

# AR MATTERS



Geoff Plant, OAM

The Hearing Rehabilitation Foundation

Woburn, MA



TALKABOUT

# Introduction



NAL Central Office  
Miller's Point, NSW

# Introduction



Denis Byrne  
1935 - 2000

# Introduction



Joined NAL in September, 1974 at a time when services to older Australians (veterans and pensioners) were being expanded.

Provided with opportunity to work on any project I wanted.

Interested in working with older adults.

Advice and materials provided by Pat Pengilley

# Introduction



Recruiting House  
York Street, Sydney

# Introduction



First projects with older adults were the provision of Hearing Aid Orientation Groups

Four x one-hour sessions covering:

How we hear  
Hearing aids

Visual cues for speech understanding  
Hearing Tactics

# Introduction



# Introduction



WHO Fellowship in 1977 to look at adult AR programs in Denmark and Sweden.

Services varied considerably, but some exemplary services. Included residential program for deafened adults in Denmark and Sweden that stressed lipreading training and auditory training.

On return to Australia, started to work on the development of programs to maximize use of residual hearing – AUDITORY TRAINING

# Introduction



Auditory training (AT) was once seen as an integral part of the approach used with adults with hearing loss following fit with hearing aids.

It is sometimes argued that AT and other AR approaches are no longer necessary as technology has solved most of the problems created by an acquired hearing loss – HAs and CIs make such approaches redundant.

# Introduction



Many adults with HL resent the implications of this approach. When a person does not perform as expected; is it the fault of the person with HL, or the fault of a philosophy that doesn't provide meaningful support and training?



# A Dickensian Quandary

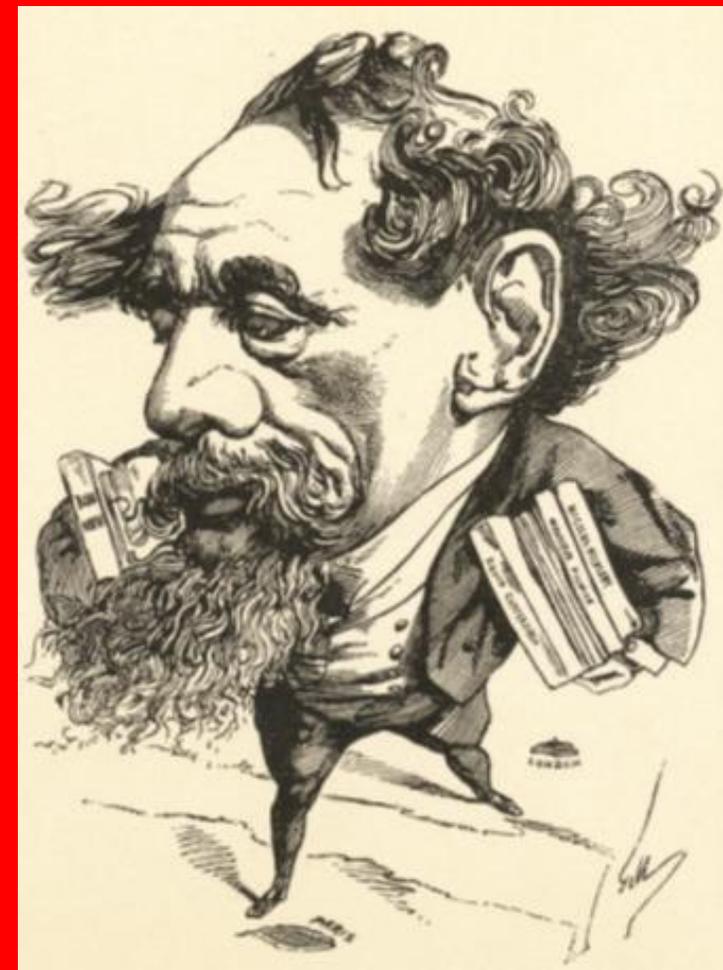


The BEST of times

HAs, CIs, assistive technology, improved access to telephones – relay services, speech recognition technology, Face Time, etc.

The WORST of times

Services post-fit are very limited, little access to training



# The best of times



Mary Wood Whitehurst

# The worst of times – almost!



August, 1944

467

## AGAIN, ZENITH MAKES HEARING AID HISTORY!

Brings New Smartness and Style at No Extra Cost with the

### New Neutral-Color Earphone and Cord

ZENITH made hearing aid history by bringing fine precision quality within reach of all. Now Zenith follows through—makes history again—brings you, in its complete production, an entirely new standard of hearing aid smartness and style!

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There are cases in which deficient hearing is caused by a progressive disease and any hearing aid may do harm by giving a false sense of security. Therefore, we recommend that you consult your otologist or ear doctor to make sure that your hearing deficiency is the type that can be benefited by the use of a hearing aid.

#### Mail Coupon for Free Descriptive Booklet

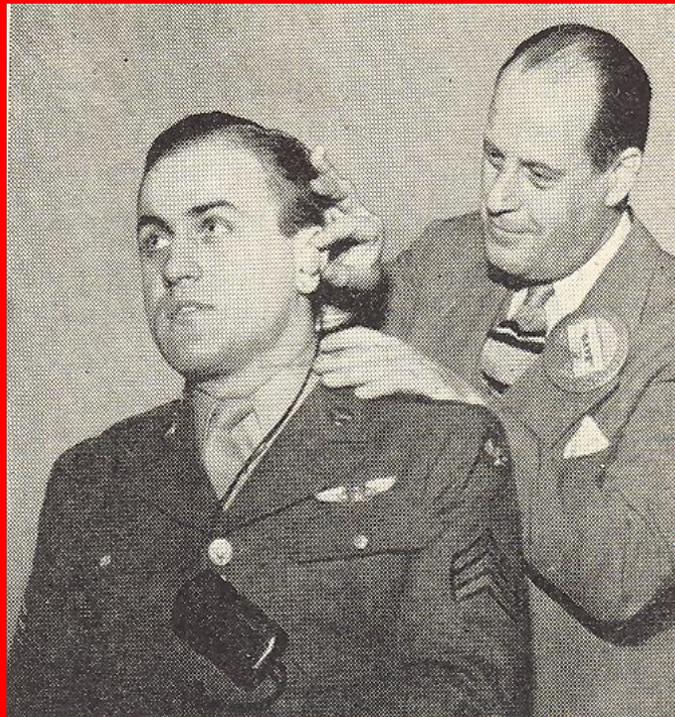
Zenith Radio Corporation, Dept. VR-8  
P. O. Box 6940A, Chicago 1, Illinois

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- Translucent plastic—looks well with any apparel. Greatly reduces friction or clothing noise.
  - Slender, light in weight, more comfortable, less longer.
  - Perpiration-proof, water-proof, kink-proof, washable. Will not fray, wipes clean with damp cloth.



