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OTICON
AUDIOLOGY

Learning Objectives:

1. ... recognize the importance of a complete set of cues for the cognitive system
2. ... identify the importance of spatial information in the ability to organize the sound environment
3. ...recognize how different compression approaches affect the inherent cues in the amplified speech signal

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Why?

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Conventional Amplification

Improved Audibility & Improved S/N ...

But ...

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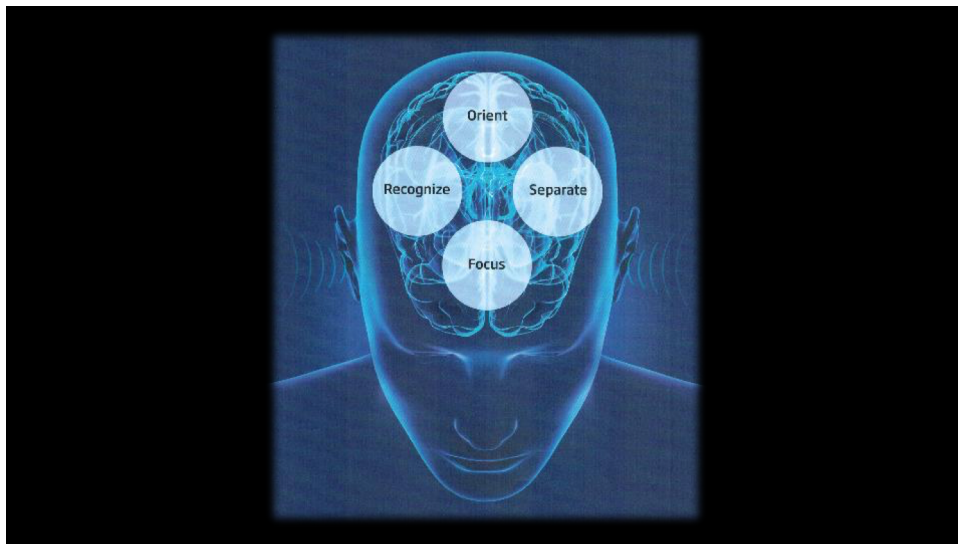
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Speech Understanding:
A Cognitive Process

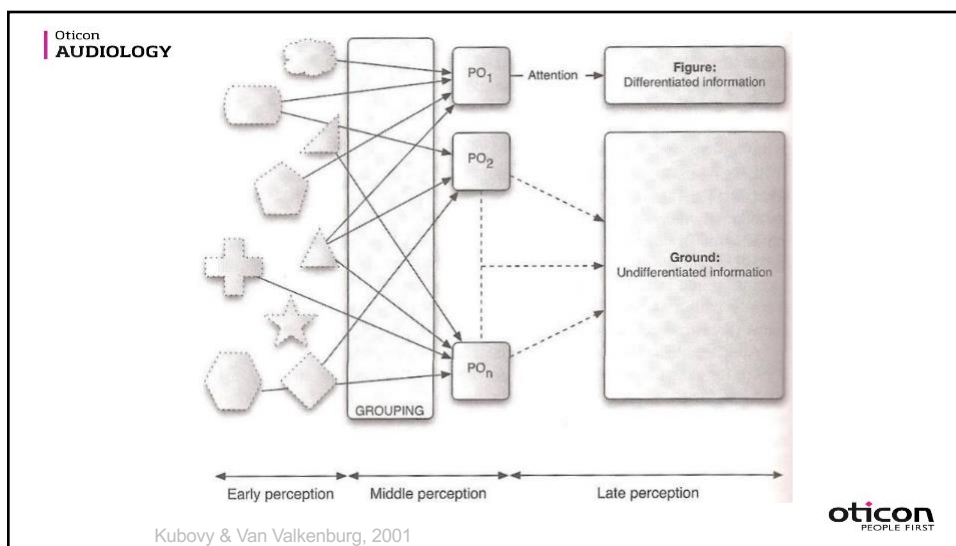
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The image is a slide from a presentation. At the top left, there is a header with the Oticon logo and the word "AUDIOLOGY". The main content area is white and contains the title "Speech Understanding: A Cognitive Process" in a bold, black, sans-serif font. At the bottom right, there is the Oticon logo with the tagline "PEOPLE FIRST".

