The how-to of SoundRecover 2

Fitting and verifying frequency-lowering technology

A Sonova brand

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Learning Outcomes

- After this course, participants will be able to identify when frequency lowering is appropriate.
- After this course, participants will be able to explain how to make proper adjustments to SoundRecover2 while understanding the effects of those adjustments.
- After this course, participants will be able to explain how to perform verification of SoundRecover2.

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Agenda

Jon Brittian, AuD

SoundRecover2

- Who
- Why
- How

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What do patients with severe to profound hearing loss tell us?

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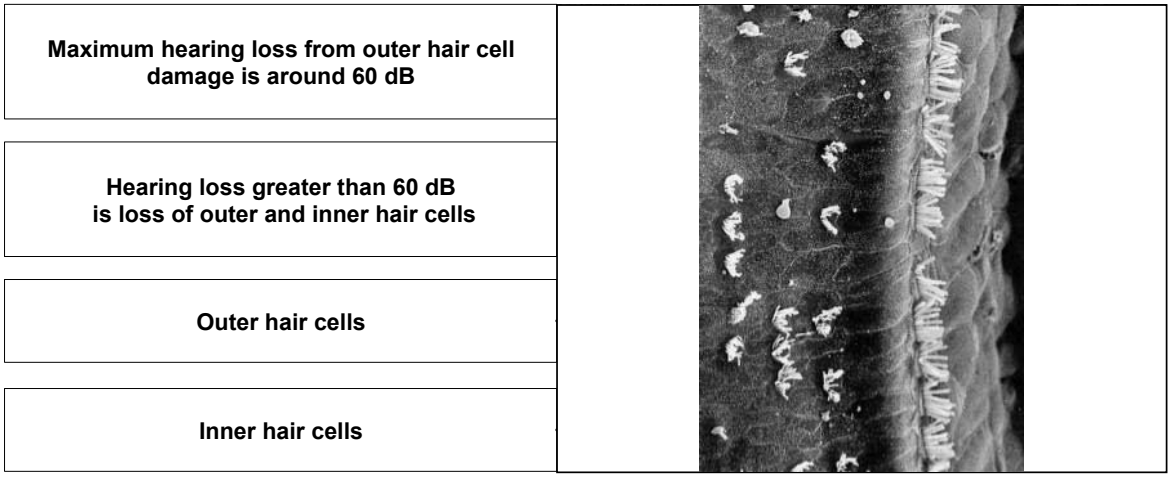
Why does this happen?



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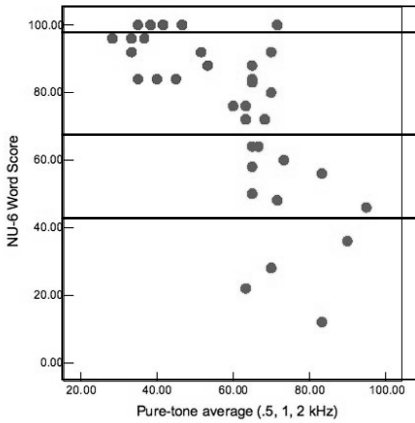
The severe to profound population is anything but homogeneous



Excellent benefit from amplification	
Very good benefit from amplification	
Benefit from amplification Counsel about realistic expectations	
Amplification indicated Limited outcome expected from traditional amplification Consider referral for CI	

Souza, P. (2009). Severe Hearing Loss - Recommendations for Fitting Amplification. *Audiology Online, January 19.* Reprinted with permission of AudiologyOnline

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What do you do today that ensures we are meeting the needs of this population?

A holistic approach:

1. Hearing and listening needs assessment, including the situations most important to the patient
2. Complete audiological assessment
3. Recommend a complete solution that aims to meet the listening and communication needs of the patient and their communication partners

A complete solution often includes elements beyond the hearing aids. A solution that not only solves face to face communication but helps patients navigate hearing at home, at work, with family and in their social life.

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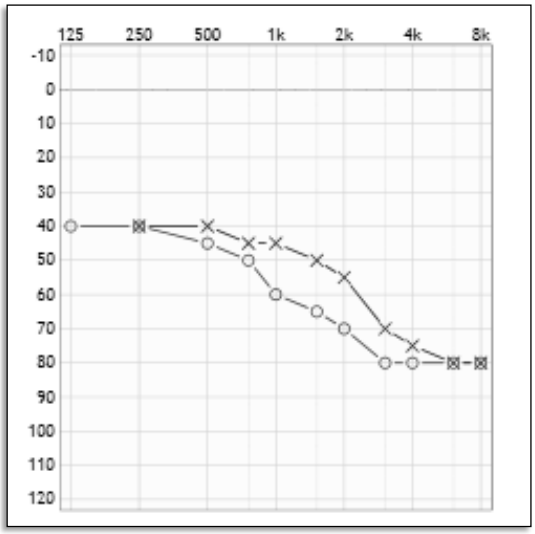
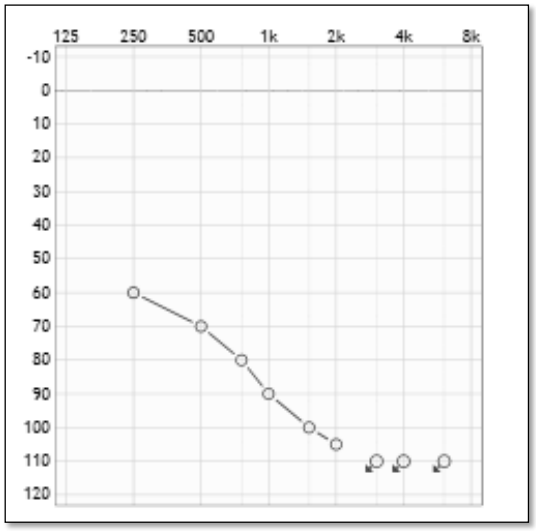
When do you need frequency lowering?





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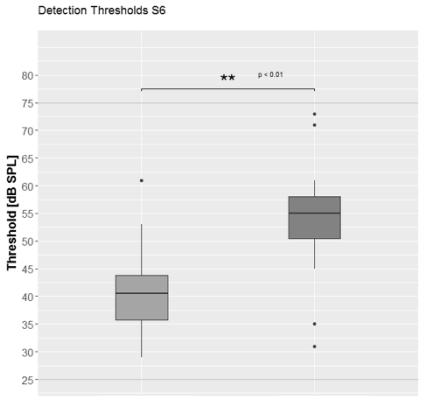
SoundRecover2 improves audibility of high frequencies: Adults



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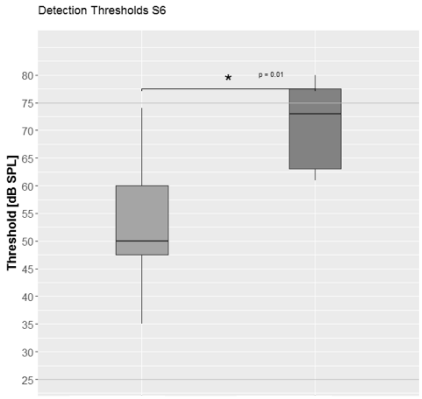
SR2 OFF
SR2 ON



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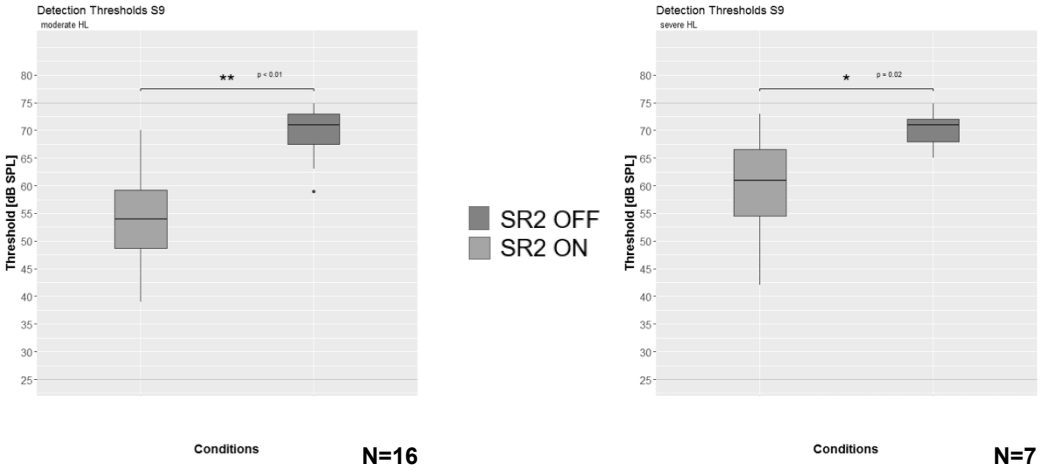
SoundRecover2 improves audibility of high frequencies: Adults



