



G-O-H HEARING SCREENING

THE METHOD OF REPETITION
USING SHORT SYNTHESIZED SPEECH UNITS

Proposed adaptation experiment to the languages of
Visegrad countries: Slovak, Czech, Polish

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The method of G-O-H screening was developed in the 80s

- The acronym G-O-H corresponds to the first letters of the authors names **G**ósy, **O**laszy and the Hungarian word '**H**allás' (*'hearing'*).
- **Why synthesized speech?**

The acoustic content of specially synthesized speech items, produced with a formant synthesiser have less redundant acoustic structure, than naturally pronounced ones.

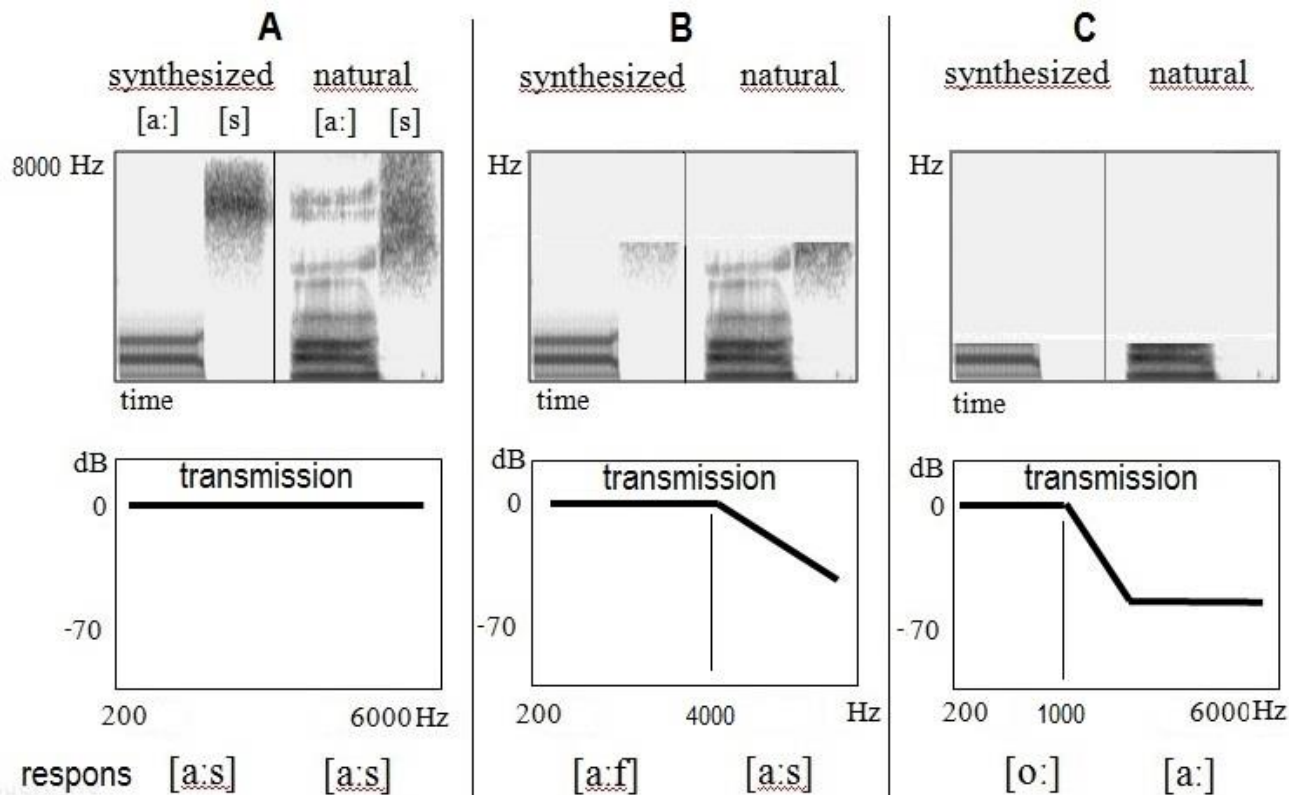
Method of repetition



The repetition (answering) method is based on echoing.