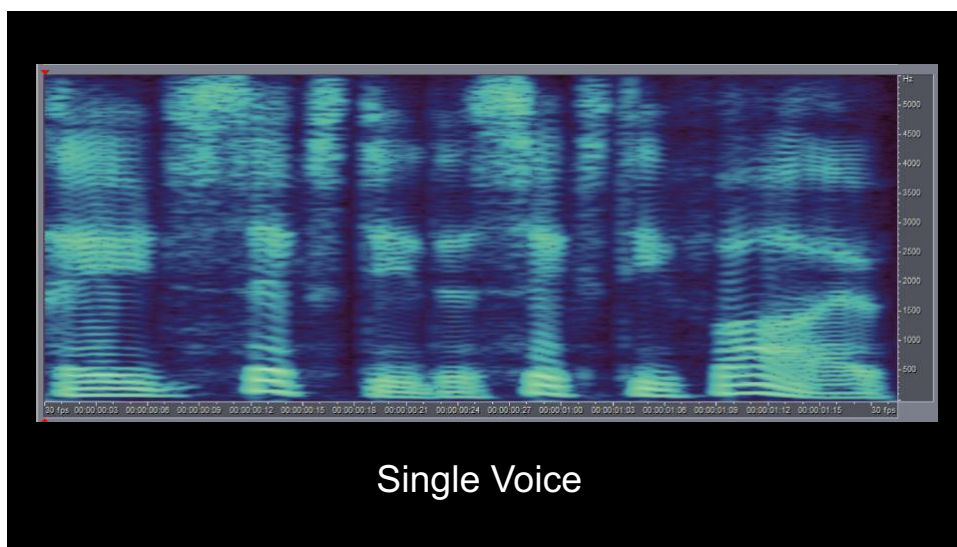
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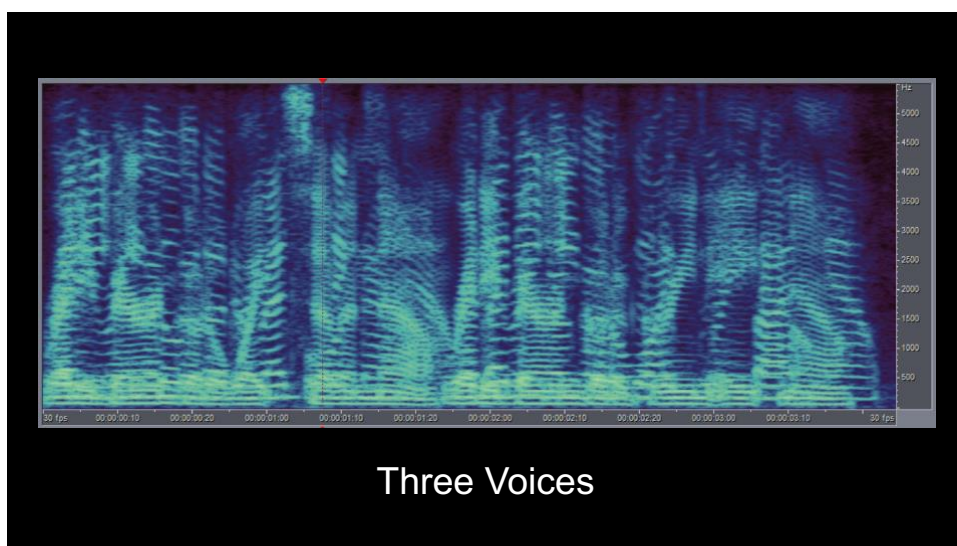
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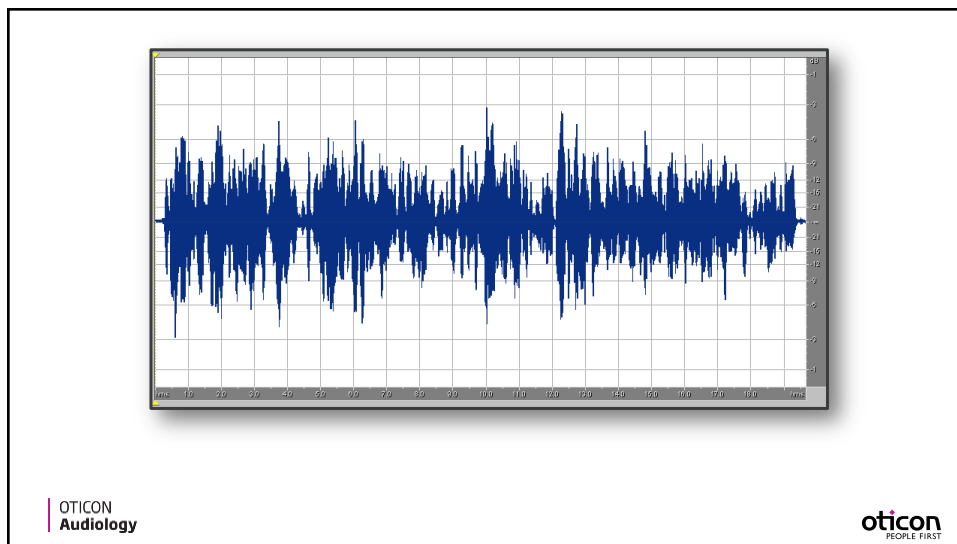
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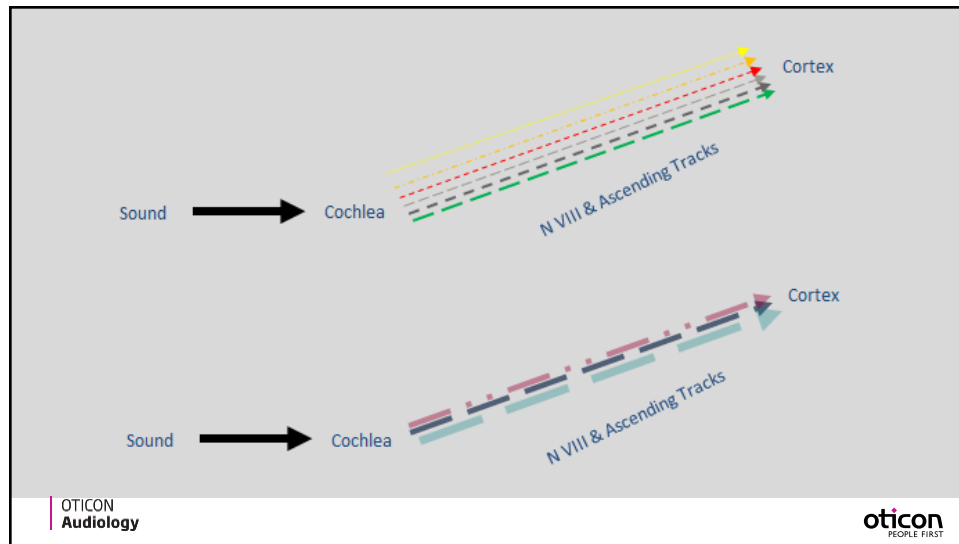
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Natural Voice Separation & Tracking:

Fundamental Frequency
Harmonic Structure
Supra-segmentals
Visual Cues
Linguistics
Loudness
Location
Timbre
Rate
etc.

