

Adaptive Auditory Speech Test (AAST)

- achtergrond en klinische toepassing -

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AAST

Was developed to screen/assess young children (3-4 y)

also applicable for individuals „older than 4“:

- **School-aged children**
- **Teenagers**
- **Adults**
- **Elderly / senior citizens**

AAST

Criteria for test construction (1)

1. Minimal influence of articulation, memory, vocabulary, visual cognition
2. Word-picture association (touch/click)
3. Closed-set (n=6) / multiple-choice format
4. „Easy“ words
5. Word material with redundancy like in daily life

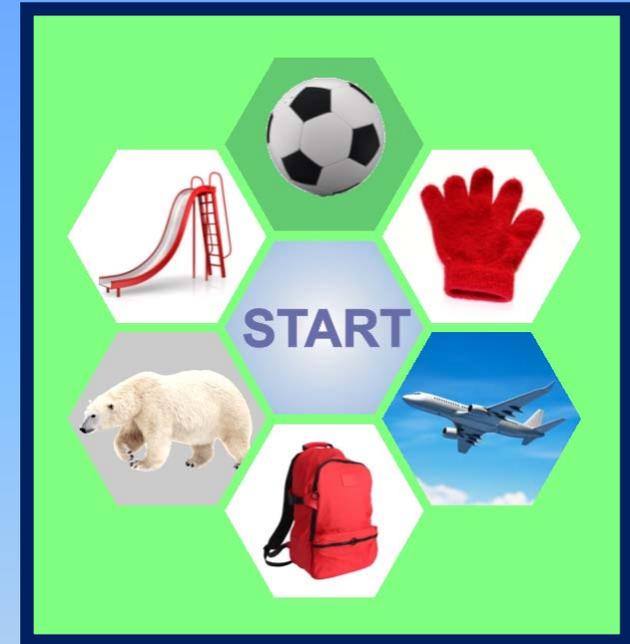


English

AAST

Criteria for test construction (1)

1. Minimal influence of articulation, memory, vocabulary, visual cognition
2. Word-picture association (touch/click)
3. Closed-set (n=6) / multiple-choice format
4. „Easy“ words
5. Word material with redundancy like in daily life
6. No contrast in word prosody
7. Maximum contrast at phonemic level
8. If possible: spondee words; if not: trisyllables



Dutch

AAST

Criteria for test construction (2)