ZENITH RADIO CORPORATION, CHICAGO, ILLINOIS



# Current situation



A wide range of HAs and CIs available, but little attention paid to providing training that will maximize an individual's use of this technology.

Auditory training is provided in few places – mainly restricted to CI clinics and research facilities.

Some interactive training programs such as LACE, Read my Quips, Angel Sound and cLEAR, but little evidence of use by many clients

# Current situation



In early 2019, I asked members of the FB group “Cochlear Implant Experiences” to tell me what sort of AT they had received after activation.



# Current situation



70 responses, and found that the scope and type of services varied greatly. Only 14 reported receiving 1:1 listening training, 26 reported that the training had been home-based, and many had used online courses such as i-Angel Sounds, AB Clix, and LACE. Others listened to recorded books, TED talks, etc.

Finally, almost half (33) reported they had received *no* training at all. Several expressed concern that they had not received any specific listening training even though they were experiencing difficulties, or were not satisfied with their performance level.

# Current situation



Vasil and English (2015) conducted a survey of more than 350 AuD students to determine their “experiences with auditory training in clinic.”

Results indicate that few clinics are offering auditory training to their adult clients.

# Current situation



Are you familiar with AT procedures?

Not at all ~18% A little ~35% Somewhat ~40% Very ~7%

On-campus clinic experience with AT procedures

Rarely ~65% Somewhat often ~28% Often ~7% Very often 0%

Have you used AT in your off-campus clinic experience?

No ~75% Yes (both chn. & adults) ~10% Yes (adults) 10%

Yes (children) ~5%

# Current situation



There is a growing awareness of that people with hearing loss must “work harder” to follow conversation. Many can perform with increased focus for a short time, but find it difficult to maintain for extended periods.

Awareness of increased “cognitive load” created by acquired HL. Need to use “global” cues to overcome problems caused by the ambiguous signal provided by HL. NH people usually only engage such processes in difficult listening conditions – noise, accent, etc.

# It's a marathon, not a sprint



Most measures used to evaluate a person's ability to understand speech fail to take these factors into account. Listening to a word or sentence list for a few minutes does not really replicate the realities of everyday communication for the person with HL.

Only required to maintain focus for a short period of time and testing is often performed in acoustically treated rooms. Need to develop testing and training resources that better reflect real life listening for the person with HL.

# Hearing Rehabilitation Foundation



Registered not-for-profit established in 1996, “to provide and promote speech communication training.”

AT sessions usually last 2 hours and are provided 1:1.

Clients asked to make a small donation to the HRF for each session (suggested donation is \$50), but is not obligatory.

All services provided by volunteers.

# Auditory training



Provide training aimed at improving person's ability to understand speech – usually via listening only, but do provide some auditory-visual training

Series of training programs developed by the HRF

Although most clients are CI-users also provide training to people with HA's

Important part is the use of KTH Tracking Procedure

# Auditory training



Develop ability to listen for extended periods – people with hearing loss often comment on how hard it is to focus on speech for more than a short period of time

## DEVELOP HEARING STAMINA

Work on improving confidence in ability to stay on task – a demonstration of how well the person can focus in a listening situation.

# Auditory training



Wherever possible, clients attend once a week for a two-hour session. Over time, may reduce to every two weeks, monthly,

There is no break in the session, but there is always time for informal conversation, questions, discussing client's specific needs or situation, etc.

Try to also have some time for listening for enjoyment – story telling, discuss a slide show, etc. With CI clients often devote some time to music listening

# Warm-up exercises



Begin each session with a short exercise aimed at encouraging attentive listening, rapid response time with accuracy.

Examples include:

NUMBER STRINGS, NONSENSE SYLLABLES, WORDS, SENTENCES

Materials usually presented without visual cues (lipreading)

# Number strings



NAME \_\_\_\_\_ DATE \_\_\_\_\_

PRESENTATION MODE A      V      AV      QUIET      NOISE \_\_\_\_\_

LEFT CI   HA   UNAIDED      RIGHT CI   HA   UNAIDED

## FIVE ITEMS

#	NUMBERS	RESP	#	NUMBERS	RESP	#	NUMBERS	RESP
1	39810		1	12437		1	63897	
2	40213		2	47869		2	53216	
3	90758		3	12836		3	95173	
4	53874		4	48279		4	02631	
5	31950		5	63518		5	47291	
6	97820		6	20947		6	37815	
7	29143		7	38791		7	19685	
8	30274		8	84250		8	12980	
9	13264		9	23401		9	90761	
10	93450		10	64893		10	17843	

# Syllables



Wanted a measure of response rate for a task involving [aCa] syllables – how many syllables can a client identify correctly in two minutes?

Needed a reliable response to minimize chance of trainer mishearing the client's response -- allow approach to be used in quiet and noise.

Use a modification of the NATO phonetic alphabet.

# [aCa] syllables



<b>B</b>	Bravo	<b>N</b>	November
<b>CH</b>	Charlie	<b>P</b>	Papa
<b>D</b>	Delta	<b>R</b>	Romeo
<b>F</b>	Foxtrot	<b>S</b>	Sierra
<b>G</b>	Golf	<b>SH</b>	Shadow
<b>H</b>	Hotel	<b>T</b>	Tango
<b>J</b>	Juliet	<b>V</b>	Victor
<b>K</b>	Kangaroo	<b>W</b>	Whiskey
<b>L</b>	Lima	<b>Y</b>	Yankee
<b>M</b>	Mike	<b>Z</b>	Zulu

# Syllables



As client's performance improves move to [Ca] syllables, also look at other vowel contexts [iCi], [uCu]

Recently introduced a new [CV] task, which presents the 20 consonants combined with the vowels [a, i, u, ɔ, aɪ, eɪ] to form 120 syllables – some meaningful words and some nonsense syllables. Training list consists of 6 presentations of each item in a random order. Client's task is to identify the *initial consonant*.