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Normal Aging

- Which Skills Are Affected?
 - motor skills
 - sensory sensitivity & acuity
 - short term memory
 - sensory-motor reaction time
 - processing & decision speed
 - selective attention
- Which Skills are Retained?
 - Long-term memory (recall)
 - intelligence
 - linguistic skills

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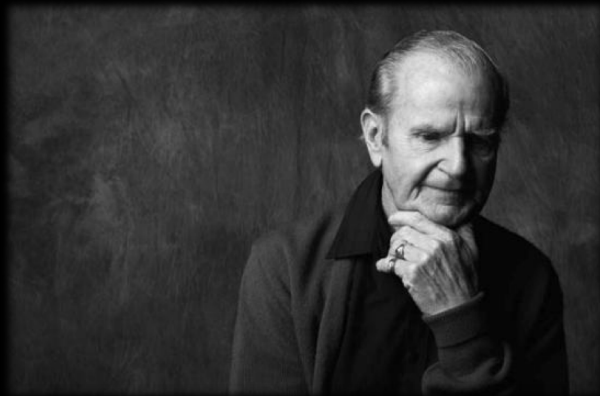
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Normal Aging

- Loss of efficient processing of information
- Neurological Slowing . . . All neurological events takes longer to happen

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Loss of the ability to organize sound

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Explaining Speech Understanding

- Audible?
- Above the noise?
- Where does the noise come from?
- What constitutes the “noise”?
- Who is the talker?
- Support cues?
- How sensitive to noise? (distortional component)
- How good is the patient at piecing together a partial signal?
- How much effort is the listener investing?

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Three Principles of Cue Preservation:

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Three Principles of Cue Preservation:

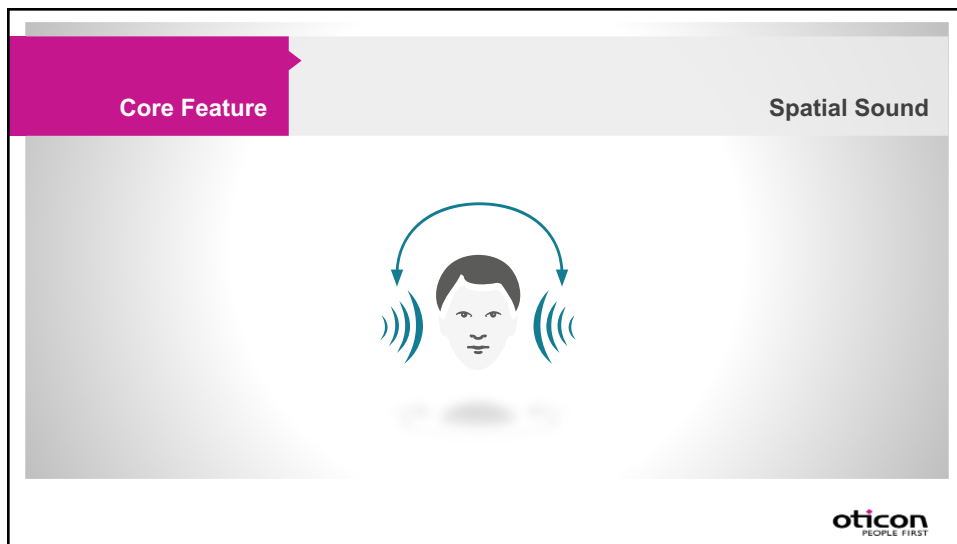
Where sound comes from matters

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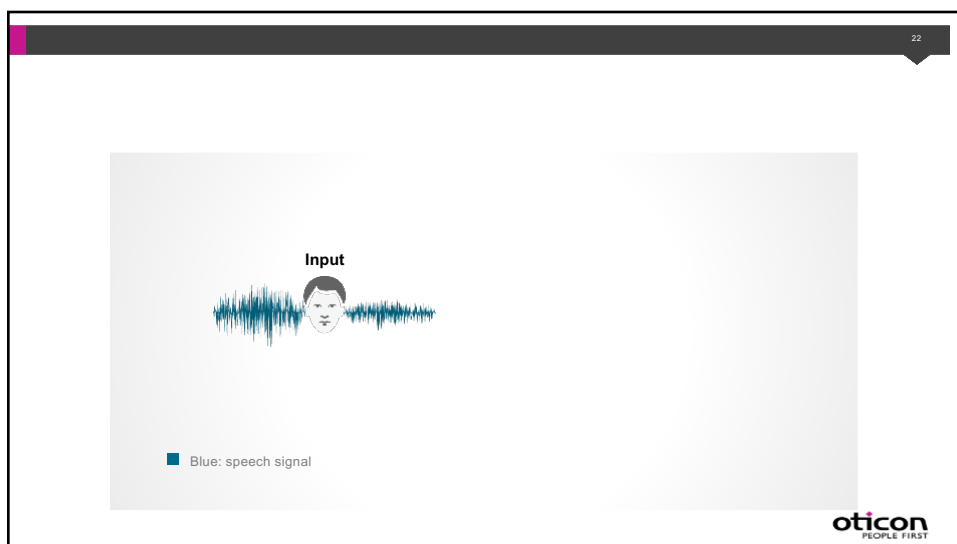
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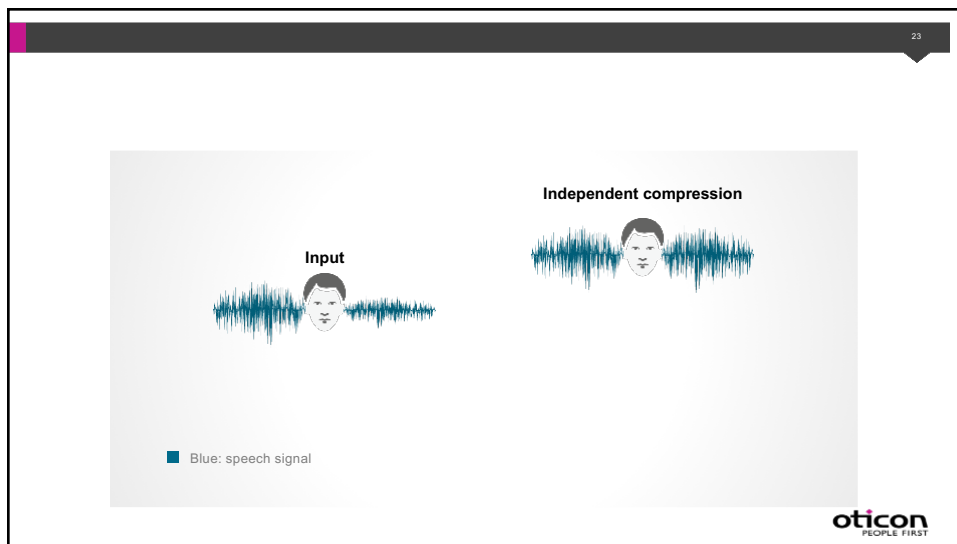
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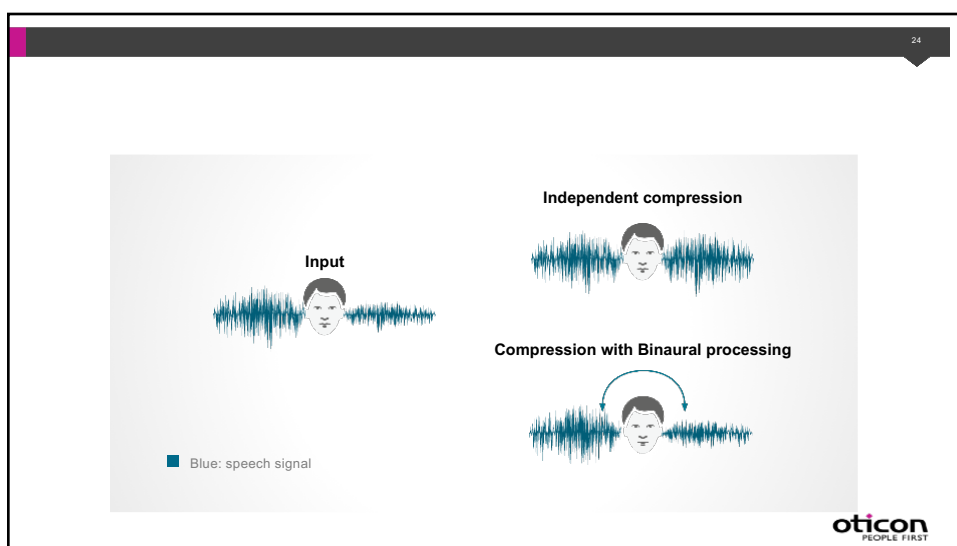
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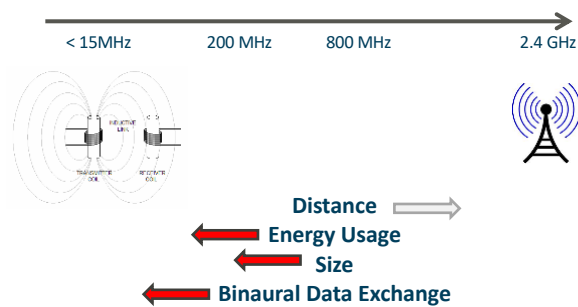