WHY CAN THIS METHOD BE USED FOR HEARING SCREENING?

The hearing mechanism works like a filter



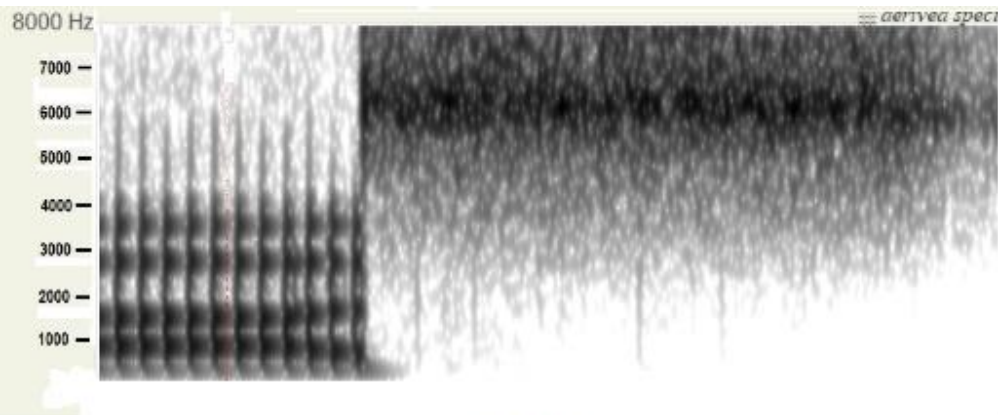
Repetition difference


In case of some hearing problem the redundant natural speech may be perceived correctly while the less redundant synthesized items are NOT perceived correctly.

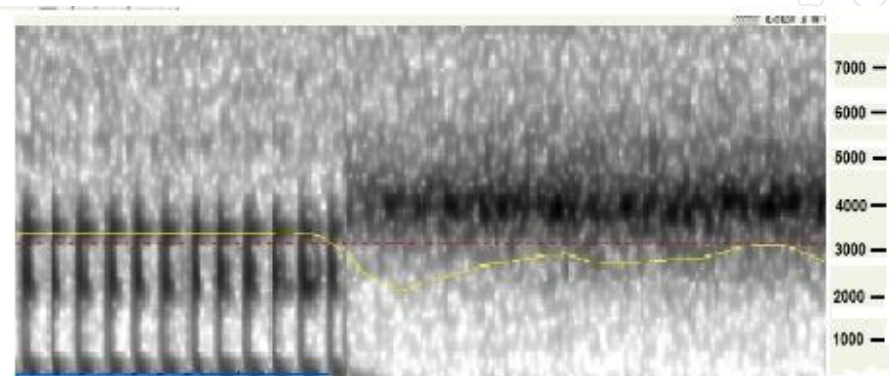
So, specially synthesized syllables can be used for hearing screening.

- Only 3-4 formants in vowels
- Narrow formant bandwidths
- Planned and predetermined spectral shape band for voiceless consonants

Example for controlled synthesis of the phonological same voiceless fricative speech sound in two realisations on 6000 Hz and on 4000 Hz.