9. **Automized adaptive procedure:**
fast, efficient, easy-to-handle

a) **First 3 trials: no level changes**

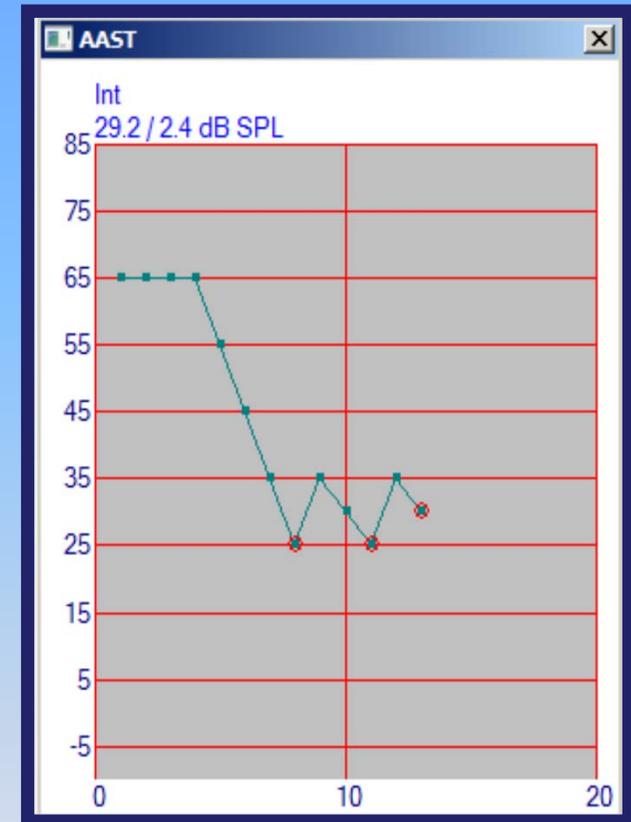
b) **Starting with trial 4:**

1 correct → 1 step down

1 wrong → 2 steps up

c) **Up till first lower reversal: double step size**

d) **Stop after 2 reversals (screening) or 4 reversals (test)**



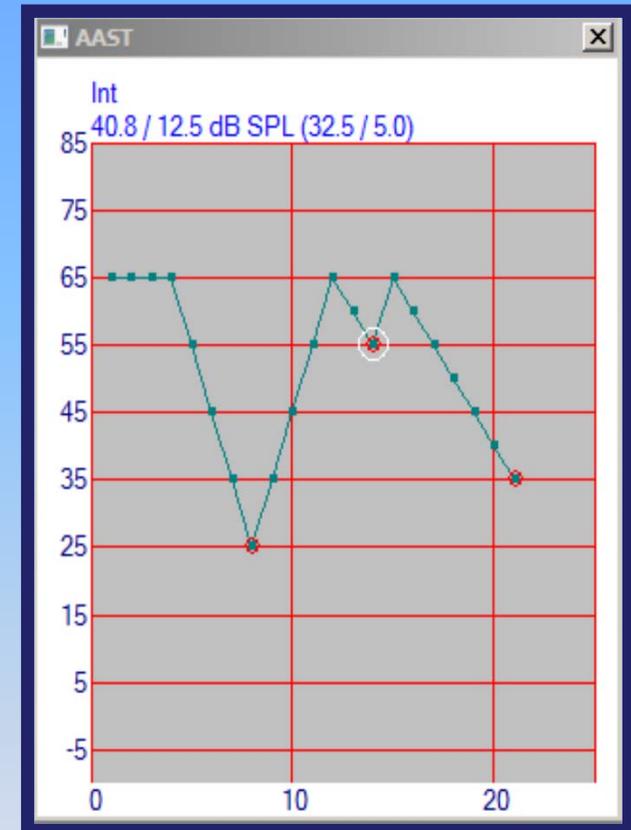
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Criteria for test construction (3)