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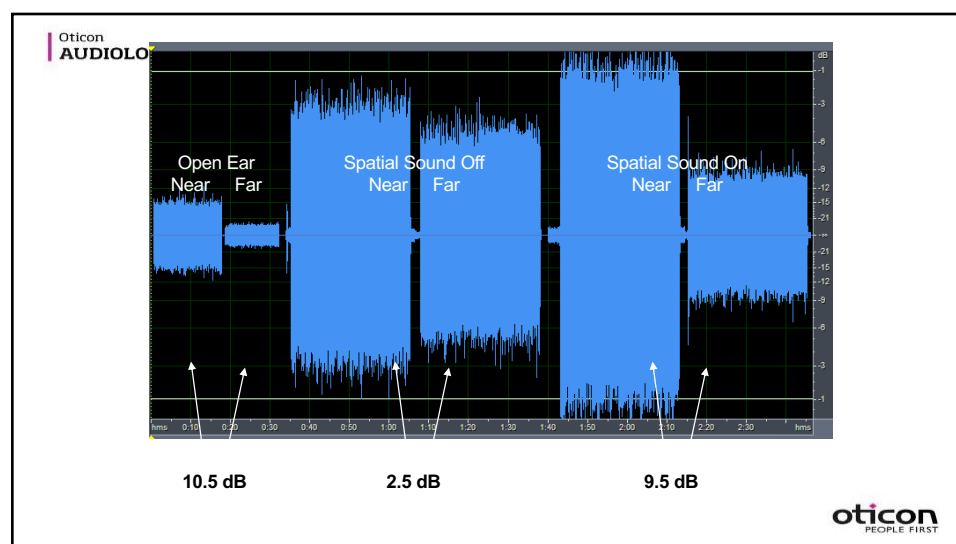


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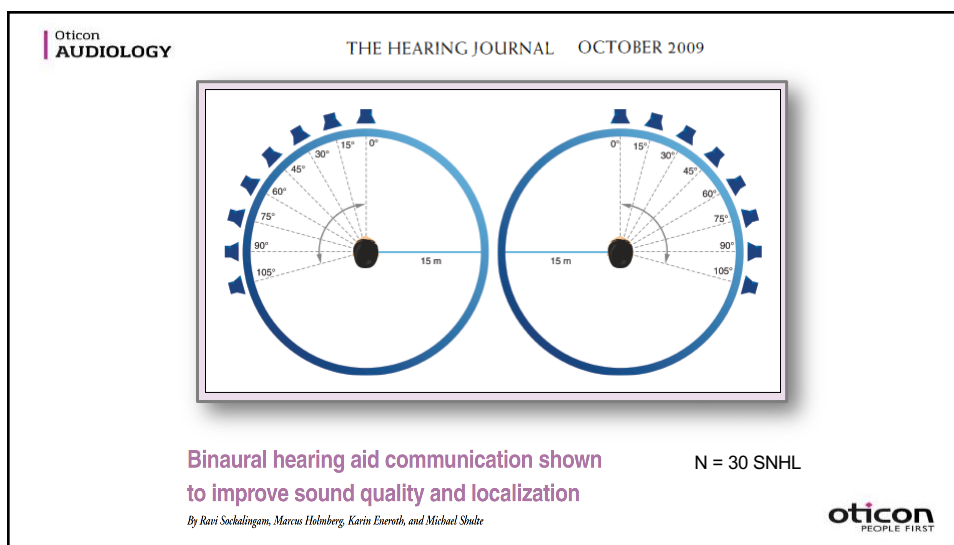
Magnetic Induction vs. Radio Frequency



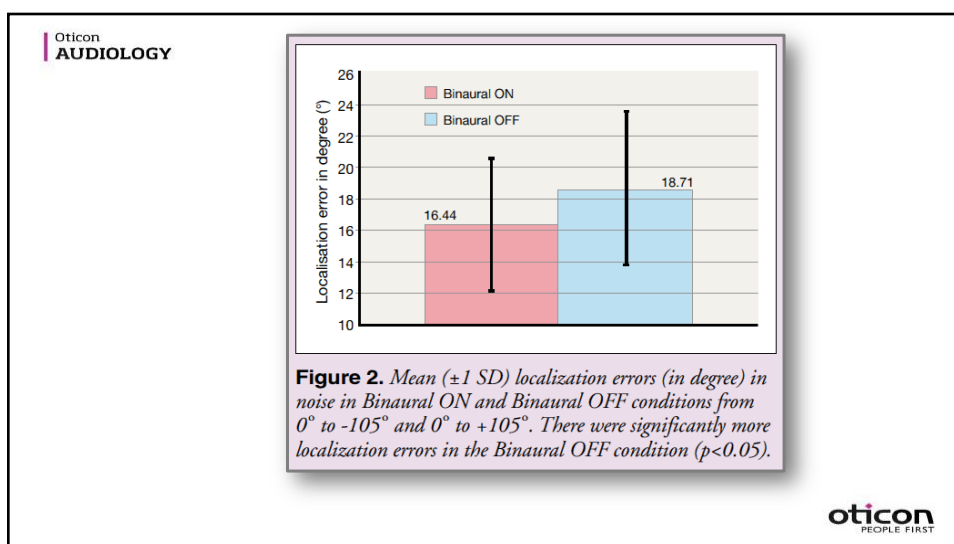
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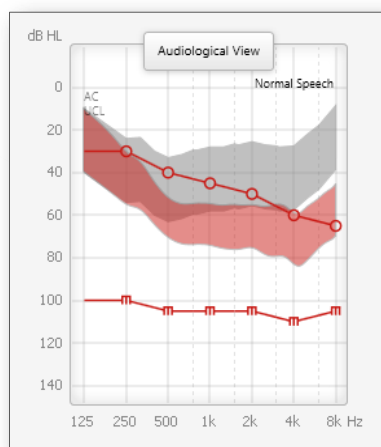