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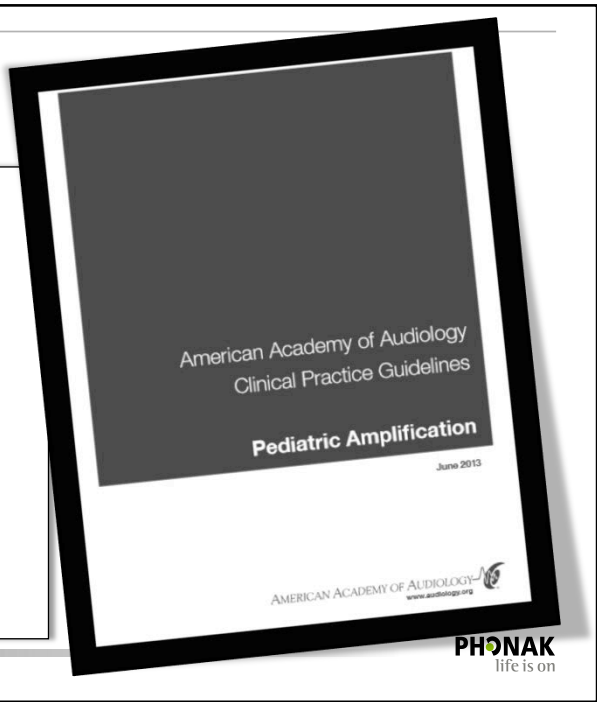
Part of fitting guidelines

5. **Signal Processing and Features**
   - Objective
   - Fundamental Requirements for Hearing Aid Audio Signal Processing
   - Recommendations for Hearing Aid Audio Signal Processing
     1. Compression in the dynamic range
     2. Software bands
     3. Compression channels
     4. Output limiting:
     5. Expansion at low input levels
     6. Extending high-frequency bandwidth
     7. echniques for frequency lowering
     8. Feedback suppression
     9. Directional microphones
     10. Digital noise reduction
   - Summary of Evidence for Signal Processing
   - References



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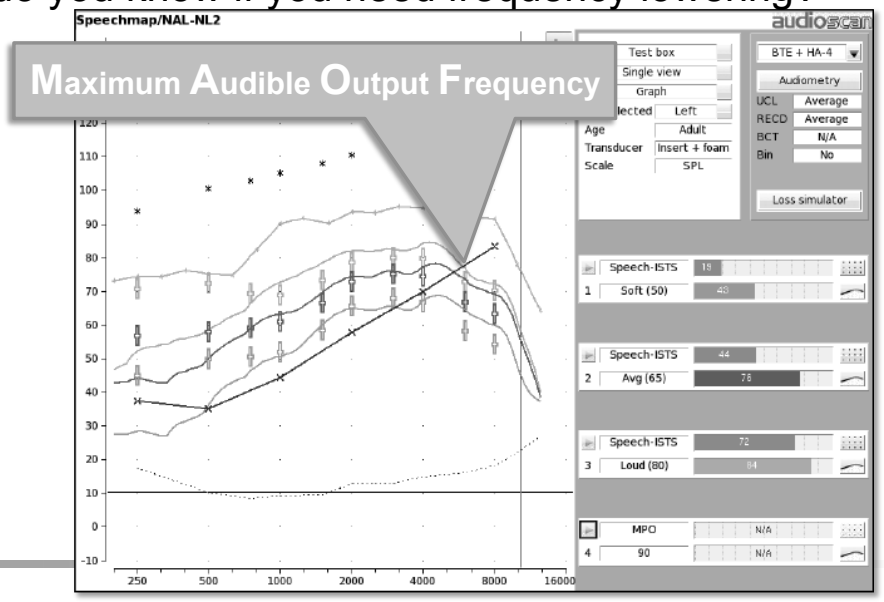
How do you know if you need frequency lowering?



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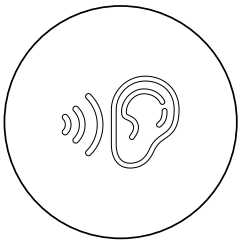
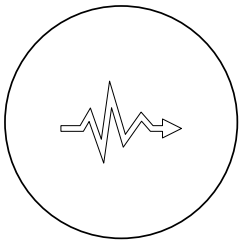
Special considerations for all types of frequency lowering algorithms

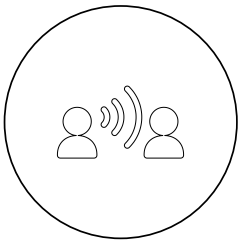
Changes to sound quality



Preservation of low frequency information



Maintaining vowel familiarity



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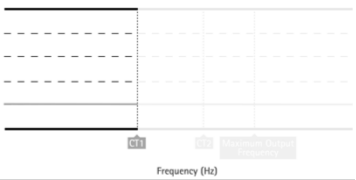
What is significant about SoundRecover2?

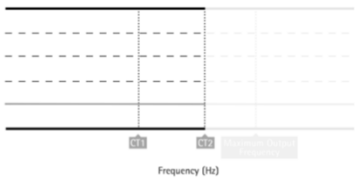
Adaptive
Flexible
Less distortion
Independent

Adaptive: How does SoundRecover2 work?

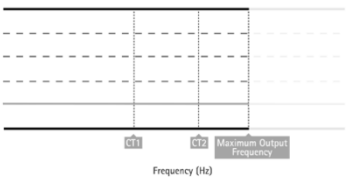
Based on the audiogram default settings are generated for



Lower cut-off frequency (CT1)



Upper cut-off frequency (CT2)



Maximum Output Frequency

Compression ratio

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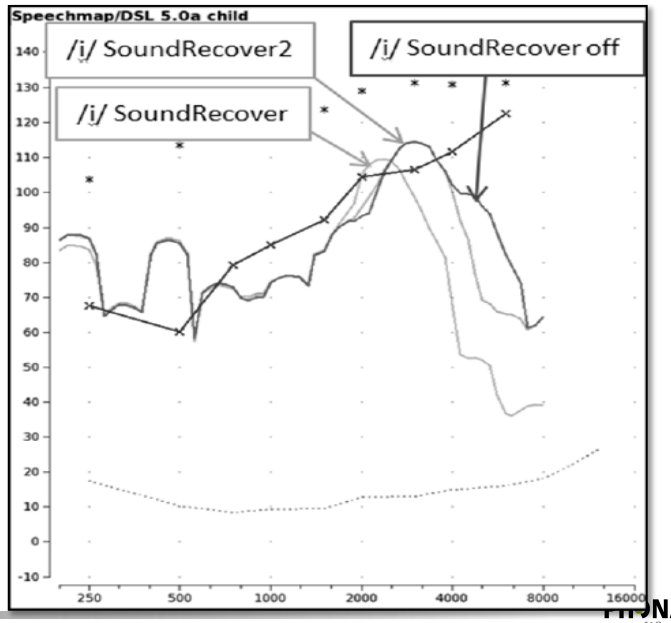
Ling6 **/ee/** - SR vs. SR2



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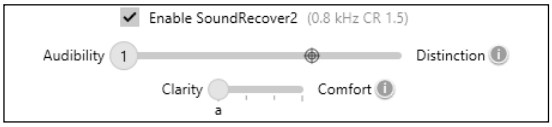
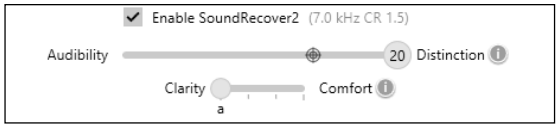
Flexible – 80 possible settings for precise fine tuning





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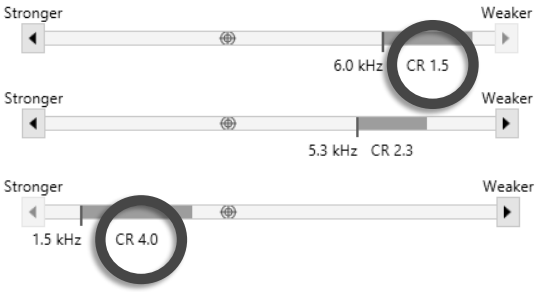
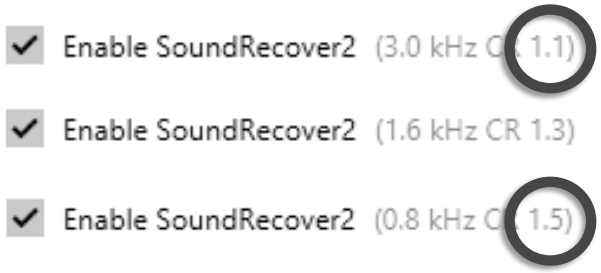
Less Distortion - More consistent compression ratios

