
  With or without audible voice
- Any previous test with degraded vision: Poor lighting (reduced light, increased glare)
  Talker interference (hands around mouth, excessive facial hair, chewing gum/eating, etc.)
- Any previous test with unfamiliar test administrators

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<table>
<thead>
<tr>
<th>Students</th>
<th>01 M CIs</th>
<th>02 F HAs</th>
<th>03 F HAs</th>
<th>04 M HAs</th>
<th>05 F CI ELL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Craig Speechreading Test: Sentences</td>
<td>79</td>
<td>94</td>
<td>91</td>
<td>85</td>
<td>67</td>
</tr>
<tr>
<td>CID Everyday Sentences</td>
<td>96</td>
<td>94</td>
<td>95</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>Iowa Build-a-Sentence Test</td>
<td>83</td>
<td>96</td>
<td>88</td>
<td>100</td>
<td>92</td>
</tr>
<tr>
<td>Continuous Visual Tracking Test</td>
<td>95</td>
<td>94</td>
<td>95</td>
<td>91</td>
<td>11</td>
</tr>
<tr>
<td>Binnie Viseme Test</td>
<td>86</td>
<td>96</td>
<td>86</td>
<td>84</td>
<td>80</td>
</tr>
</tbody>
</table>
Individual Goals or Targets

On the Midterm exam:
I will improve my speechreading skills by _______
(Choose your top 5 preferences)
___ Working on vocabulary from my difficult courses.
___ Working on phrases my hearing friends use.
___ Working on sentences from texting conversations.
___ Working on paragraphs from my most difficult courses.
___ Working on speech sounds that give me trouble (e.g., l, r, k, g, ng, h)
___ Working on words that look the same on the mouth (e.g., prevent, befriend)
___ Working with computer programs and internet exercises
___ Working with different speakers (not just my classmates)
___ Working in different noise conditions
___ Working in different light conditions
Anything else you’d like to work on? ______________________________________
Choose your top 5 for 23–27.

a. Working on vocabulary from my difficult courses.
b. Working on phrases my hearing friends use.
c. Working on sentences from texting conversations.
d. Working on paragraphs from my most difficult courses.
e. Working on speech sounds that give me trouble (e.g., l, r, k, g, s, h)
f. Working on words that look the same on the mouth (e.g., prevent, befriend)
g. Working with computer programs and internet exercise
h. Working with different speakers (not just my classmates)
 i. Working in different noise conditions
j. Working in different light conditions

________________________ (what else would you like to work on?)

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Lecture 4: Speechreading Training

- Training across meaningful language:
  Academic language, social language, personal interests
  With multiple speakers: Various dialects, ages, across varying hearing levels (including deaf speakers)

- Training at an analytical level:
  Stress patterns, consonant combinations, new words
  e.g., rebel and rebel, present and present, contract and contract, content and content, etc.

- Training at a synthetic level:
  Personal anecdotes, short paragraphs, textbook readings, video-recorded speakers/VLOGs

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Group or Individual Activities

- Value in both
- But as we customize the material for their goals, the activities become more individual.

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With or without audition?
With or without signing?
With or without print?

S-A-N-D-W-I-C-H-I-N-G

We encourage the students to use all their resources, including their hearing and their signing.

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Speechreading Training

And we give homework:
Trying to bridge the activities from our class to other classrooms or academic interactions
And their personal interactions
And their experiences with media or 2-dimensional communication

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<tbody>
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<td>12/31/10</td>
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<td>3</td>
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<tr>
<td>1/2/11</td>
<td>1</td>
<td>2</td>
</tr>
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<td>1/2/11</td>
<td>1</td>
<td>2</td>
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<tbody>
<tr>
<td>1/5/11</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3/1/11</td>
<td>3</td>
<td>3</td>
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Sample Analytical Activity

- Quiero que trabajar.
- Me gusta tu vestido.
- Tengo dos gatos.
- Mis manos son sucios.
- El chico es muy alto.

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Hi R.
It's Nichelle, from your speechreading class. I'm reminding you to email me some familiar words from your accounting class. It can be 5-6 accounting words that your teacher has been using in class this semester.

Please send them by Monday, to give me a chance to make sentences with the words, for your Tuesday class.

Thanks and have a good weekend!
Sample Synthetic Activity (Visual Tracking)

Story 3: A Bus Trip

Last summer we took a trip by bus. We traveled all through western part of the United States. We saw many interesting cities and stopped in Denver, Las Vegas, and San Francisco. The bus was air-conditioned, so it was never uncomfortable. When it was time to eat, we usually stopped at a fast-food restaurant along the highway.

# of words repeated ___ / 57 words total = 19 %

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References


References


Thank you for attending!

For a fun look at the McGurk effect and political humor, see:

www.badlipreading.com

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Questions?

Questions are guaranteed in life; Answers aren't.
Final Exam:

1. Define speechreading. How is it alike/different from reading fingerspelling? Reading handwriting?
2. What evidence is there that infants use speechreading?
3. What are the 3Cs of speechreading?
4. What do we know from the research literature about the impact of aging on speechreading?
5. What cognitive skills appear to predict speechreading skills?
6. Identify an analytical speechreading test.
7. Identify a synthetic speechreading test.
10. Rate your own learning from this course.