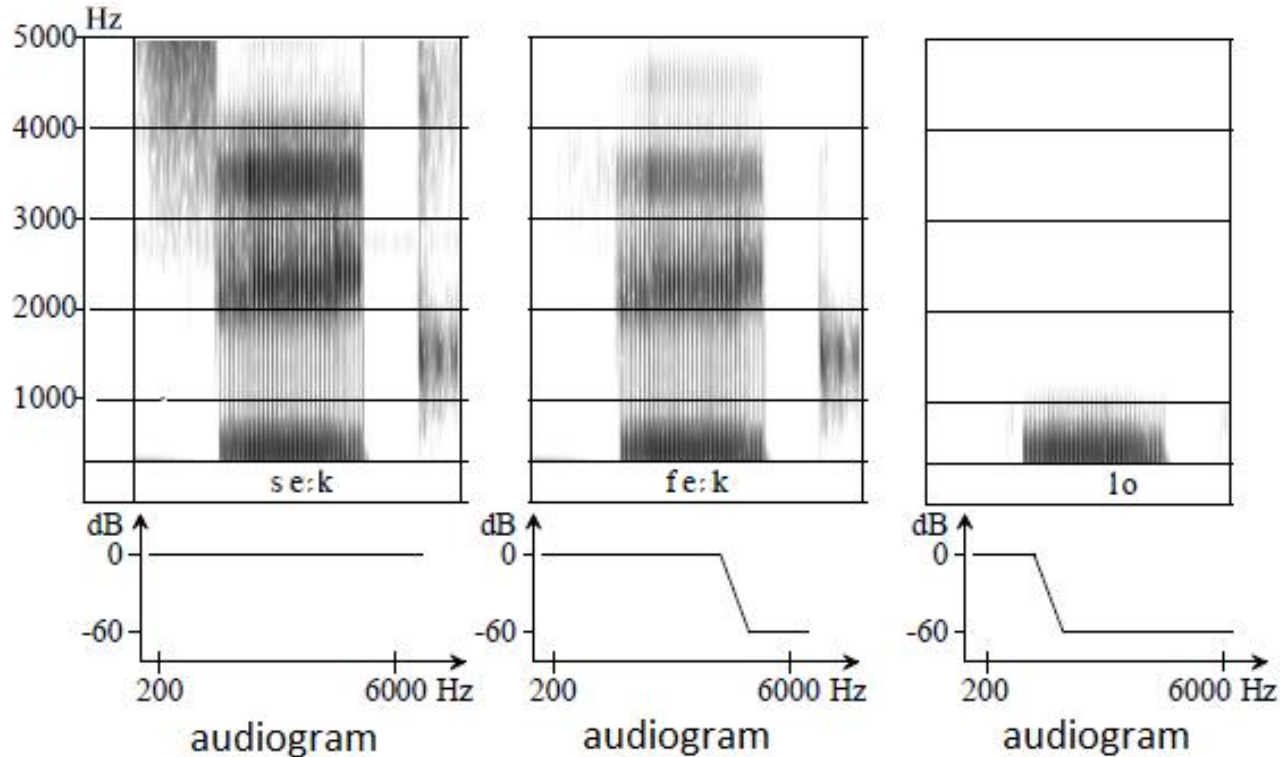


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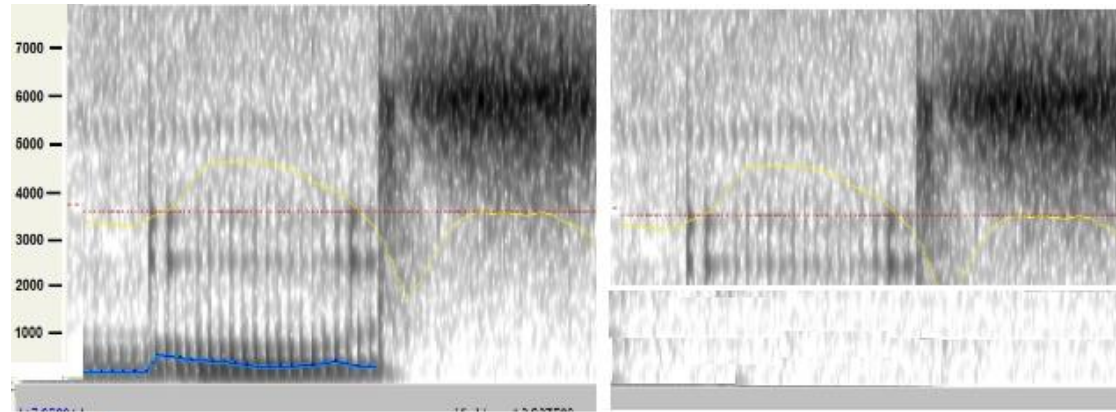