SoundRecover



SoundRecover2



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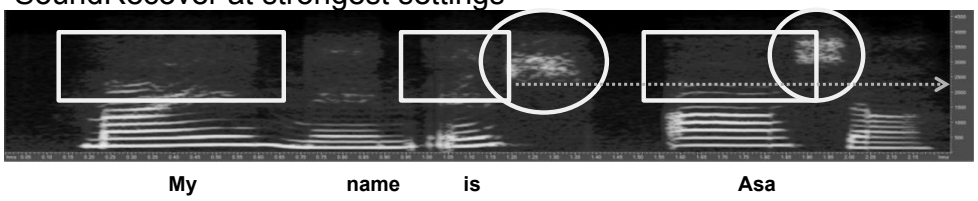
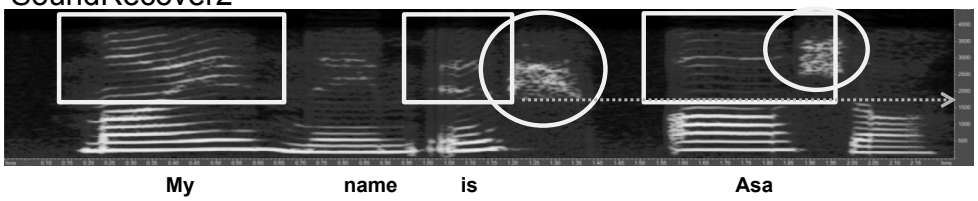
SoundRecover vs SoundRecover2

SoundRecover at strongest settings



SoundRecover2



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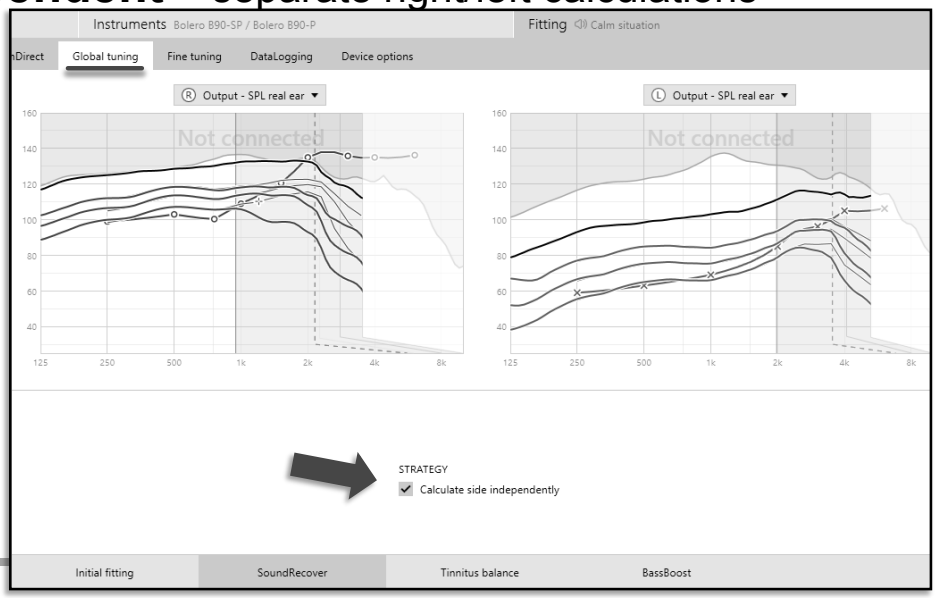
Independent – separate right/left calculations



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Bottom line –
Adaptive behavior results in more audibility of high-frequency sounds

- Lower cutoff abilities extends benefit to sloping losses and corner audiograms
- More audibility of high frequency sounds
- Lower compression ratios improve sound quality of the compressed signal
- Vowels sound pleasant and natural

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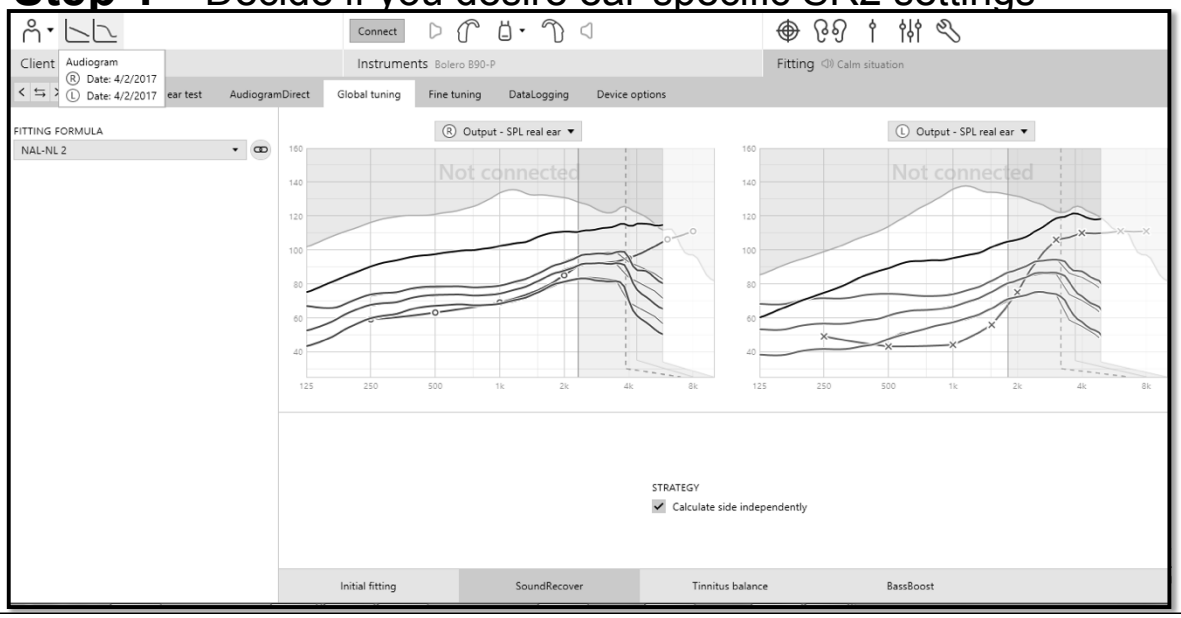
Step 1 – Decide if you desire ear-specific SR2 settings



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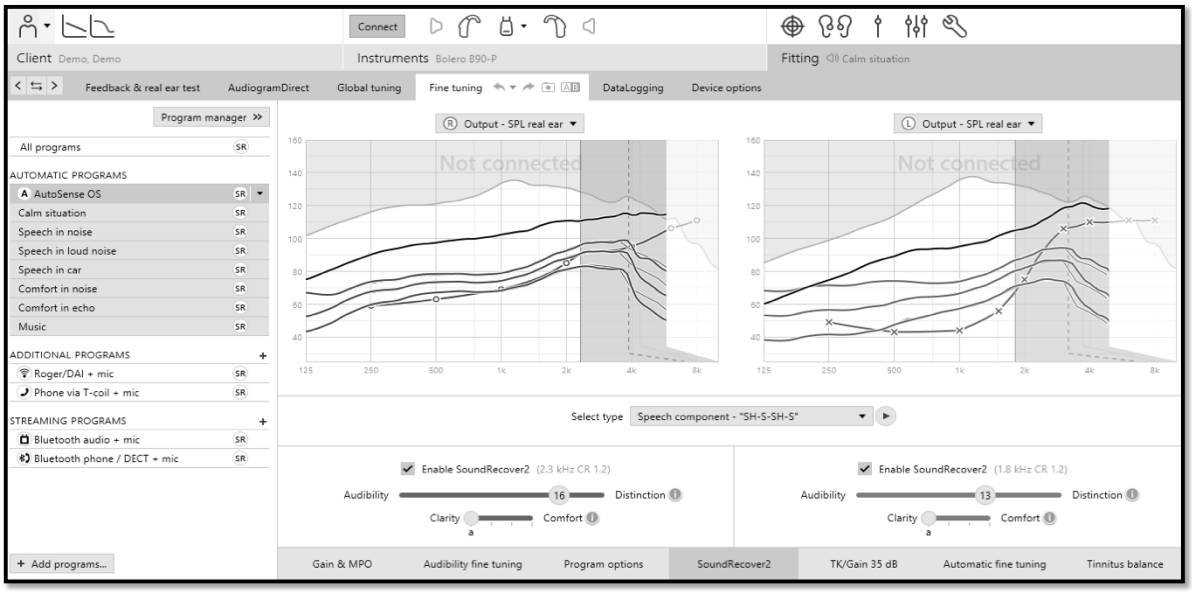
Step 2 – Select Audibility/Detection and Comfort/Clarity



Fitting and fine tuning tips and tricks - measuring

Good
Live voice to quickly check sound quality and perception

Speak /Mississippi/ or /s sh s sh/, ask if /s/ is
- **heard**
- **distinguished from /sh/**
- **lisping**

Speak words with voiced sounds only (e.g. /ama/, /mom/, /alabama/, etc.) ask if words are okay or strange

Better
Phoneme Perception Test

Determine if high frequency phonemes are
- **detected**
- **recognized**
- **distinguished**