# Word contrasts



BYE	SIGH	DIE	GUY	PRY
PIE	TIE	VIE	FLY	PLY
FRY	THIGH	CHAI	TRY	CRY
NIGH	MY	LIE	WHY	DRY
RYE	HIGH	SHY	SPY	STY

# Synthetic training



Many of the warm-up exercises are ANALYTIC training materials. Client is forced to rely upon the “acoustic-phonetic” signal.

Also use many different SYNTHETIC training materials. Client can use her/his language knowledge to fill in “gaps” created by HL, make predictions based on language knowledge.



# Speech Tracking



Technique that involves reading a story line-by-line

Client has to repeat *every word* before moving on to the next line

Continues for five minutes, computer automatically calculates number of words correctly repeated over that period to give a *Tracking Rate* in words-per-minute.

# Speech Tracking



In a typical session, the KTH approach will be used for around one hour. Present materials both AV and A only in five minute blocks. AV presentations are used to encourage use of lipreading to supplement the auditory signal. Also provides a welcome relaxing respite from auditory only condition. At end of each five minute block, client is asked to rate EFFORT and CONFIDENCE using a 7-point scale.

# KTH Speech Tracking Approach



Spens and Gnospelius (1992)

Live-voice presentation but text format is predetermined.

Entered into a computer line by line.

Displayed on monitor for the speaker

Computer records presentation times and repeats

Repeats are only repair strategy

Word displayed after two repeats

# KTH Speech Tracking Approach



**TRACKING RATE** number of words in lines correctly Repeated in a 5-minute trial, words-per-minute (wpm)

**CEILING RATE** based on lines correctly repeated on first presentation, wpm

**PROPORTION OF BLOCKED WORDS** number of words blocked as a proportion of total number of words presented

# KTH Speech Tracking Approach



Tracking Rate and Ceiling Rate involve:

SPEAKER



Present line



Receive and  
process

RECEIVER



Repeat line



# KTH Speech Tracking Approach



# KTH Tracking Text

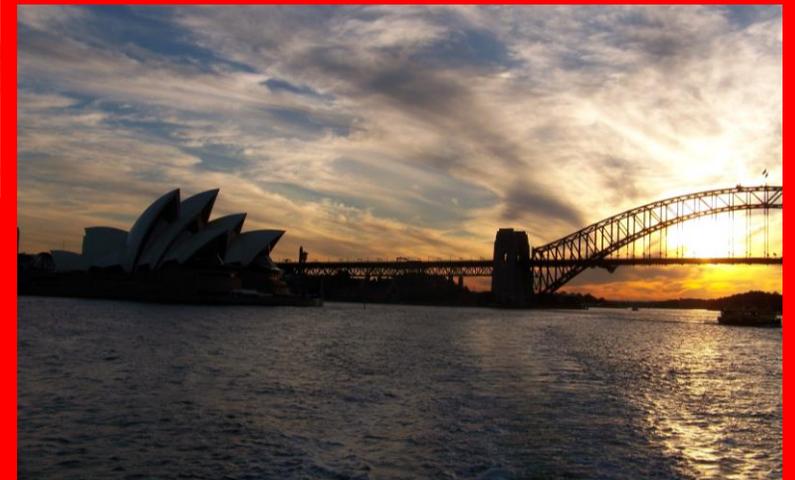


Have written a story of around 160,000 words in length.

Set in Central Australia and in the area around Sydney.

Told in first person, written using a conversational style, akin to level of complexity found in books for Young Adults.

# Kumanjayi



# Kumanjayi



# Client #1



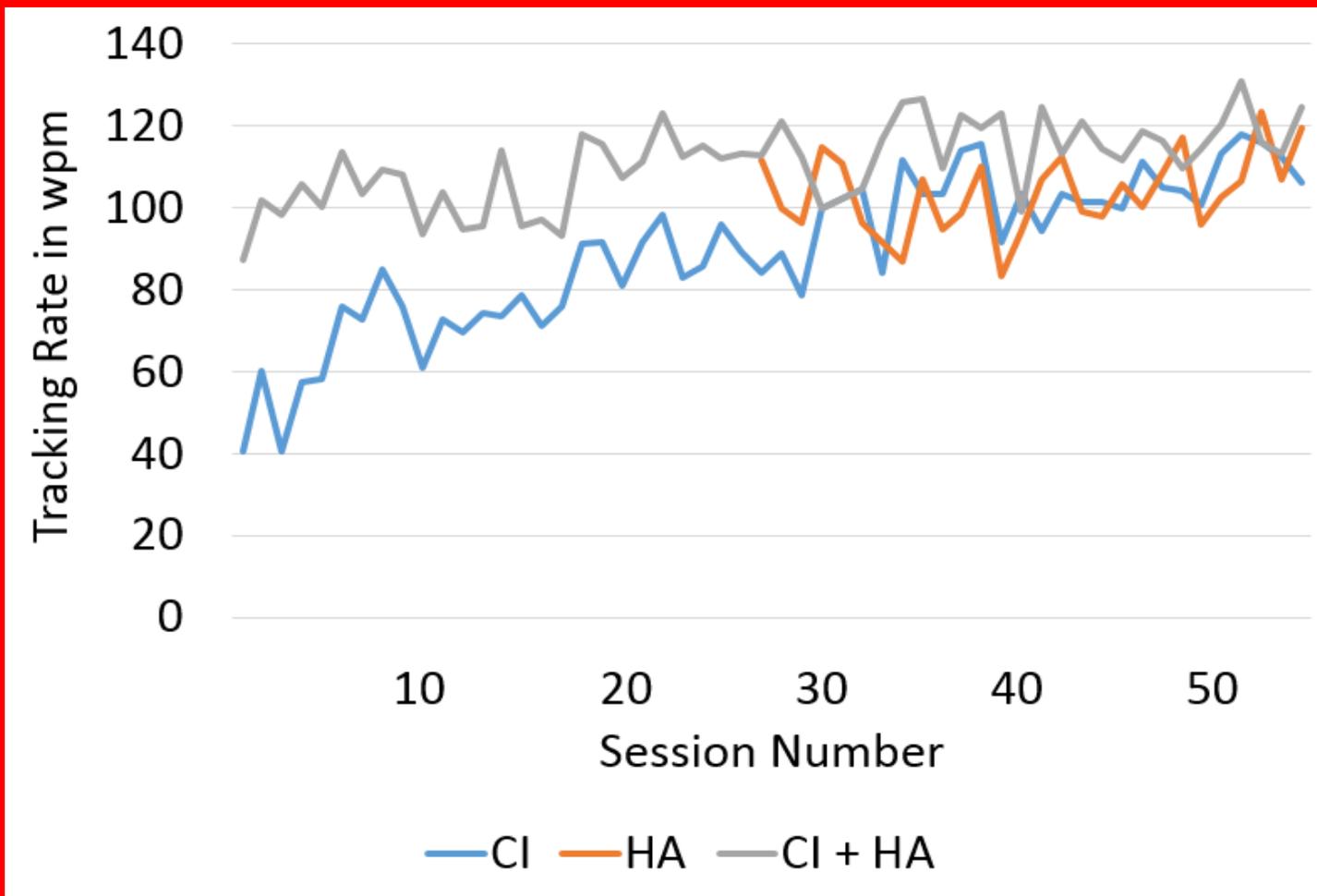
Woman in late 50s, long-term HL, opted for CI in one ear, continues to use HA in other ear. Works as a Middle School nurse and reported trouble with hearing children.