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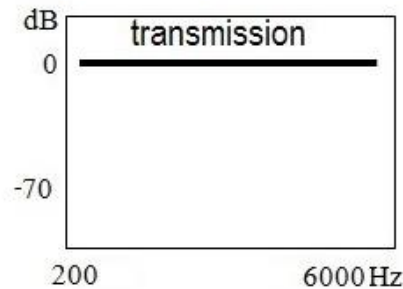
The hearing loss can be imitated by electronic filtering



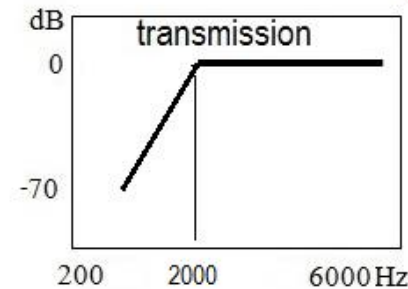
The imitation of low frequency hearing loss by electronic filtering



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The GOH hearing screening method

After many experiments the development of the G-O-H hearing screening method was completed and published in 1985

It consisted of:

- Specially synthesised monosyllabic items
- Answer (repetition) sheets for evaluation
- Hardware to play speech items



The ears of the child were examined separately

10 synthesized items



- The place of examination is a quiet room
- The synthesized, mostly meaningless syllables are played on 50 dB SPL to the ear.
- The complete screening of 1 child needs 3-4 minutes
- This is a toy for children

I. Good hearing	II. Possible hearing or speech perception deficit	III. Probable hearing loss	IV. Hearing loss
meggy	(begy) legy vegy negy	egy	bó od e ó
sip	sít sít súp szíp szép	zúg suk sut su(só) vid fut hó	kút út tū ú
bú	dú bók but bot bó pók pú púk dū(gū)	tú tó pú pó út	ó ú -
ász	ház pász áz	ás ágy álláj	(áf)áh átáp á a ó ú -
bot	but böt bō(bu)	pot put po pu ot ut op up lot dod tut	ó ú -
szél	cél szép szil szir cil szék szül szöl	fél fér tér tēl tól tór hé hó só	él ól ló tō(tū)ó -
méz	néz mész misz niz miz müz	bé bō vél bŭ bō bóf ból(bél) bōl	tóf tot tōt tū tó ó -
zsír	szír szil szér zér zir sil sél zil zsi zse si sé	főr fot fūr fŭl(fut) fup fop	hū hó úr út ór ót up óp -
bőr	pőr bōl pōl bér pér bél bír(dőr) ör	bor por bur pur	bo bu po pu tō tū ó ú -
szű	szó szür szül szór ször szū szūr	sū sŭ só fō(fū)	hó hú ló lū tō tū pū út ót ó ú -

Answer and evaluation sheet

Proof of concept

Clinical examinations were carried out:

- **the synthesized speech unit material was used for hearing screening**
- **involving more than 1,500 children with various types and degrees of hearing impairment (ages between 4 and 10)**

VS.