Test box measures

Verify audibility based on RECD

Best
Real ear measures

Use /s/ and /sh/ stimuli to
- **verify audibility of high frequency phonemes**
- **verify appropriate separation of high frequency phonemes**

Make adjustments in target software to make high frequency phonemes audible

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UWO Plurals Test

- Test the perception of high frequency speech sounds
- Specific to the English language
- Measures the listener's ability to detect word final consonant ie. /s/ and /z/

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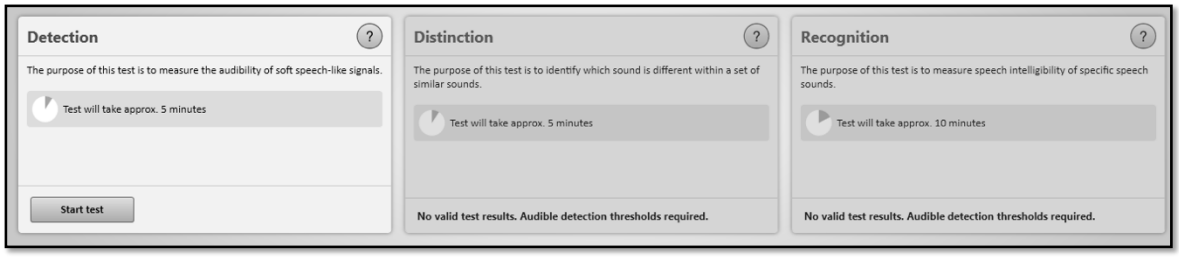
Phonak Phoneme Perception Test



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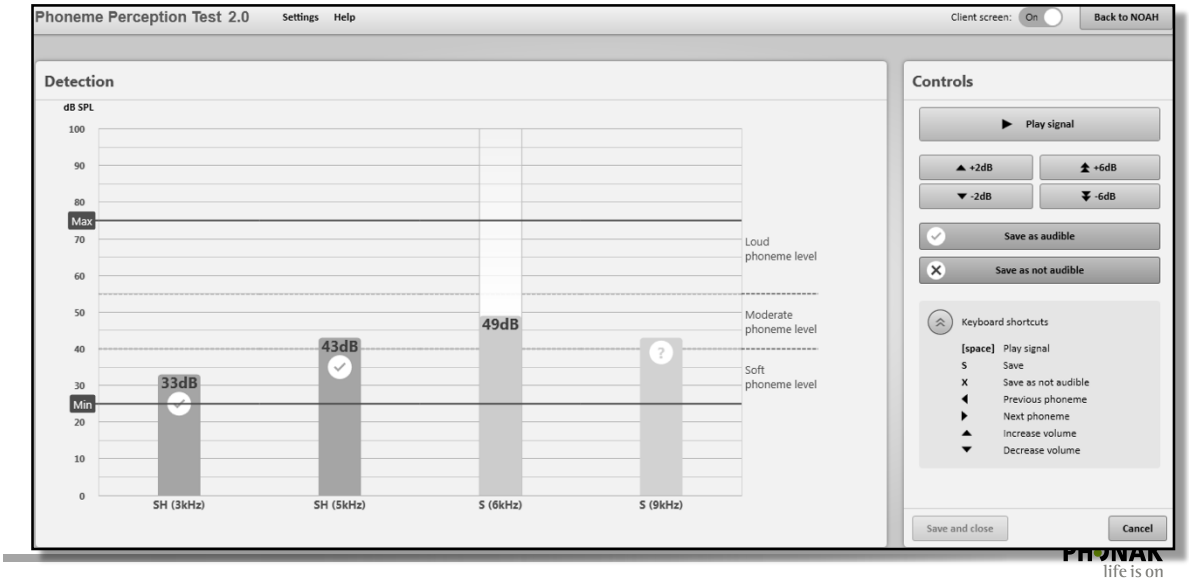
Detection test



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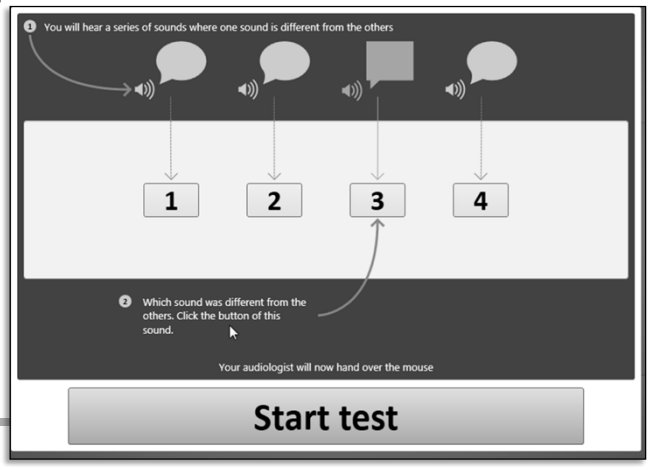
Distinction

Can reveal root cause of phoneme confusion

a. Lack of acclimatization to HI

b. Reduced distinction capabilities of client



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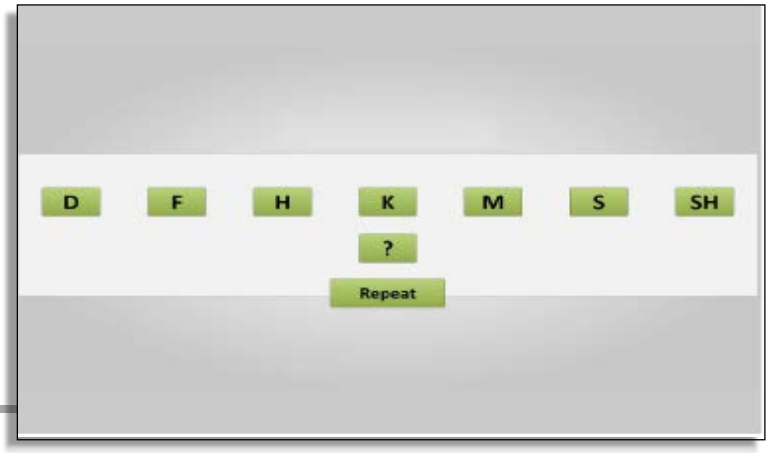
Recognition

Systematic confusion between two similar phonemes (/s/ and /sh/)

a. Acclimatization

b. Incorrect HI settings of frequency lowering



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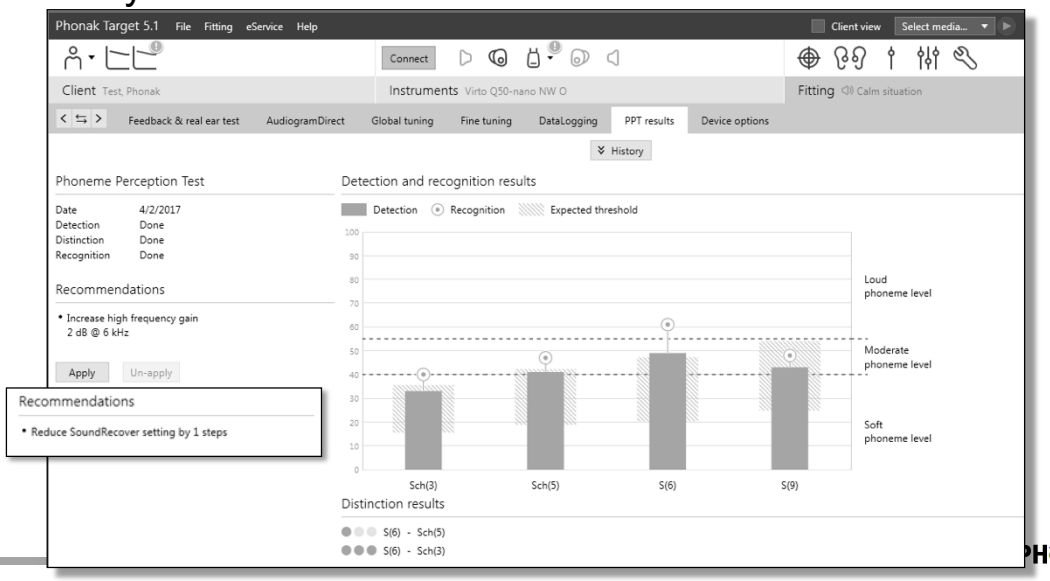
What do you do with this information?