At first, training focused on CI only and CI + HA. Then introduced a third condition, HA only, to compare performance.

Speech Tracking results show a steady improvement over a period of around one year.

# Client #1

# Auditory only



# Client #1



*“I thought I had speech discrimination and understanding pretty much under control after wearing a hearing aid for the majority of my life, but, as a new cochlear implant recipient, there were plenty of nonsensical sounds swimming around in my head that I struggled to understand. Auditory training simply helped to make sense of sounds and turn them into comprehensible speech. Geoff not only helped me to maximize my comprehension and processing time, but, more so, guided me in gaining the confidence in my own ability to do so.”*

## Client #2

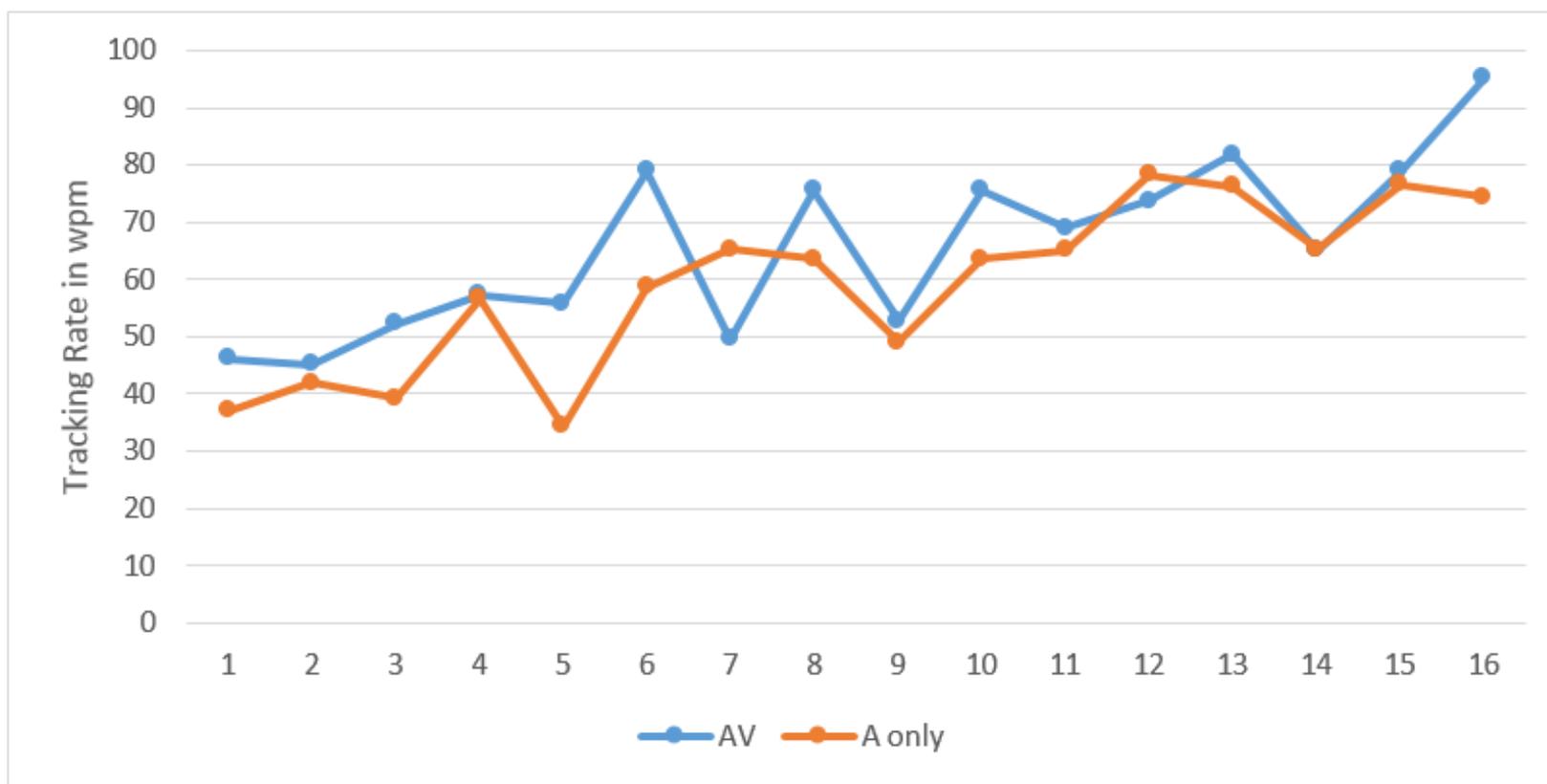


88 year old man with a long standing HL, wore HA in R ear (“positively helps”), CI in L ear for around one year (“couldn’t sustain on its own,” “not up to speed as yet”). Wondering whether the CI was worth the effort, and talked about perhaps discontinuing its use.