10. Elimination of outlier values:

When $StDev > StepSize$

- a) Outlier reversal is identified
- b) Optional use of corrected SRT



AAST

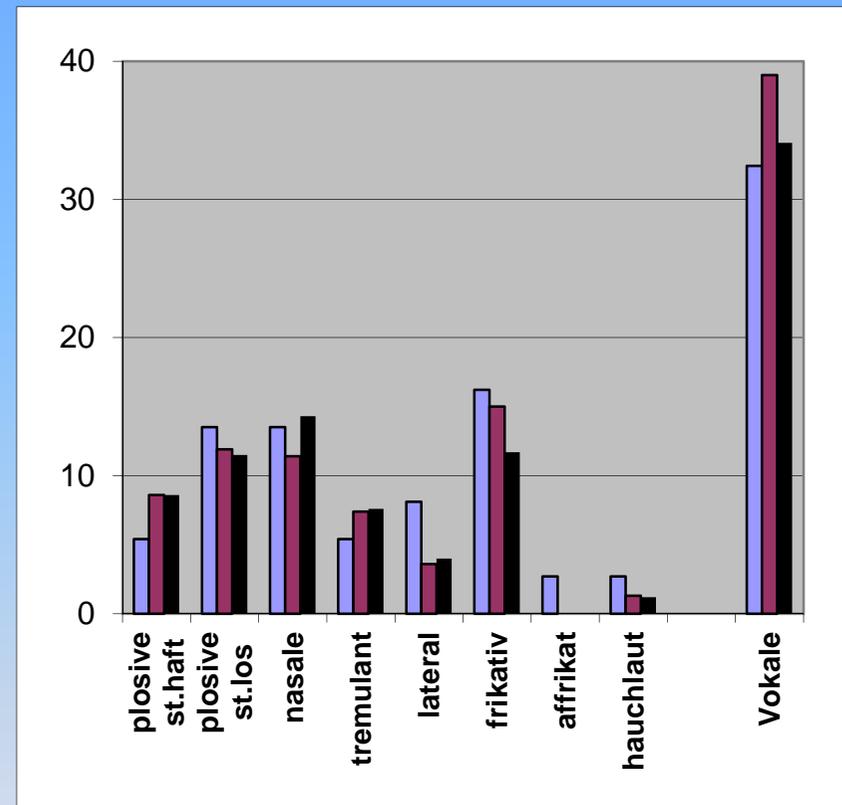
„internal balancing“

Phonematic:

phoneme clusters

instead of

phonemes

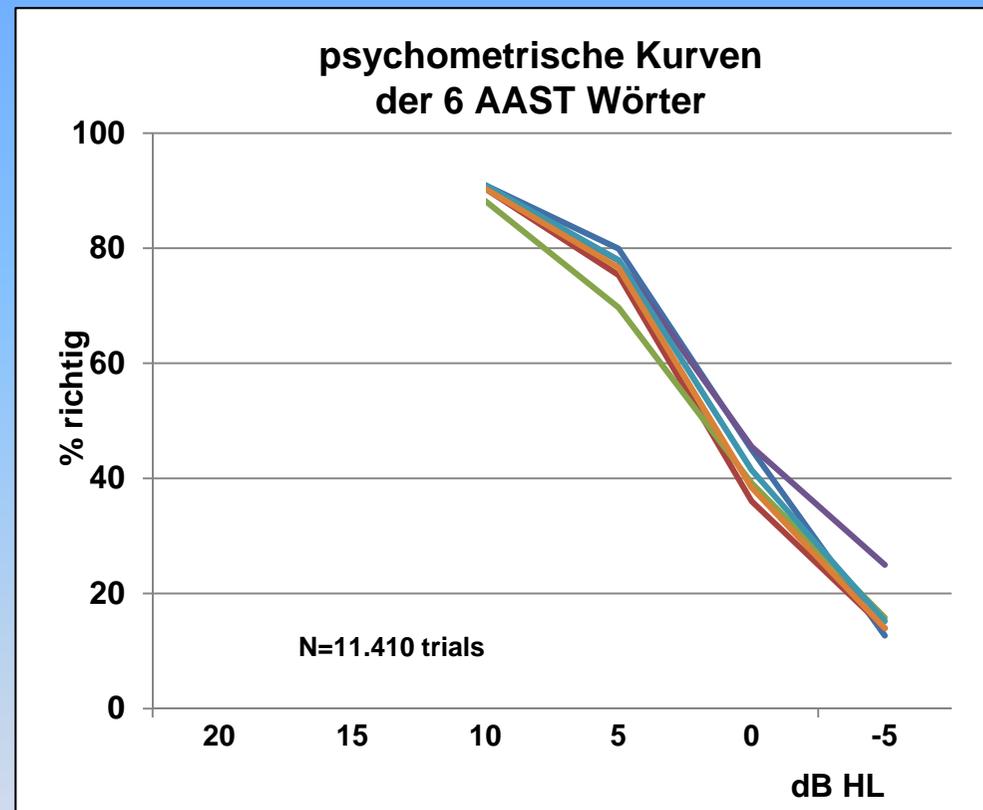


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„internal balancing“

Intensity

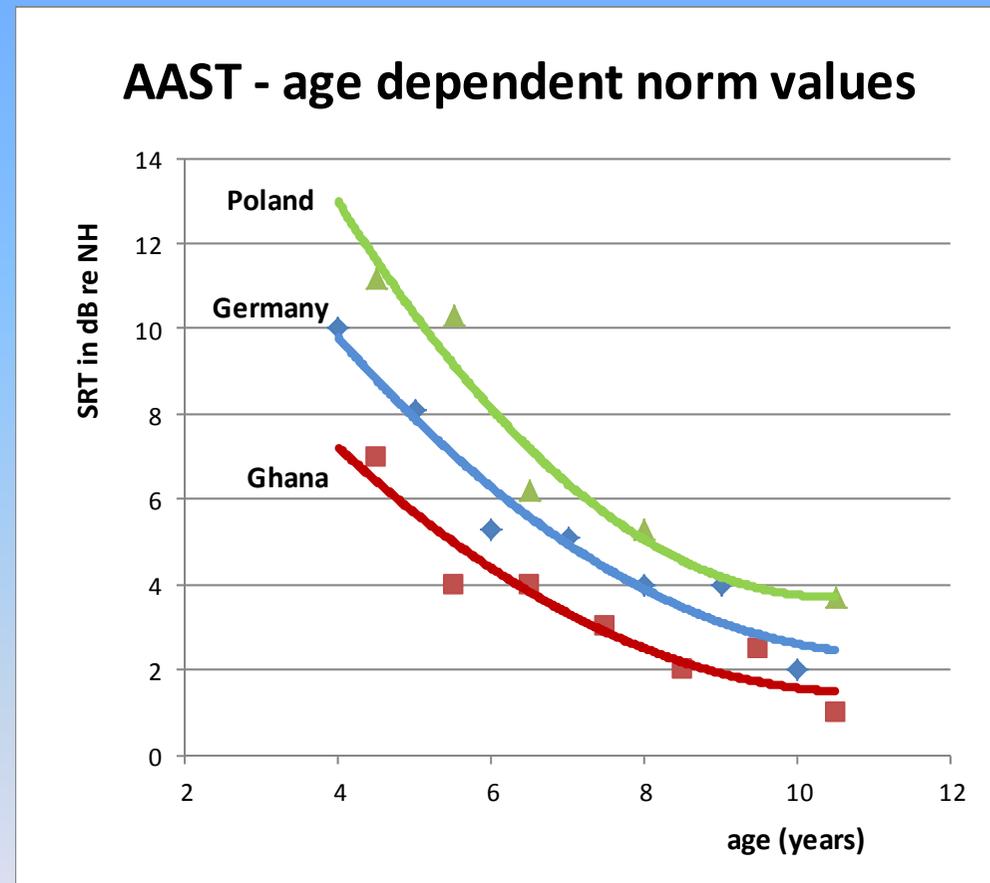
- Psychometric curves for each of the 6 words.
- for each language and condition (quiet, noise)