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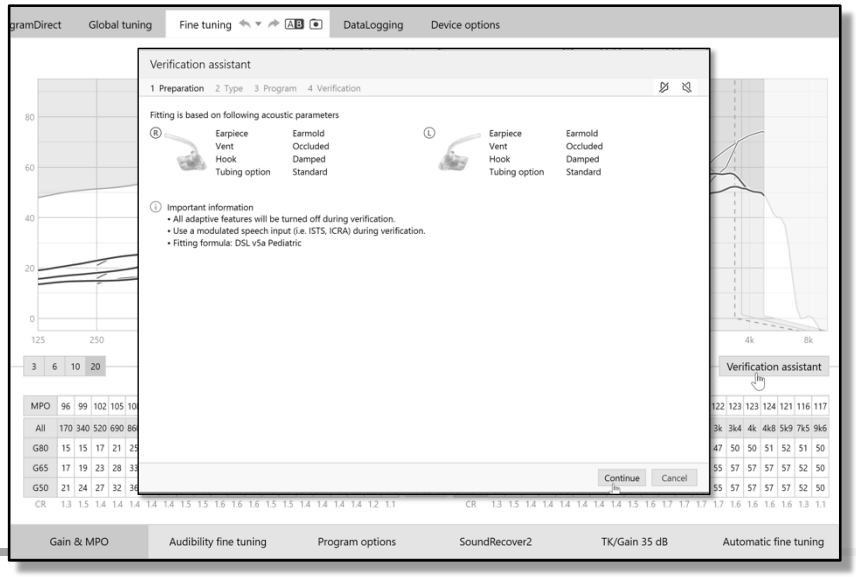
Phonak Target – Verification assistant (1)



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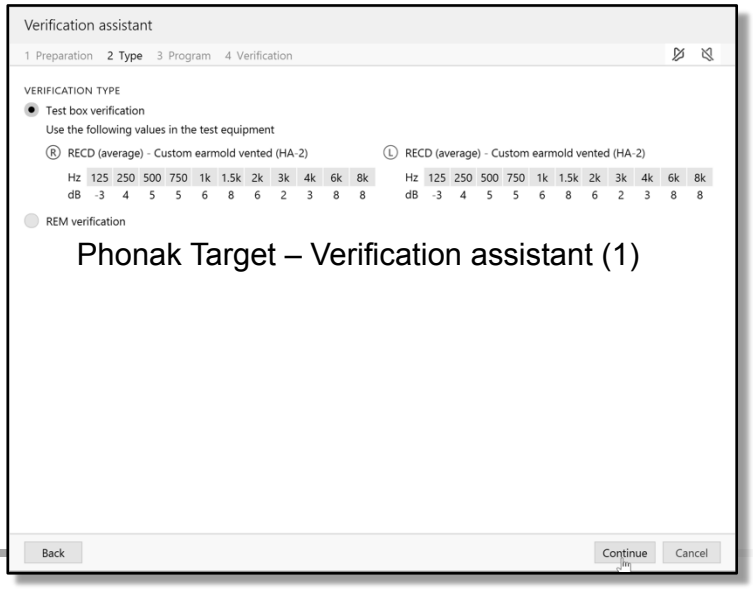
Phonak Target – Verification assistant (2)



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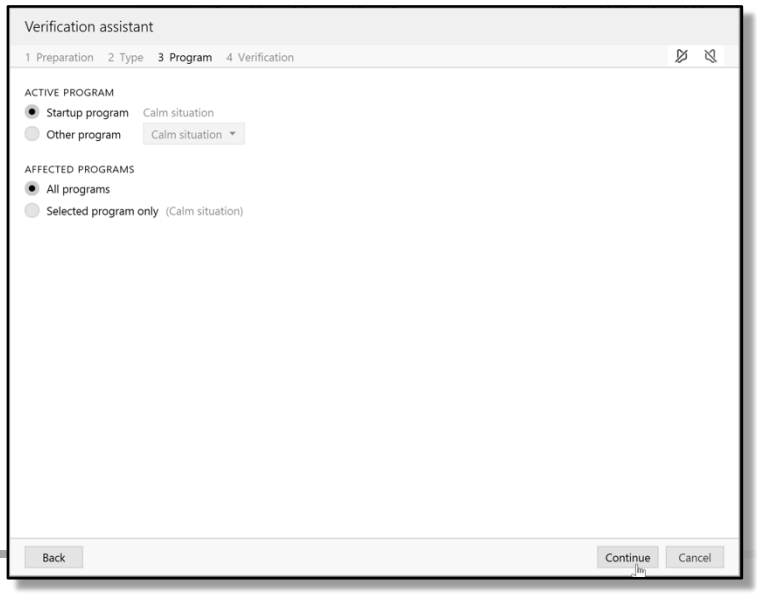
Phonak Target – Verification assistant (3)



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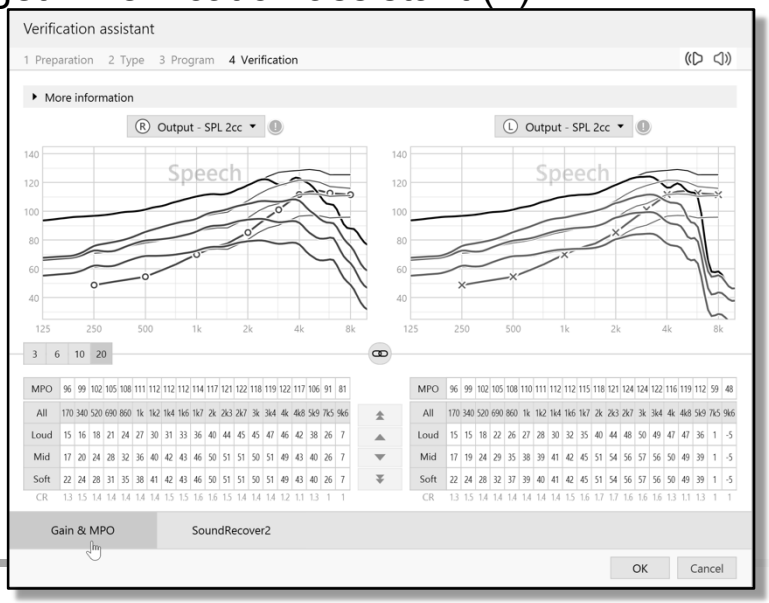
Phonak Target – Verification assistant (4)



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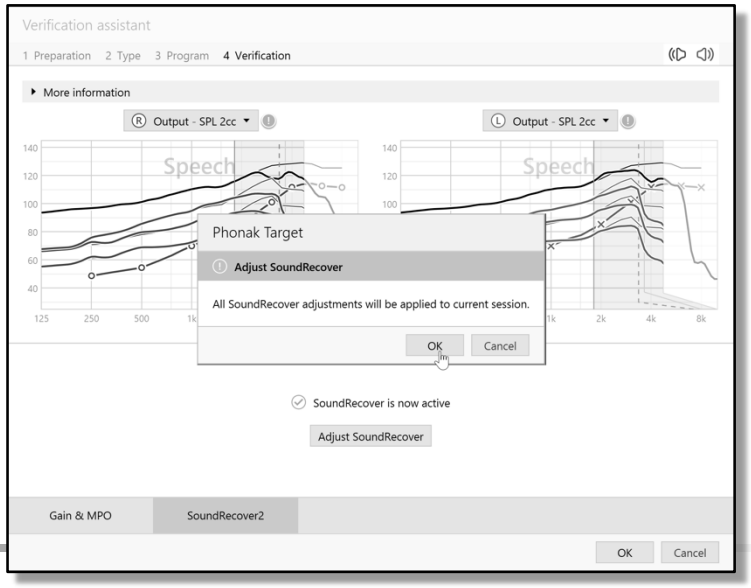
Phonak Target – Verification assistant (5)



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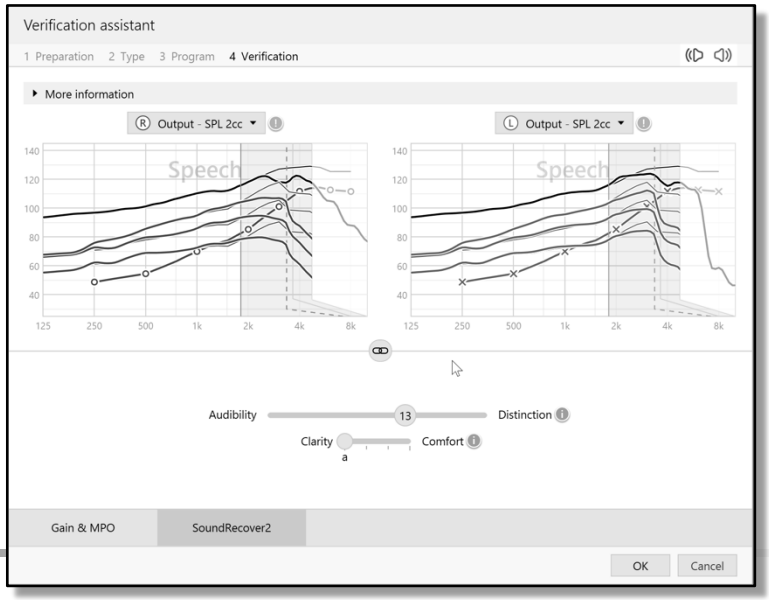
Phonak Target – Verification assistant (6)



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Authors of Best practice protocol