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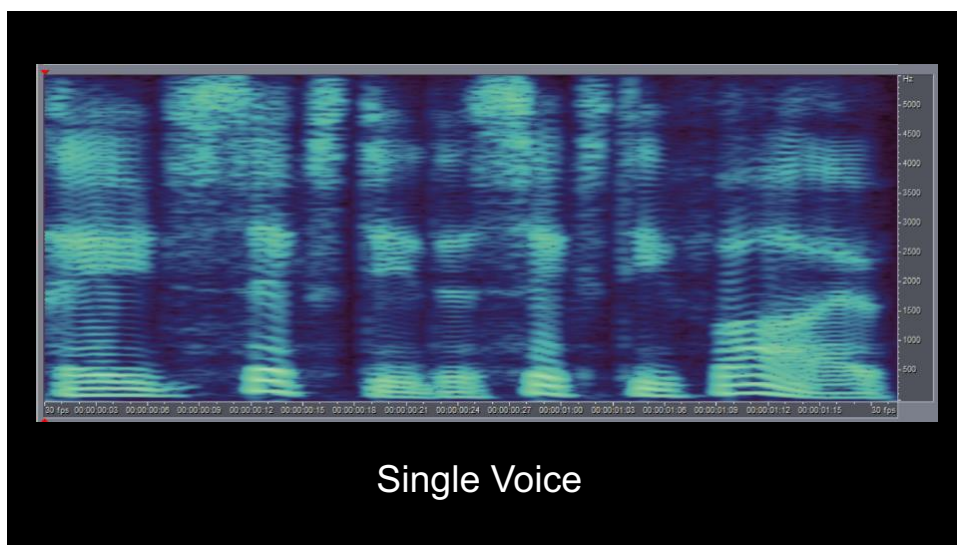
Three Principles of Cue Preservation:

The bandwidth of speech matters

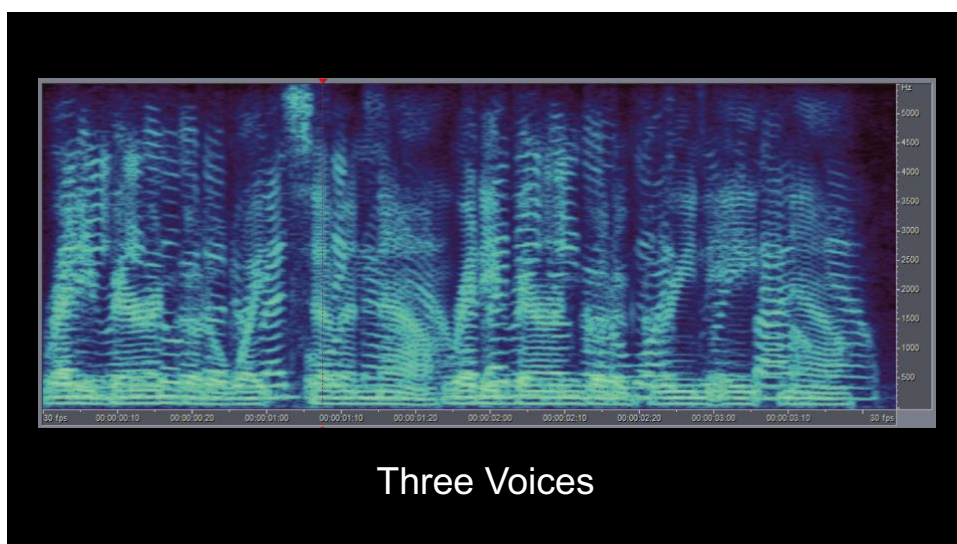
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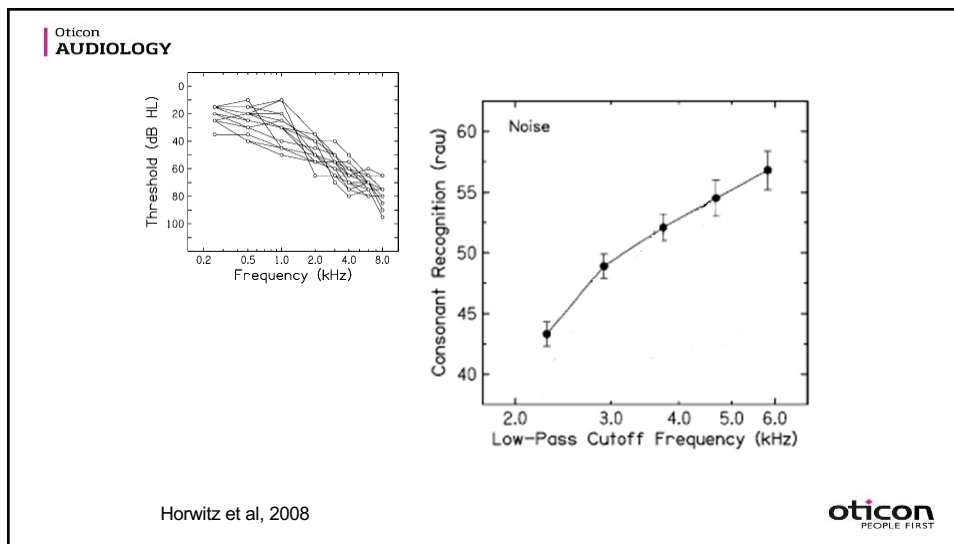
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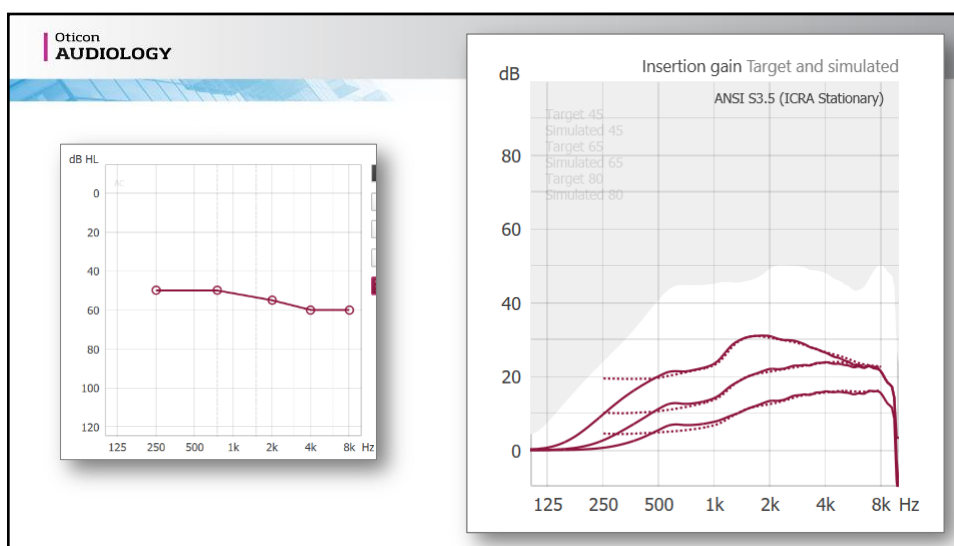
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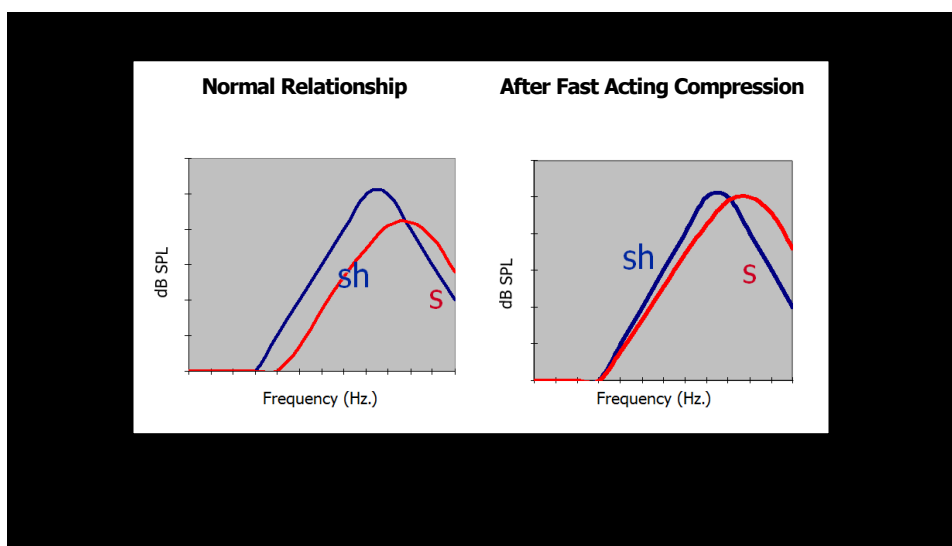


