Assessing Hearing and Speech Recognition

Audiological Rehabilitation

Quick Review

• Audiogram
• Types of hearing loss
  – _________ hearing loss
  – _________ hearing loss
• Testing
  – Air conduction
  – Bone conduction
Familiar Sounds Audiogram

Quick Review

- Air –bone gap
- Sound level
- Frequency
- ______ Average (PTA)
- Most comfortable loudness
- ______________ loudness level
How Hearing Loss Affects Speech Recognition

- _______ - In quiet situations, speech recognition is barely affected. In the presence of noise, speech recognition may decrease by _____.
- __________ - If the situation is quiet, face-to-face, and the topic of conversation is known, most will be understood.
- _______ - If a hearing aid (HA) is not used, most or all of the conversation will be missed. Great difficulty conversing in groups.
- _______ - May not even hear voices unless speech is loud. Without HAs the person will probably not recognize any speech.
- ________ - May perceive sounds as vibrations. Will rely on vision as the primary sense for speech recognition. May not be able to detect even loud sounds without HAs.
Simulation of Hearing Loss

250 Hz LP

Simulation of Hearing Loss

500 Hz LP
Simulation of Hearing Loss

1000 Hz LP

Simulation of Hearing Loss

2000 Hz LP
Simulation of Hearing Loss

4000 Hz LP
Speech Recognition

• Definition- Refers to the _______ of ________ information through listening, lipreading, or speechreading.

Speech Recognition Testing

• Speech Reception Threshold (SRT)
  – The lowest presentation level for spondee words at which ____ can be identified correctly

• Speech discrimination score
  – The percentage of ________ words presented at a comfortable listening level that can be correctly repeated
Purpose of Speech Recognition Testing

• To determine the need for ___________
• To compare performance with a listening aid to the performance without an aid
• To compare different ___________
• To demonstrate the benefits of ________ information in understanding speech information
• To determine how they perform in adverse situations

Purpose, cont.

• To assess performance ____________
• To determine need for ______________ training
• To determine placement within a training curriculum.
• To determine if ____________ has been achieved.
Patient Variables

- How would you expect the following variables to affect Perception Testing?
  - __________________
  - Hearing ability
    - With and without listening device
  - Maturity
  - __________________
  - Other disabilities

Stimuli Units

- Phonemes
  - Allows ________ errors to be examined
    - Can determine speech features (voicing/manner/etc) they are utilizing
  - Advantage: Performance is relatively independent of ___________
  - Disadvantage: Phoneme stimuli have poor face value

- Words
  - Most commonly used stimuli
    - Most lists are phonetically balanced
  - Have somewhat higher _________ than phonemes
    - We speak in words, although not words in isolation
  - Can be scored by ___________ or __________________
    - Allows for more concrete understanding of how well a person is performing
Stimuli Units, cont’d

• Phrases and sentences
  – Unrelated vs. Topic-related
    • Performance will be better with _____________ sentences
  – Have a high face validity
    • Better reflection of how a patient is performing in _____________ communication
  – Performance is affected by linguistic knowledge and memory

Test Procedures

• Test conditions
• Response format
• Live-voice vs. _____________
Test Conditions

• ___________ - Only the auditory signal is presented usually at a normal or moderately loud conversational level
  – May be presented in quiet or in noise
• ___________ - Only the visual signal is presented, usually showing the head and neck of the talker (lipreading)
• ___________ - Auditory and visual signals are presented (speechreading)

Signal-to-noise ratio

• The level of a signal relative to a ______________. Indicates the difference between the signal and the ______.
  – If the signal is presented at 60 and the noise is presented at 50 then the SNR is ______.
  – If the signal is presented at 35 and the noise is presented at 40 then the SNR is ?
Response Format

• ________ format- No response choices and no contextual cues are provided. The material is not familiar to the patient.

• ________ format- Provides a fixed set of response choices and are easier than open-set format.

• ________ format- Falls between open and closed-set response formats

Live-voice vs. Recordings

• ________ allows you to adjust to the performance needs of the patient
• Children may be more comfortable with live-voice
• Recorded material does not introduce ______________

• Recorded materials have a higher test-retest reliability
Children’s Visual Enhancement Speech Test (CHIVE)

- Developed by Tye-Murray & Geers, 1997
- Test: ______________
- Stimuli: Uses 40 words
- ______ of test words are highly likely to be recognized in a vision-only condition, and ______ are less likely.
- Response: Open Set
- Subjects: a diverse group

California Consonant Test (CCT)

- Developed by Owens and Schubert, 1977
- Test: ______________
  - Particularly sensitive to the phoneme recognition difficulties of persons with High Frequency HL
- Stimuli: Uses words
- Response: __________ response format
- Subjects: Adults
- Ex) BACK___ BAG___ BATH___ BATCH___
Northwestern University
Children’s Perception of Speech
(NU-CHIPS)

• Developed by Elliott and Katz, 1980
• Stimuli: uses ____ monosyllabic words
• Response: Closed-set (four picture choices)
• Subjects: Used with children who have a vocabulary age ______ or older

Word Intelligibility by Picture Identification (WIPI)

• Developed by Ross and Lerman, 1971
• Stimuli: ____________ words
• Response: This test has 25 picture plates with 6 pictures per plate. Closed set
• Age: This test can be successfully used with children ___ yrs to approximately ___ yrs who have appropriate auditory language and vocabulary levels.
Phonetically Balanced Kindergarten (PBK)

- Developed by Haskins, 1949
- Stimuli: list of 50 monosyllabic words
- Response: ________
- Subjects: children

Northwestern University Auditory Test No. 6 (NU-6)

- Developed by Tillman and Carhart, 1966
- Stimuli: Uses monosyllabic words (____ words per list)
- Response: Open set
- Subjects: used with _______
  - Can be scored as whole word correct and number of phonemes correct
Bamford-Knowal-Bench Sentences (BKB)

• Developed by Bench and Bamford, 1979
• Stimuli: Sentences constructed with vocabulary familiar to ______ yr old hard-of-hearing children
• Response: Open set
• Subjects: Used with ______ children and adults

Central Institute for the Deaf (CID)
Everyday Speech Sentences

• Developed by Davis and Silverman, 1978
• Stimuli: Sentences that vary in length and structure
  – Walking’s my favorite exercise.
  – Here we go.
  – How do you feel about changing the time when we begin work?
• Response: Open set- _____ sentence lists
• Subjects: Used with older children and adults
• Allows for assessing auditory function with additional __________ information
Speech Perception in Noise (SPIN)

• Developed by Kalikow, Stevens, and Elliot, 1977
• Stimuli: Sentences that have either ____ context (H) for the last word in the sentence or ____ context (L)
  – The watchdog gave a warning growl (H)
  – The old man discussed the dive (L)
• Response: Open set, presented with ____________, speech babble
• Subjects: Used with adults

Nonsense Syllable Test

• 7 lists of ___ nonsense syllables
• Tests mostly ______ frequencies
• Completely devoid of context
• The patient must repeat nonsense syllable back
• Response: open set
• Subjects: children and adults