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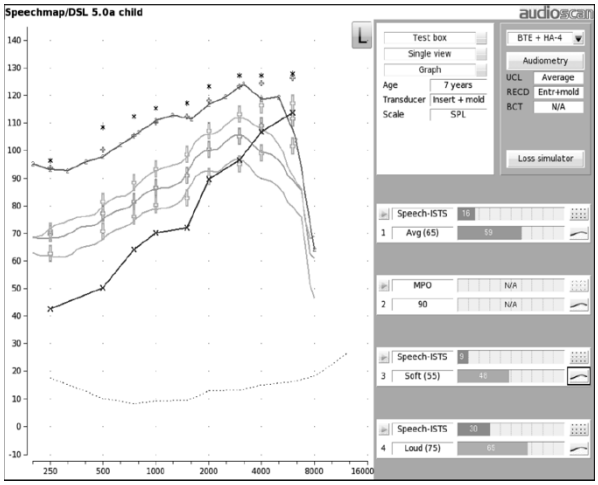
Pediatric SoundRecover2 verification protocol - 1



- Verify curves with SR2 OFF

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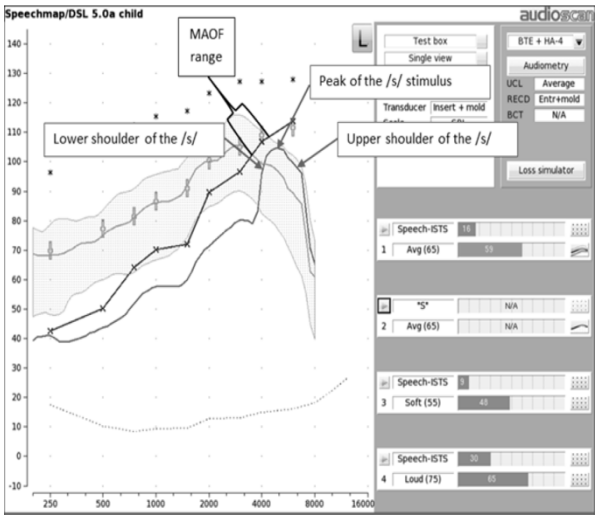
Pediatric SoundRecover2 verification protocol - 2



- Verify curves with SR2 OFF
- Determine if /s/ signal is audible

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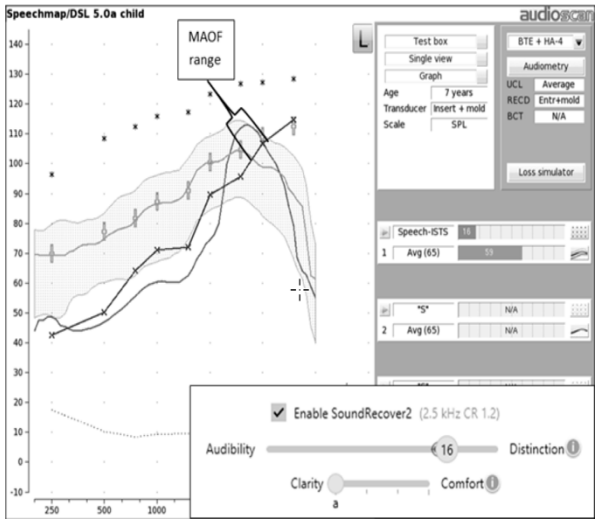
Pediatric SoundRecover2 verification protocol - 3



- Verify curves with SR2 OFF
- Determine if /s/ signal is audible
- Modify SR2 for upper shoulder of /s/ to be at edge of MAOF

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Fitting and fine tuning tips and tricks - adjusting

Good
Live voice to quickly check sound quality and perception

What if:
"/s/ and /sh/ sound muddy"
- Move Audibility/Distinction slider toward Distinction

"vowel sounds are strange and /s/ sounds are 'lispy' "
- Move Clarity/Comfort slider toward Comfort

Better
Phoneme Perception Test

What if:
/s/ and /sh/ sounds are not detected or are not measured in the audibility range in the test box
- Move Audibility/Distinction slider toward Audibility

Best
Real ear measures

What if:
/s/ and /sh/ are measured and are less than 1/3 octave apart on your Speech Mapping screen
- Move the Audibility/ Distinction slider toward Distinction

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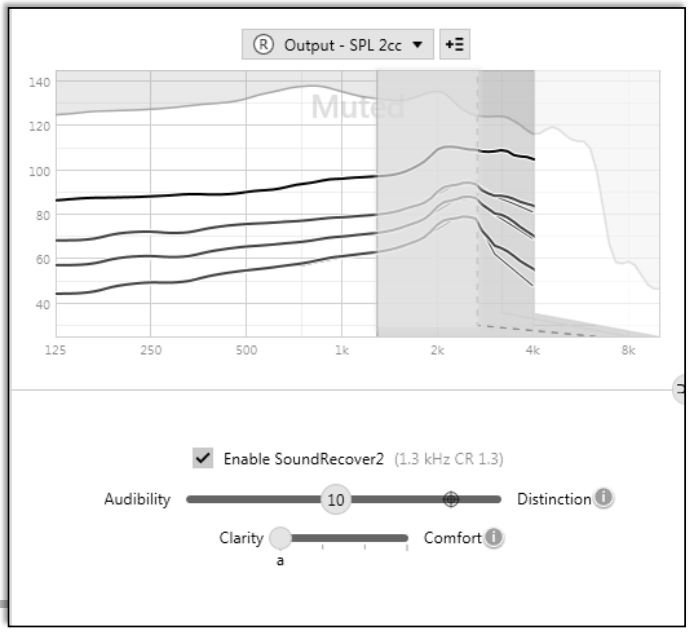
SR2 Controls

- CT1 @ 1.3 kHz
- CT2 @ 2.7 kHz
- Maximum output frequency (fmax) @ 4 kHz

← Adjustment toward "Audibility"
- Increase of CT1, CT2 and fmax
- "Stronger" frequency lowering

→ Adjustment toward "Distinction"
- Decrease of CT1, CT2 and fmax
- "Weaker" frequency lowering

Adaptive frequency compression



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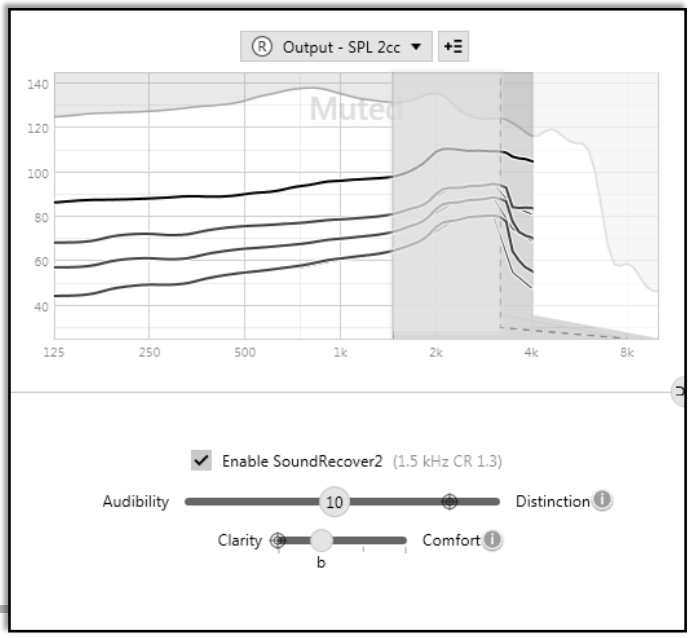
SR2 Clarity/Comfort