Three Principles of Cue Preservation:

The details of speech matter



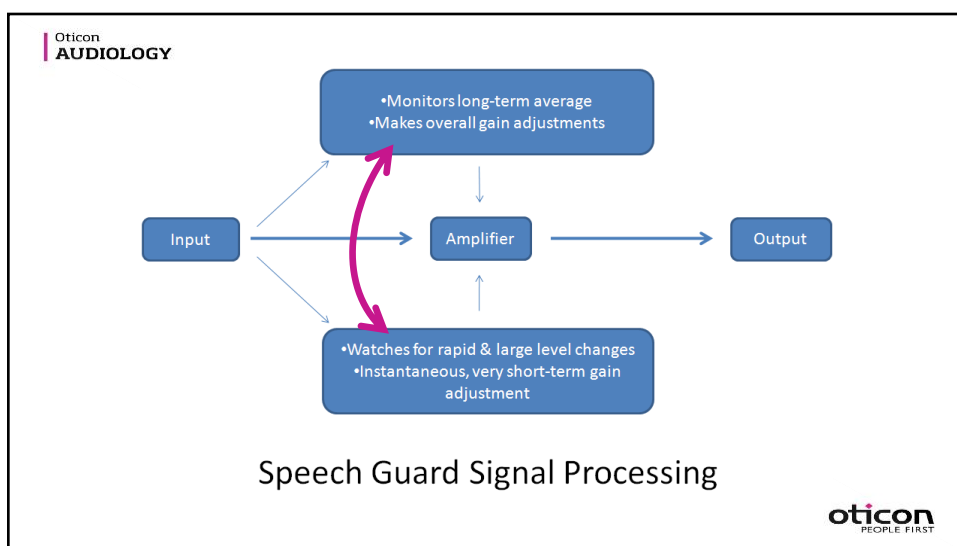
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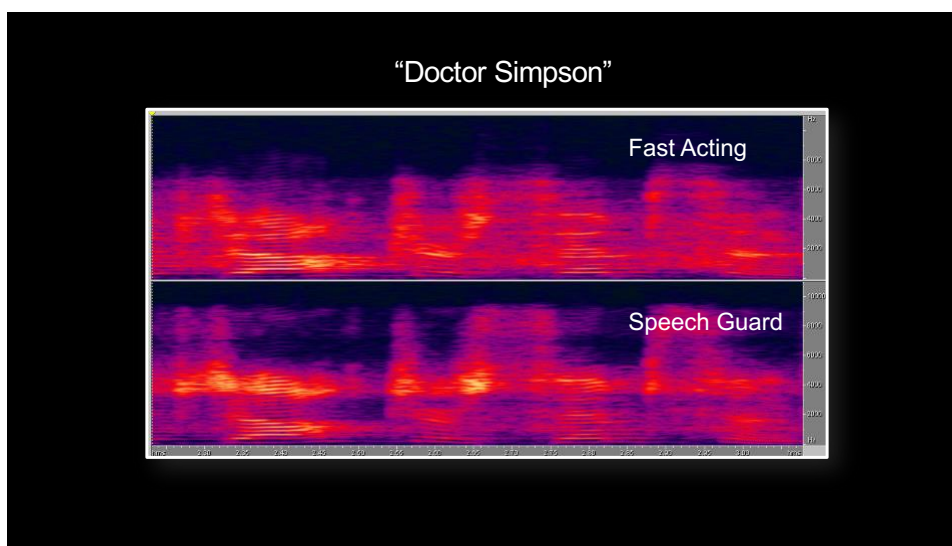
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Signal	Level	Input-FA	Input-SG	Input-SG E
Two Voices	72 dB SPL	.70	.87	.93
Speech in Impulse	72 dB SPL	.64	.86	.90