Saw him for seven sessions during which he made rapid progress. KTH plus exercises from homeheARing, not able to work as intensively during sessions due to fatigue.

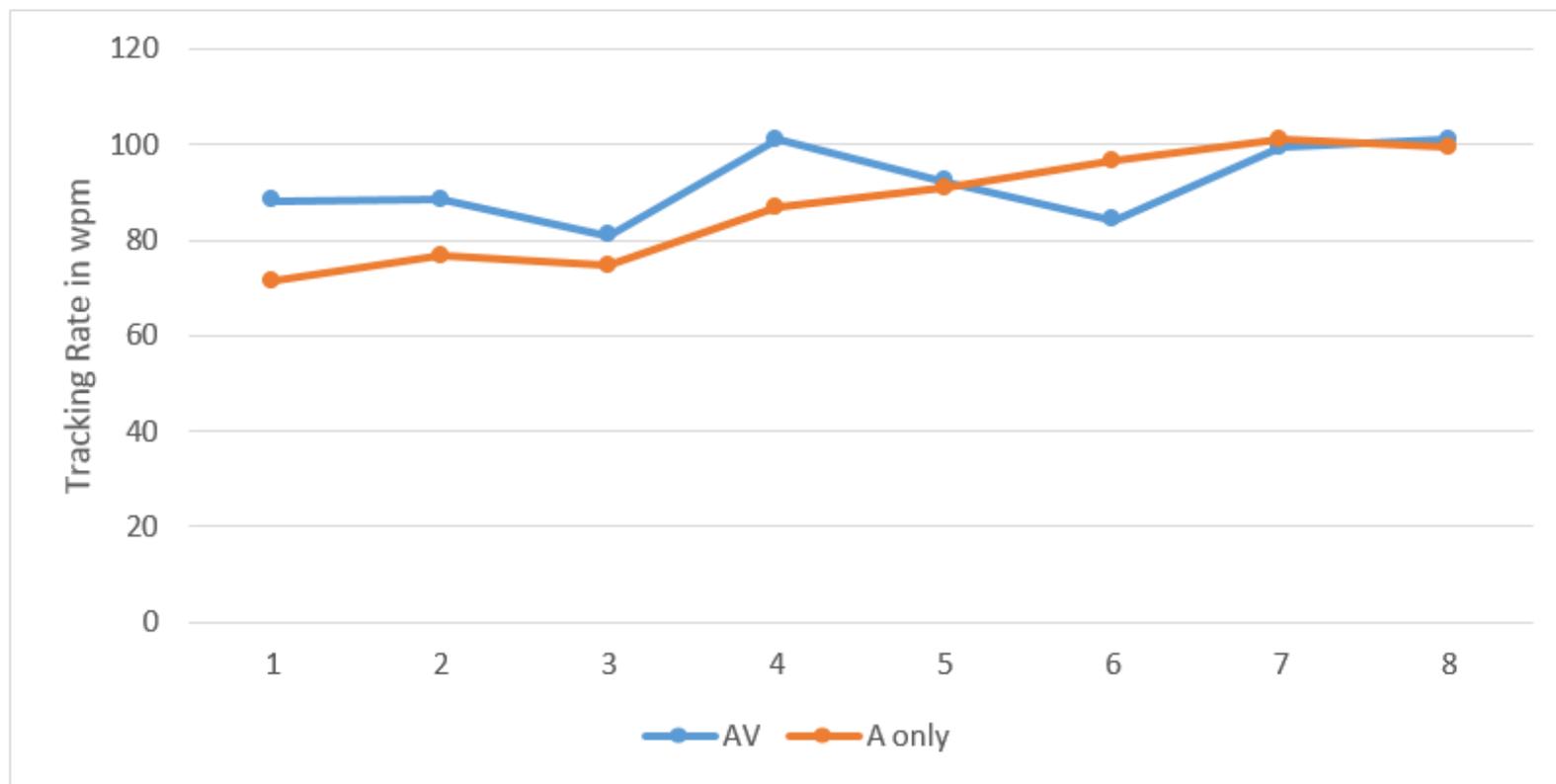
# Client #2

# CI only



1, 2	01/08/2019	7, 8	02/05/2019	14, 15, 16	03/12/2019
3, 4, 5	01/25/2019	9, 10	02/12/2019		
6	01/29/2019	11, 12, 13	03/01/2019		

# Client #2 CI + HA



1	01/08/2019	4, 5	02/05/2019	8	03/12/2019
2	01/25/2019	6	02/12/2019		
3	01/29/2019	7	03/01/2019		