- CT1 @ 1.5 kHz
- CT2 @ 3.2 kHz
- fmax @ 4 kHz

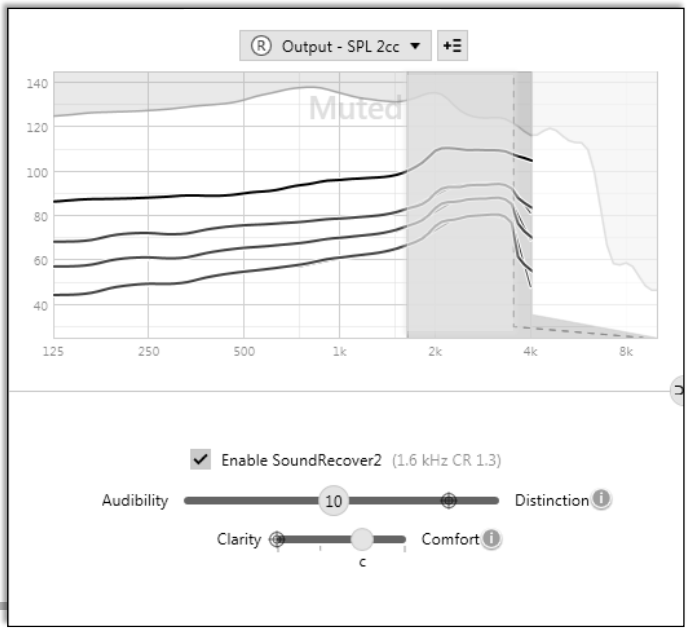
Adaptive frequency compression



SR2 Clarity/Comfort

- CT1 @ 1.6 kHz
- CT2 @ 3.5 kHz
- fmax @ 4 kHz

Adaptive frequency compression



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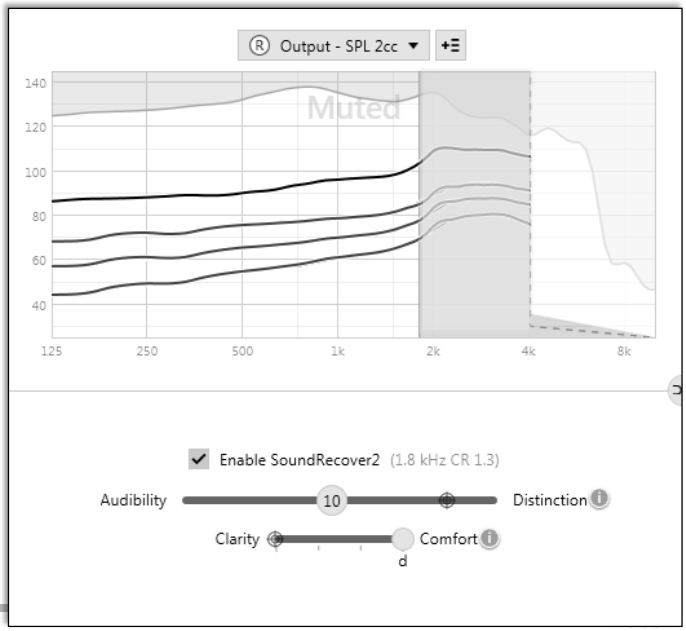
SR2 Clarity/Comfort

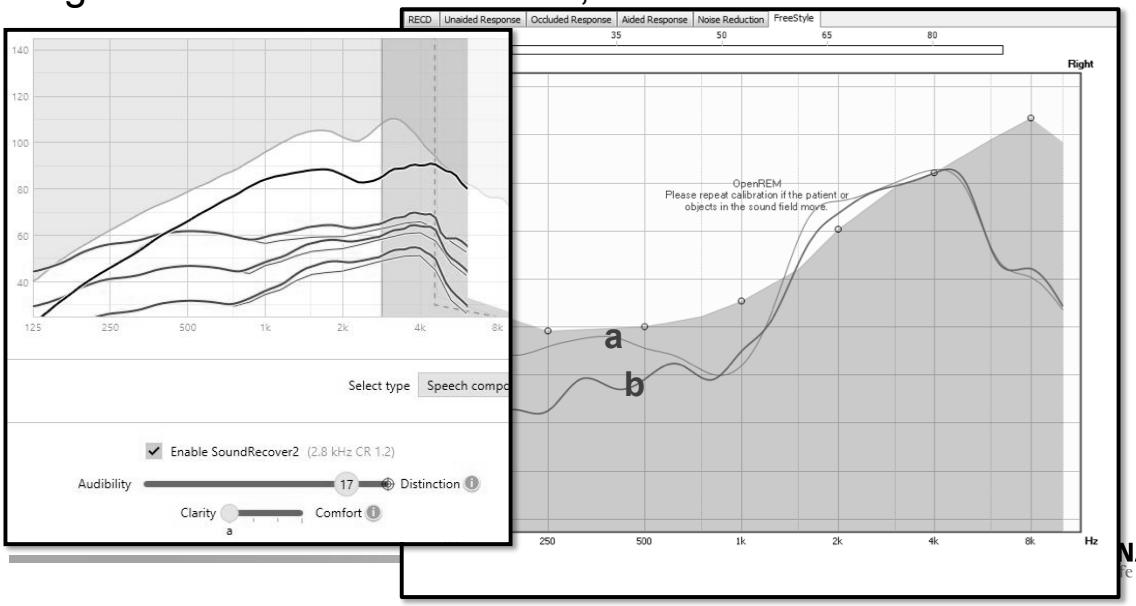
- CT1 @ 1.8 kHz
- CT2 @ 4 kHz
- fmax @ 4 kHz

Total area of frequency compression is in adaptive region between CT1 and CT2

Adaptive frequency compression



Ling6 */s/* SoundRecover2 17 a,b



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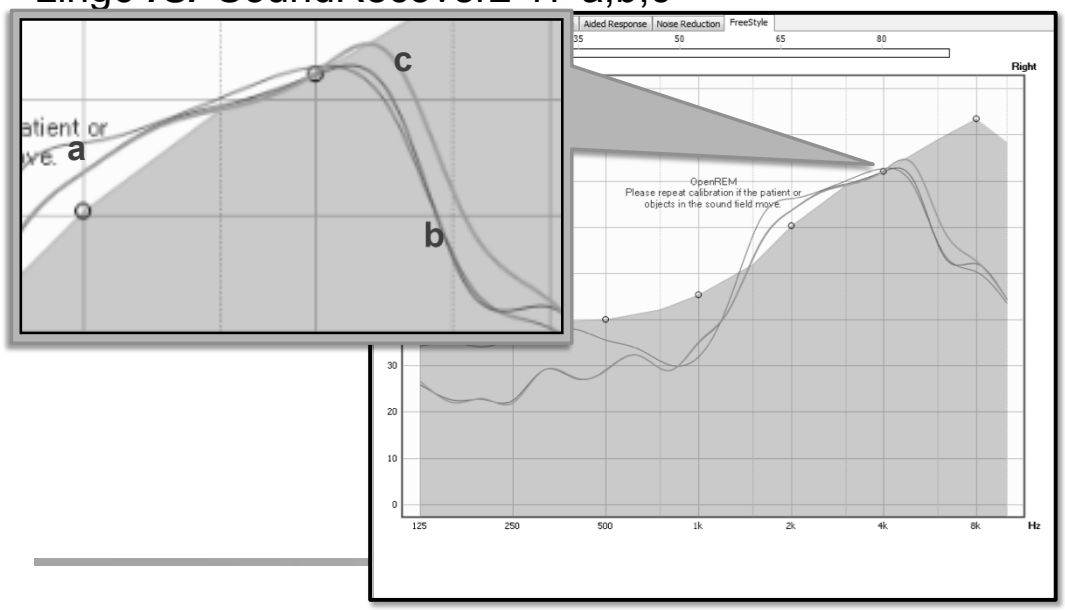
Ling6 **/s/** SoundRecover2 17 a,b,c



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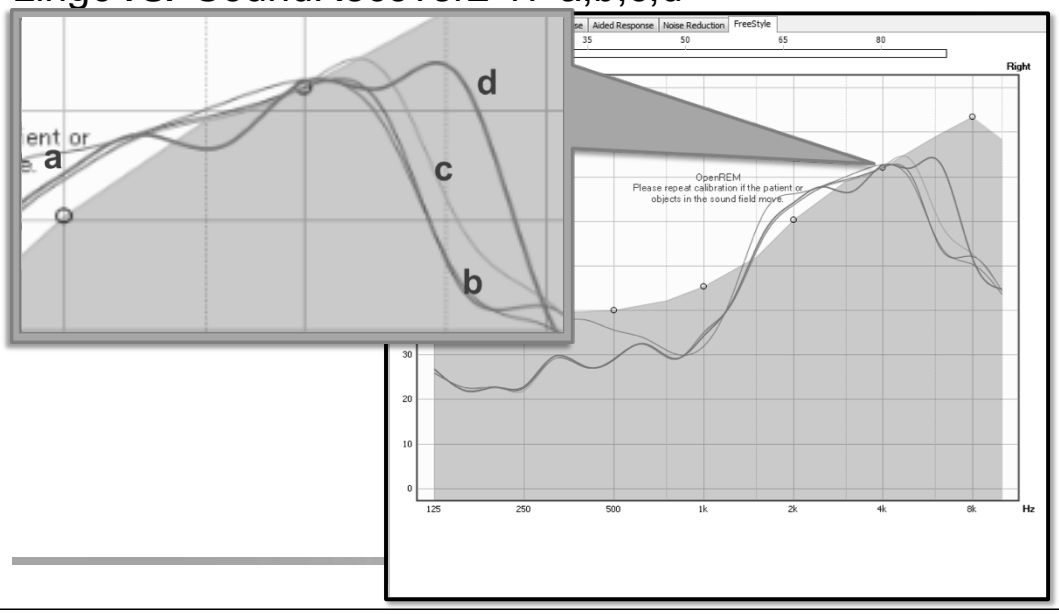
Ling6 **/s/** SoundRecover2 17 a,b,c,d