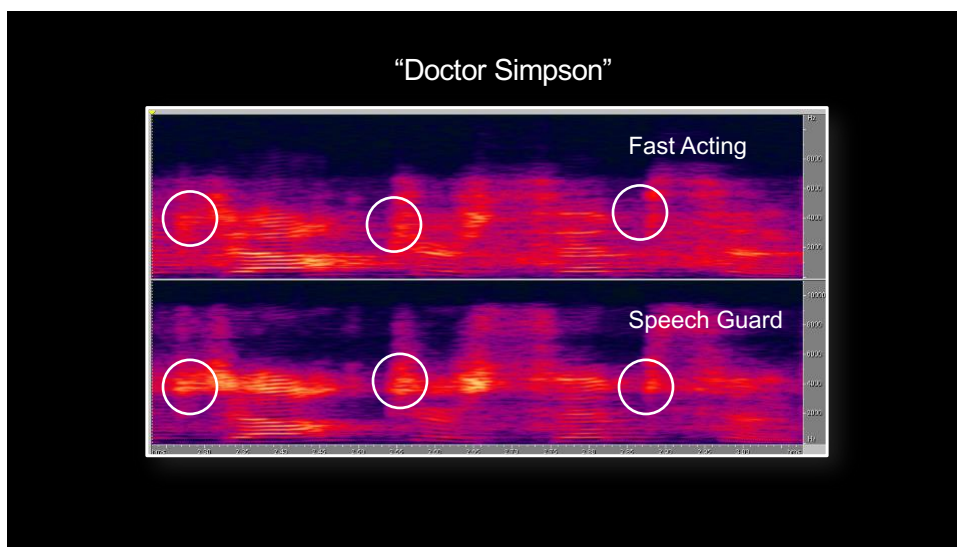
Correlations:
Original input envelope compared to processed envelope

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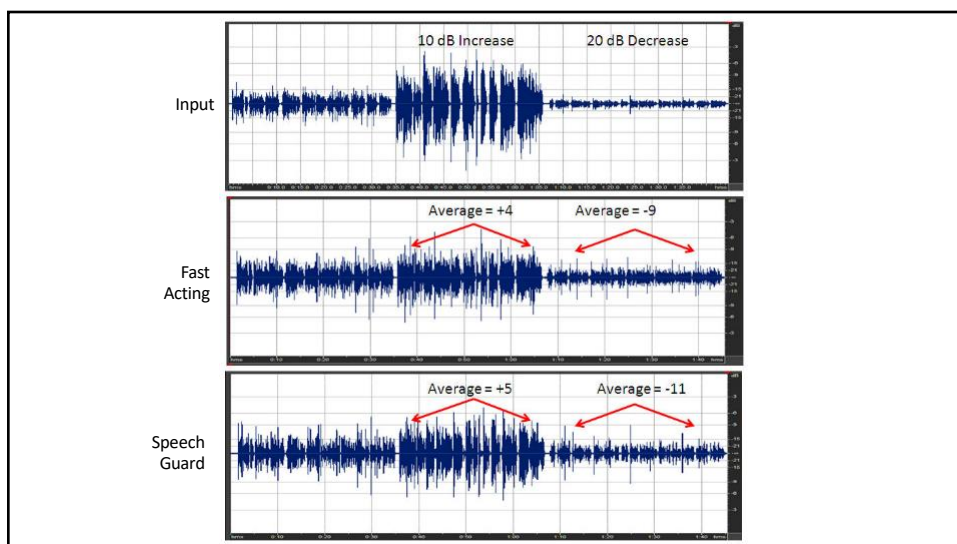
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Why?

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Conventional Amplification

Improved Audibility & Improved S/N ...

But ...

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