Analysis of the Common Sounds Audiogram: Recommendations for Revision

Cory L. Hillis[1], Lisa S. Davidson[123], and Rosalie M. Uchanski[12]

[1]Program in Audiology and Communication Sciences, Washington University School of Medicine, St. Louis, MO.
[2]Department of Otolaryngology, Washington University School of Medicine, St. Louis, MO.
[3]Central Institute for the Deaf, St. Louis, MO.

Introduction

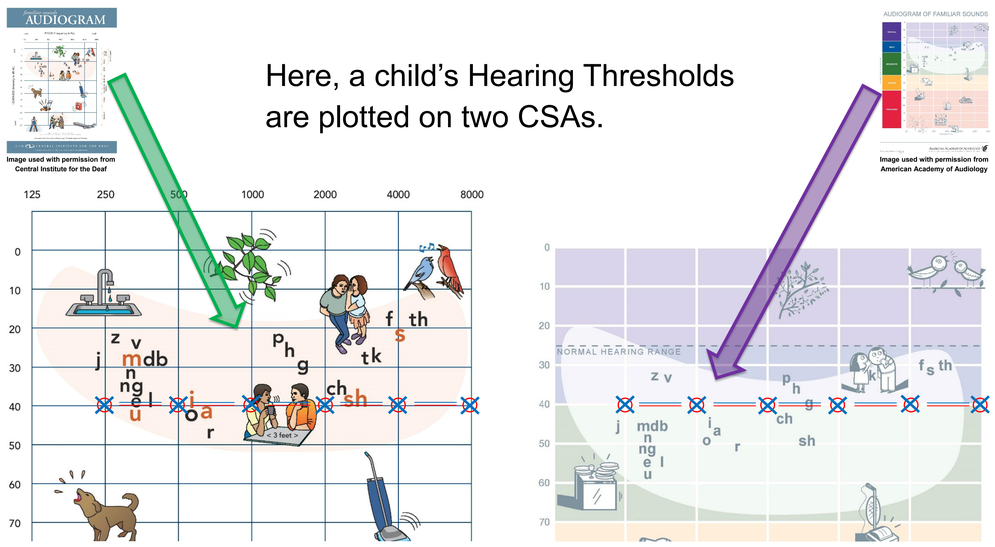
The Common Sounds Audiogram (**CSA**) helps parents and caregivers understand:

- the child's hearing loss, and
- the impact of the child's hearing loss on speech audibility.

Problem #1

CSAs are not consistent:

- Many CSAs exist and they differ. Their dissimilar content can lead to quite different interpretations by parents and caregivers.



- The CSA on the left indicates most speech energy would be <u>inaudible</u> to the child while the CSA on the right indicates most speech energy *would be* audible to the child.

Problem #2

Most **CSA**s exclude important counseling and interpretation information, such as:

<u>DISTANCE MATTERS</u>

Greater distances cause all sounds to shift up on the CSA (i.e., become "softer," or possibly inaudible, to the child).

<u>DETECTION ≠ RECOGNITION</u>

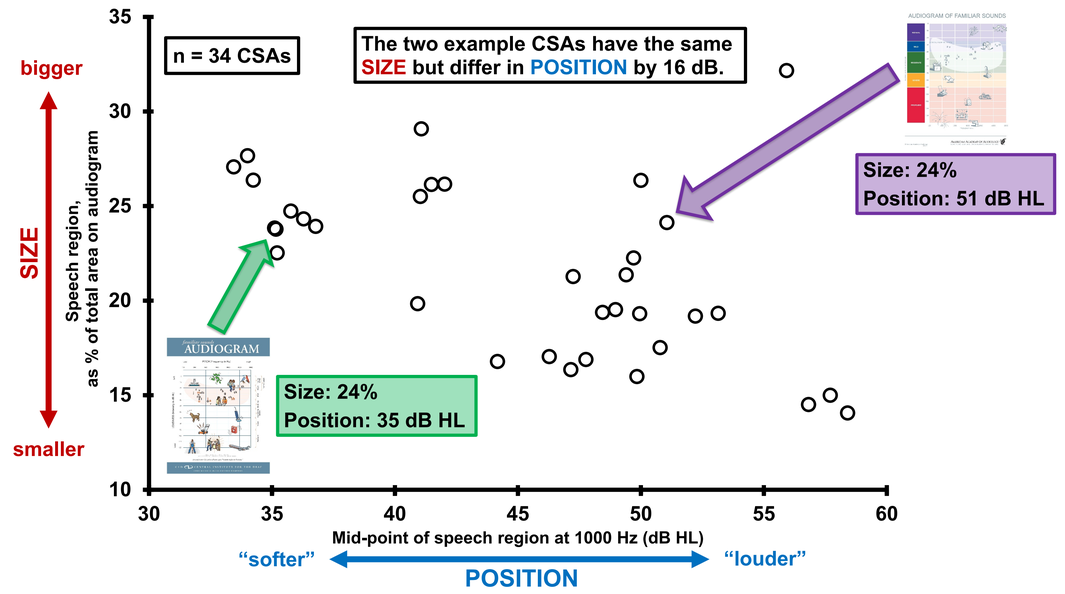
CSAs illustrate detection, not recognition.

- Detection is *NOT* the same as recognition. For example, the vowels /i/ and /u/ might both be detected (audible), but they might sound very similar to the child. Hence these two speech sounds might not be recognized correctly. Detection is necessary, but not sufficient, for the accurate recognition of speech sounds.
- Parents and caregivers may not be aware of the distinction between detection and recognition, <u>and</u> which one the CSA represents.

Quantifying These Problems

Examine CSAs' content, specifically the <u>size</u> and <u>position</u> of the **speech regions** (aka 'speech bananas') and the presence of counseling information.

<u>Results #1</u>: The <u>SIZE</u> and <u>POSITION</u> of **speech regions** of 34 CSAs.



- The <u>SIZE</u> **<u>of the speech region</u>** (% of the audiogram) varies from 13% to 33%.
- The <u>POSITION</u> **<u>of the speech region</u>** varies from 33 to 59 dB HL, a 26 dB difference.

<u>Results #2</u>: The presence of Counseling and Interpretation information

	Distance from talker/sound source	Detection vs. recognition
Number of occurrences	7	8
Prevalence	21%	24%

- More than 75% of the CSAs: 1) exclude information on the effects of distance, and 2) do not distinguish detection from recognition.

How Might These Be Fixed?

Offer an accurate and standard CSA, that:

- Is scientifically-justified
  - Use published reports of acoustic measurements of speech (overall level for a particular distance between the talker and listener; dynamic range of speech sounds).
- Includes important counseling and interpretation information
  - Distance Matters; Speech region is depicted for one assumed distance between the talker and listener.
  - Detection does not guarantee recognition.

Acknowledgements

Portions of this study were completed and published as a Capstone Project and submitted as part of the requirements for the degree of Doctor of Audiology (Au.D.) in the Program in Audiology and Communication Sciences (PACS) at Washington University School of Medicine in St. Louis.

Cory Hillis hillisc@wustl.edu