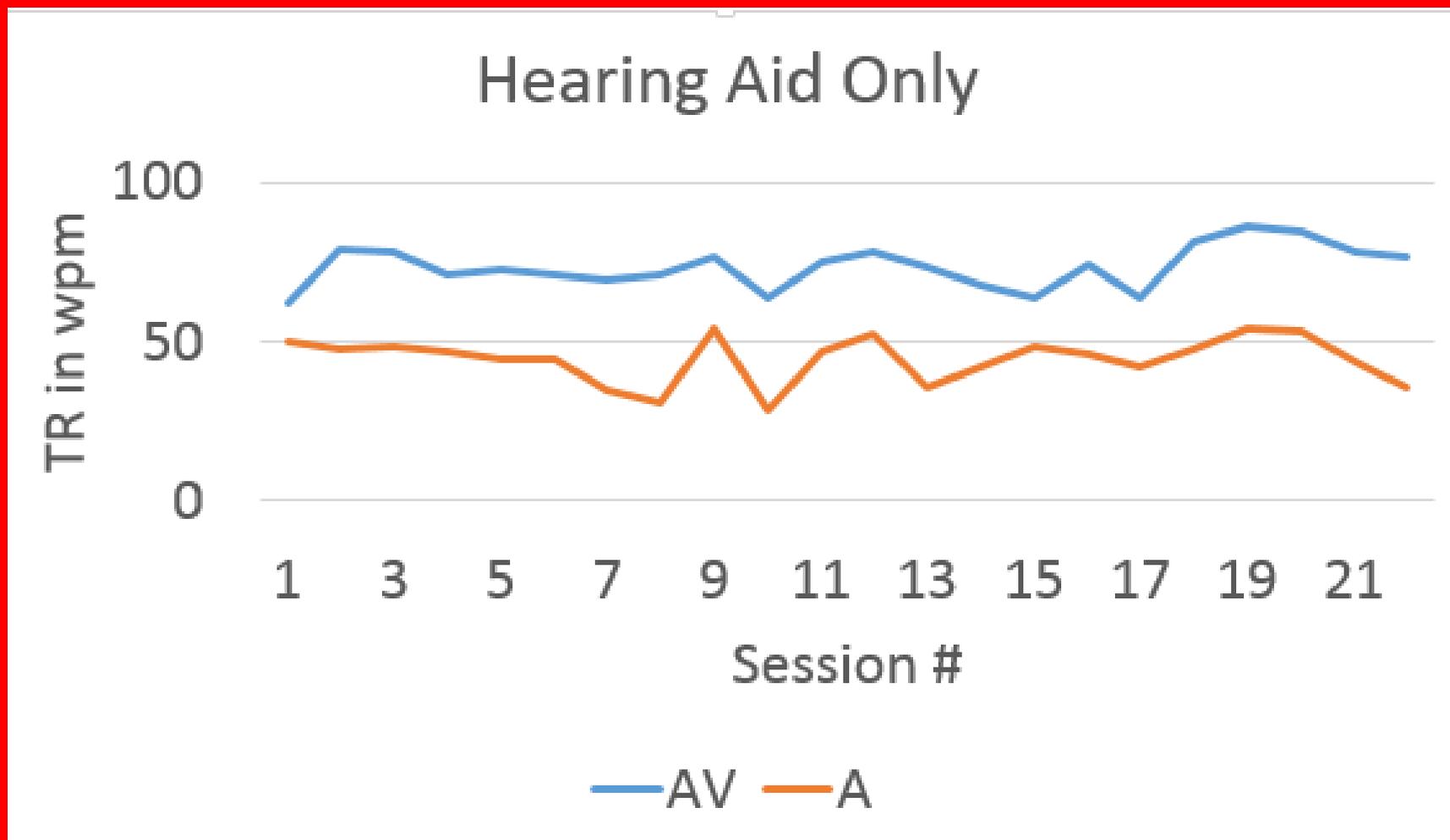
# Client #3



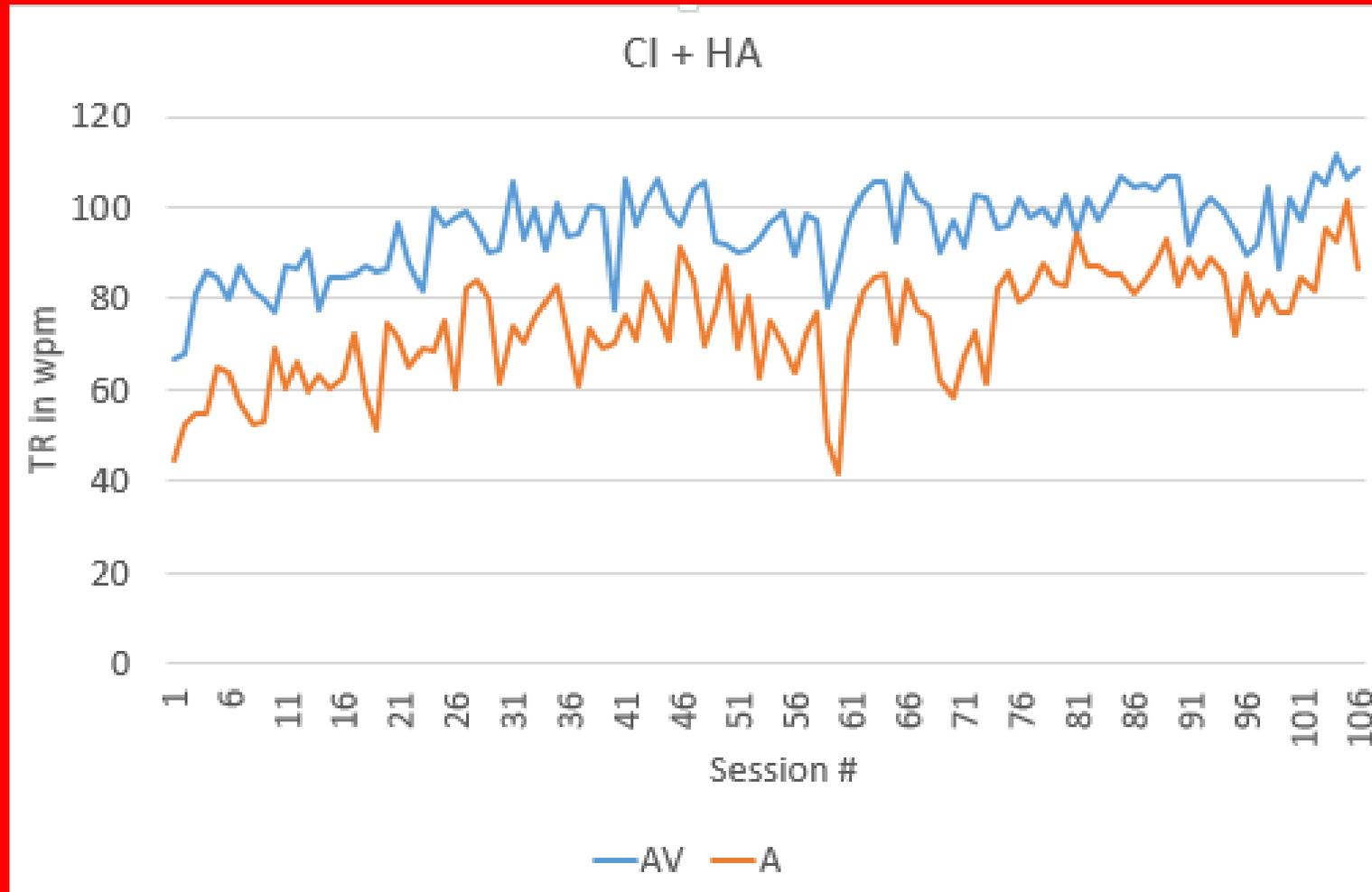
Woman in her late 30s. HL caused by ototoxic drugs administered for cancer when she was eight. Sudden HL in R ear in February, 2015. Attended for several training sessions using HA in L ear. Performance relatively poor, but she was surprised that she was able to understand speech via listening alone.