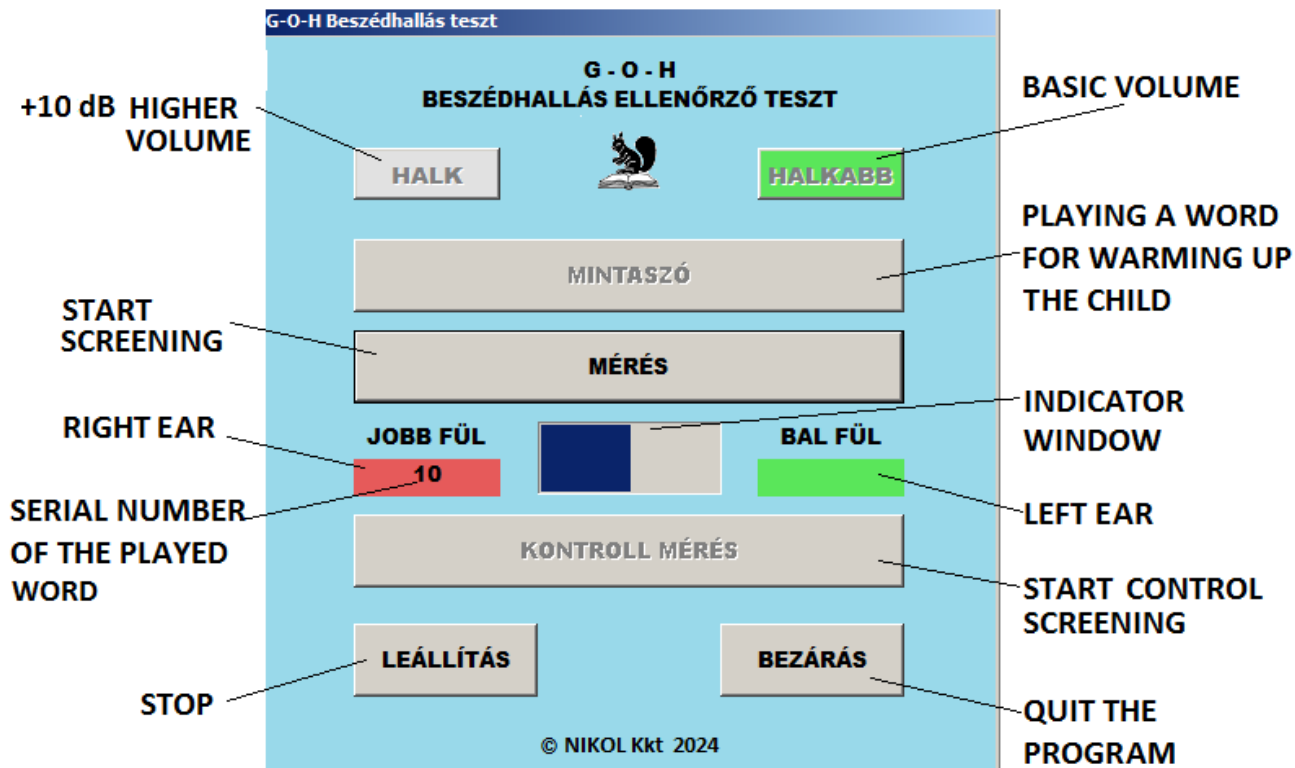
- **900 children with normal hearing**

A strong correlation was found between the incorrect repetition of the synthesized words and the hearing impairments.

Measurement in a day care center



The hearing screening software for Windows from 2024



NEW POSSIBILITIES ARISED!

THE G-O-H PROCEDURE CAN ALSO BE EXTENDED TO THE

**LANGUAGES OF THE FOUR VISEGRAD COUNTRIES
AS A CHARITY SERVICE**

**FREE OF CHARGE HEARING SCREENING POSSIBILITY FOR
THE CHILDREN AND ADULTS**



We propose the adaptations of the method for Slovak, Czech and Polish languages with the help of experts of these countries

THE STEPS OF THE ADAPTATION BASED ON THE HUNGARIAN SYNTHESIZED SYLLABLES ARE:

1. **STUDY** THE VOCAL SYSTEM OF THE LANGUAGES AND DETERMINATION OF THE MEASURING SYLLABLES (native speakers are needed)
2. **PRODUCE** SYNTHETIC SYLLABLES (done by SmarLab)
3. **CREATE** THE ANSWER AND EVALUATION SHEET FOR BOTH EARS (native speakers provide listening tests determined by SmartLab)
4. **SOFTWARE** ADAPTATION FOR SLOVAK (done by SmartLab)
5. **TEST** THE SOFTWARE IN SLOVAKIA, CZECH and POLAND
6. **FREE DOWNLOAD** IS PLANNED (for day care and speech therapy centers, schools, speech therapists and families)



I am asking for the help of Slovak, Czech and Polish colleagues today for some minutes.

Would you be so kind to do a short listening test for me after the meeting, between 16.00- 16.30?

The task is to listen 40 synthesized syllables and put down the written form of the heard meaningless syllable on your native language





**WE ARE OPEN FOR
COOPERATION**



**BME
TMIT**



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Thank you for your attention



Latest reference: https://www.isca-archive.org/hscr_2024/olaszy24_hscr.html