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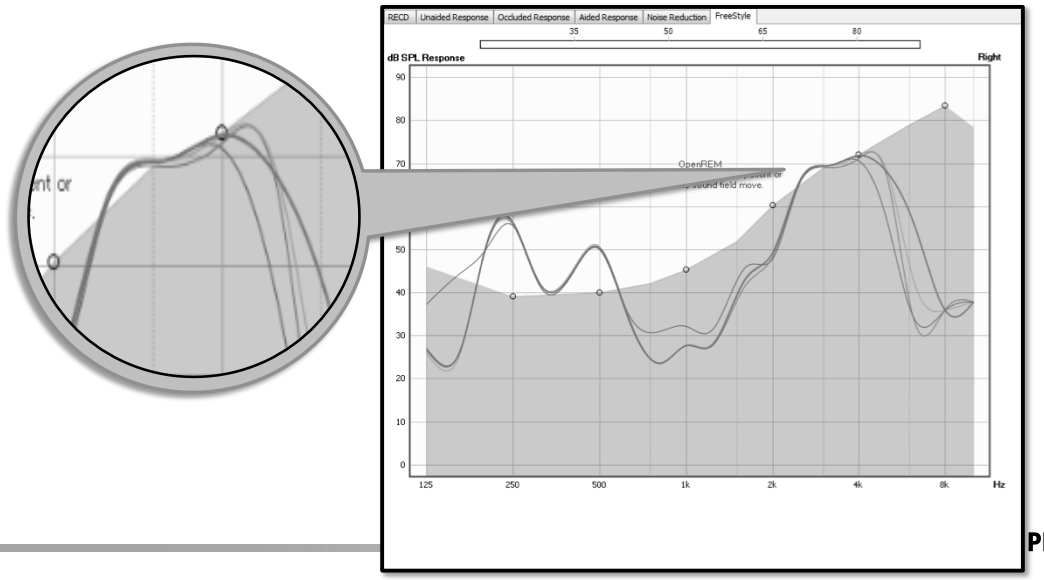
Ling6 **/ee/** SR2 ON, Comfort/Clarity : a,b,c,d



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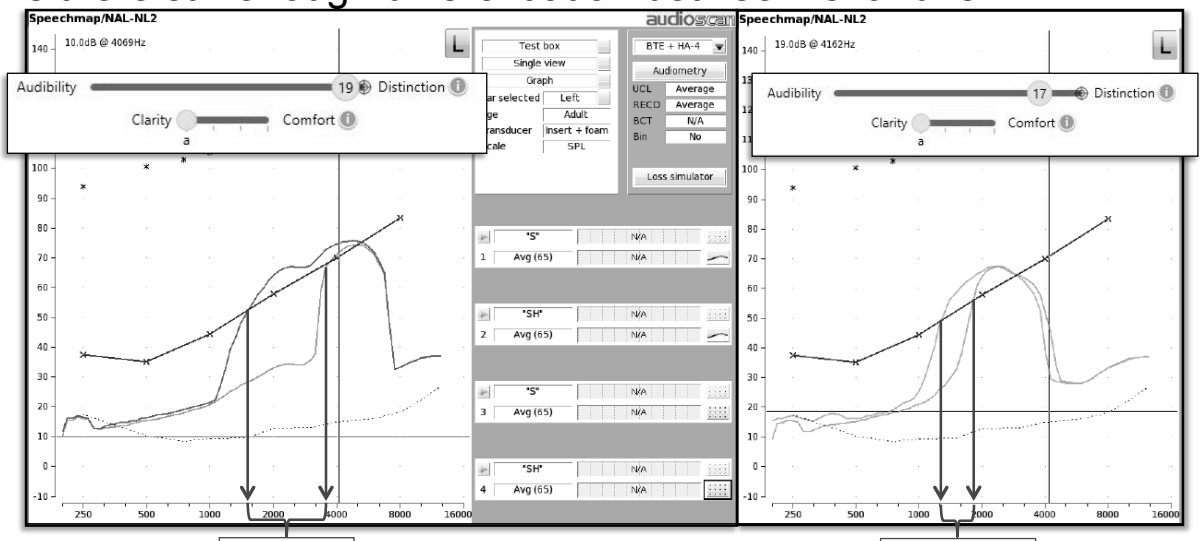
Is there still enough differentiation between /s/ and /sh/?



>1 octave

> 1/3 octave

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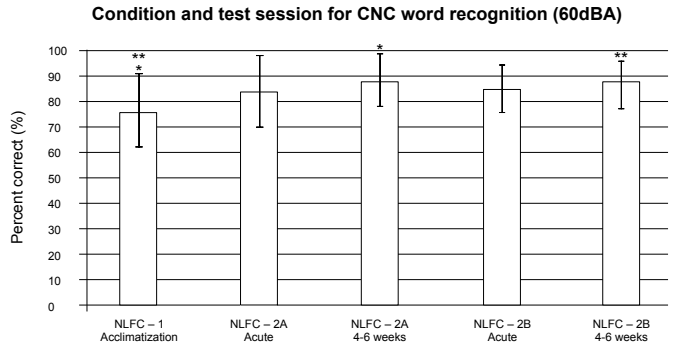
SoundRecover2 improves audibility of high frequencies: Pediatrics

Improved word recognition in quiet on the CNC test



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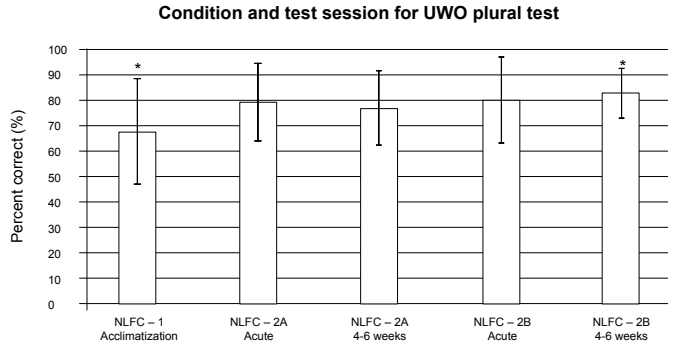
Wolfe, J. (2016). SoundRecover2 for Pediatrics: Audibility where it matters most. *Phonak Field Study News*, retrieved from www.phonakpro.com/evidence, accessed February 19th, 2018.

SoundRecover2 improves audibility of high frequencies: Pediatrics

Improved recognition of plurals with the UWO plurals test
recognition of consonants



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Wolfe, J. (2016). SoundRecover2 for Pediatrics: Audibility where it matters most. *Phonak Field Study News*, retrieved from www.phonakpro.com/evidence, accessed February 19th, 2018.

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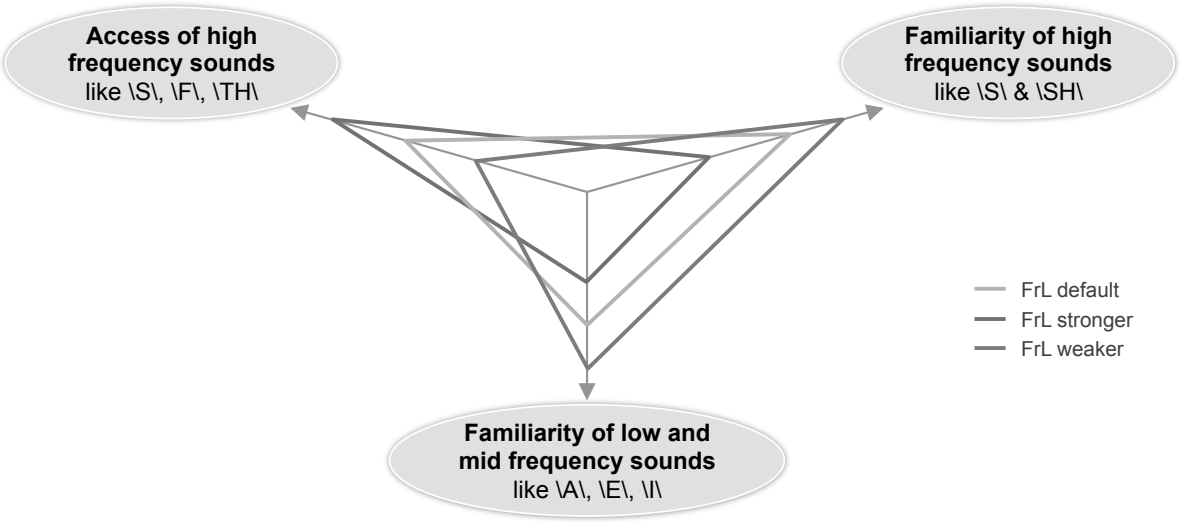
Remember the possible results of the interaction of settings



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The final take on SoundRecover2:

Restores access to high frequency information while preserving high frequency discrimination and sound quality

Retains the essence of our SoundRecover strategy, while allowing lower cut-off frequencies with weaker compression ratios

Maintains the familiarity of low and mid frequency sounds

Extends the benefits of SoundRecover to:

- more profound losses
- left corner audiograms
- ski-slope audiograms

PHONAK
life is on

Together, we change lives

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