Received CI in R ear in late 2015. Has attended for weekly sessions for around two years. All training was CI+HA.

# Client #3 (pre-CI)



# Client #3 (post-CI)

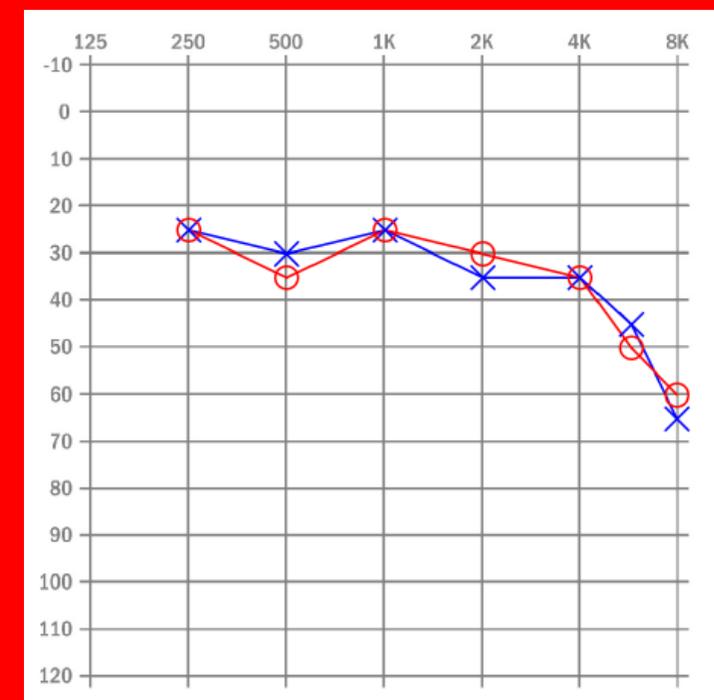


# Client #4



Woman in mid-70s, self-described as “still in denial,” but sought training help. Reported that it was “very difficult” to have extended conversations 1:1 and in groups, and particular difficulties in noise.

Has attended weekly sessions for almost 2 years, and also comes to FIKA groups with other older listeners.

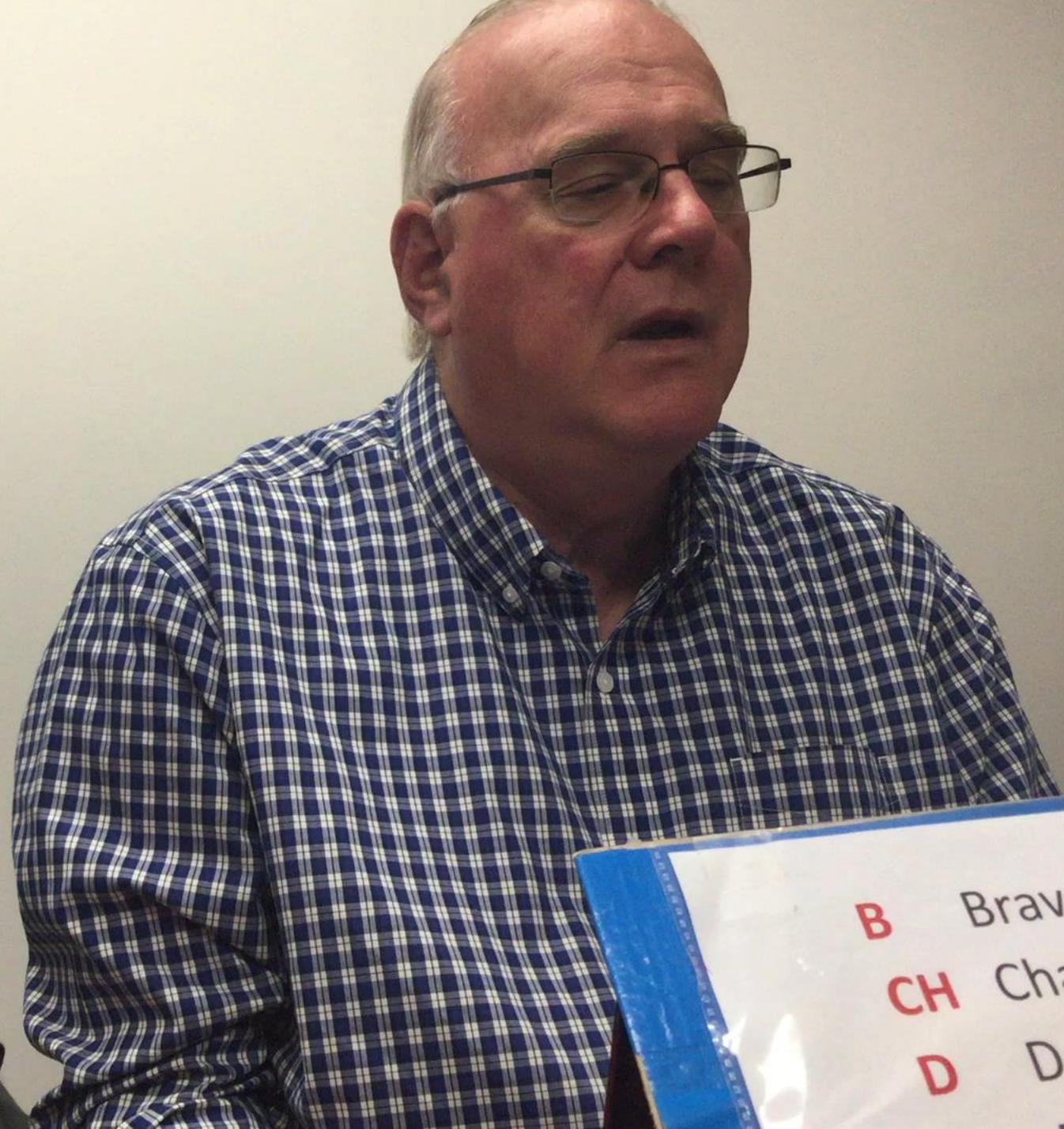


# Client #4



Training has focused on concentrated listening exercises such as nonsense syllables, number strings, and other activities requiring ongoing attentive listening.

Around half of each 2-hour session devoted to Speech Tracking in noise – competing male speaker with a British accent. Client encouraged to attempt to focus only on therapist's voice and “stream out” other speaker.



**B** Bravo  
**CH** Charlie  
**D** Delta

Five trot

## Client #4



Independent testing in March, 2019 showed great improvement in Quick Sin

“results from today showing a SNR loss of .5 when compared to results from last year showing a SNR loss of 5.5 indicate significant improvement understanding sentence material in noise. She has been working with Geoff Plant weekly and clearly the benefits of his work can be seen in these results.”

Client also reports improved abilities in noise and in overall speech understanding.

# Conclusion



Clients often come to therapy with anxiety about their listening abilities, therapist needs to help improve their skills and provide the encouragement needed to “take risks.”



# Conclusion



Clients need support and encouragement. They also need to experience success. Materials should be at the appropriate level – not so difficult that the client is discouraged, and not so easy that s/he feels no sense of challenge.

Can a computer-based, web-based training program help? Yes, but they should not be seen as substitute for direct 1:1 training. Such programs offer extra training and should be seen as an effective substitute.

# Conclusion



The therapist provides

**S**uggestions for clinic and home training, resources, etc.

**A**ffirmation – let client know when s/he is successful

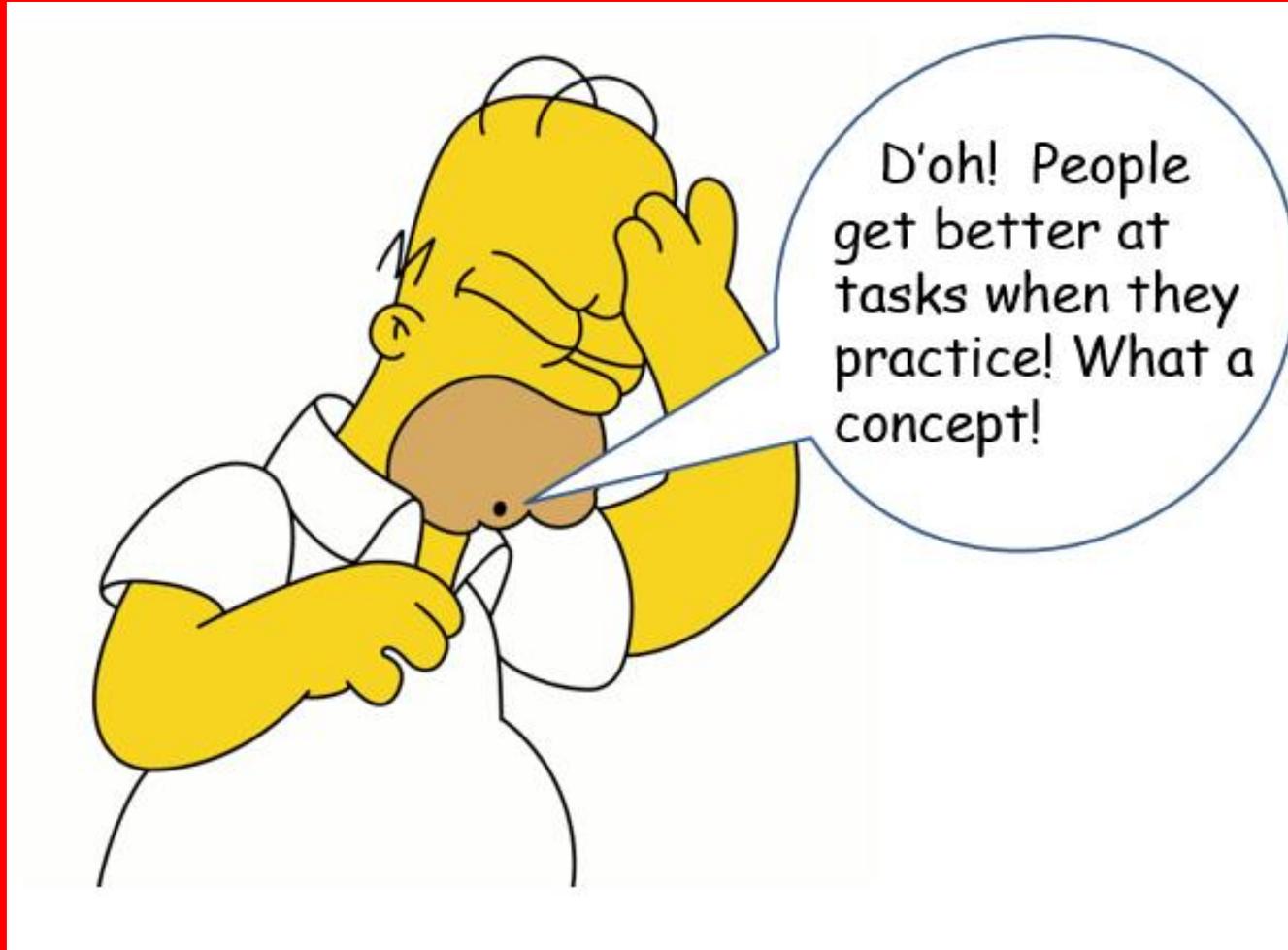
**F**eedback to let client know how s/he is proceeding

**E**ncouragement and support

**T**raining to improve listening skills.

**Y**es! positive experiences and support

# Conclusion



# International Adult AR Conference



Hilton Boston/Woburn

November 3 – 5, 2019

Contact HRF for full details

# AT for Adults with HL – Training



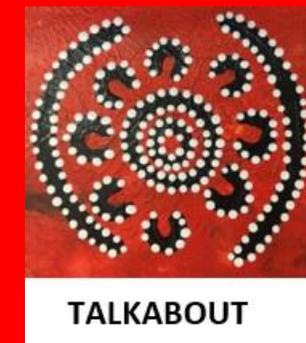
**WHERE?** Woburn, MA

**WHEN?** Friday, December 6, 2019 9:30 AM – 3:30 PM

**WHAT?** A training course for audiologists, speech pathologists, and other professionals who want to develop skills in providing auditory training to adults with HL.

**COST?** \$150 (includes a copy of homeheARing, value of \$75)

Contact HRF ([hearf@aol.com](mailto:hearf@aol.com)) for full details



# Contact



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