AAST

Norm/reference values

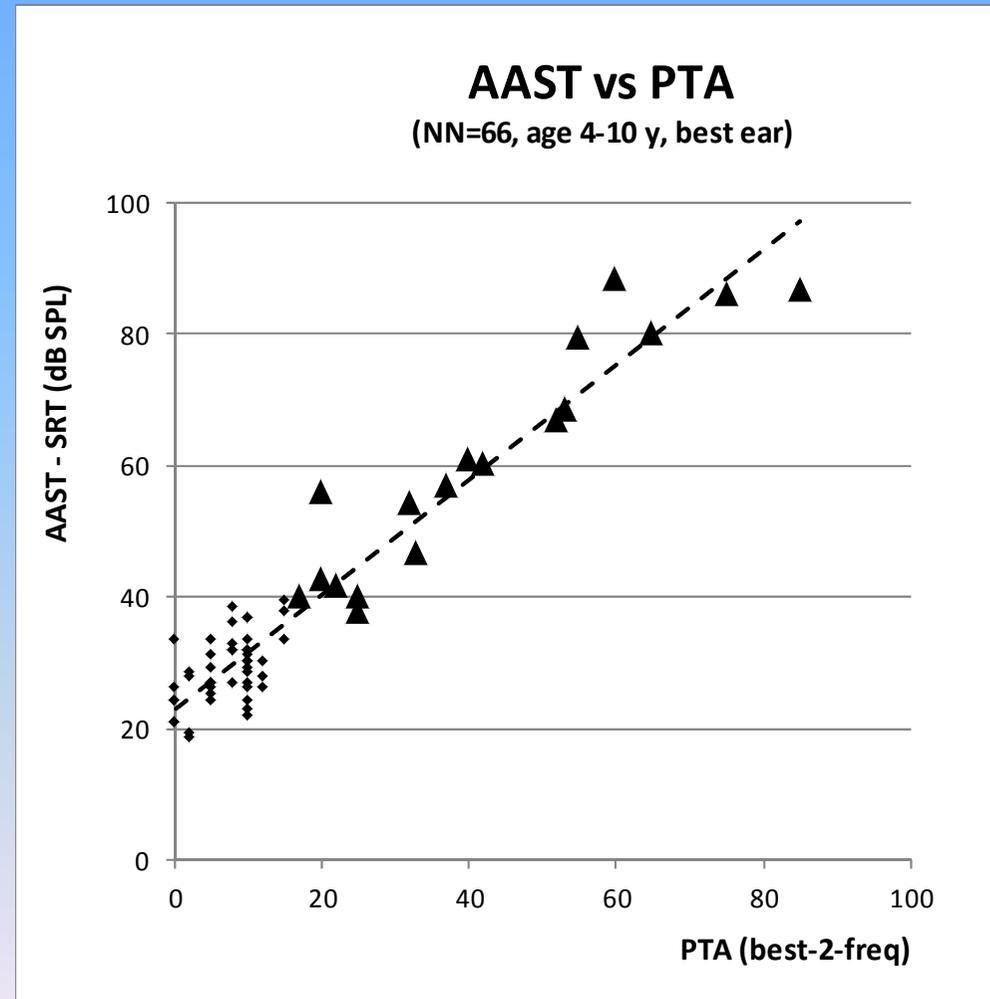
- **Very similar in different languages**
- **... at age 4;0 about +10 dB**
- **Explanation:**
 - **Better concentration**
 - **Phonemic awareness (topdown closing of bottom-up gaps)**



AAST

AAST vs PTA

- Age correction
- normal SRT at 20 dB SPL
- NOT used:
3 or 4 frequency average
- USED instead:
average of best-2-freq
(250-8000 Hz)



AAST - adaptations



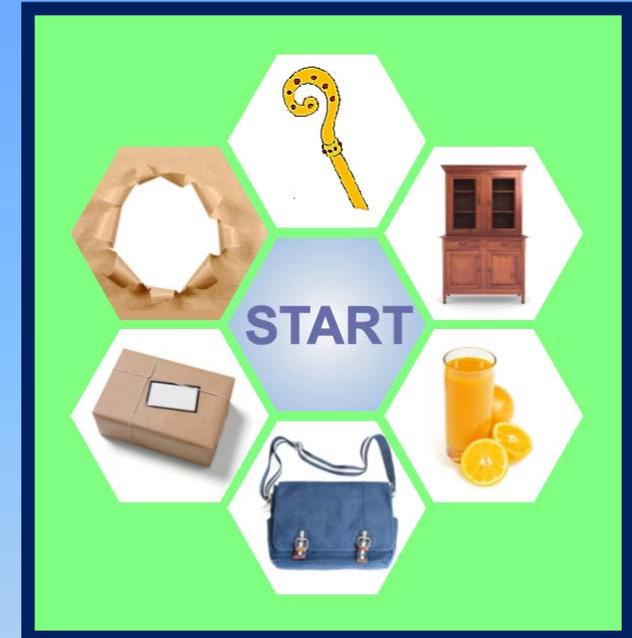
AAST - adaptations



AAST - adaptations

Criteria for HF-test construction

1. Minimal influence of articulation, memory, vocabulary, visual cognition
2. Word-picture association (touch/click)
3. Closed-set (n=6) / multiple-choice format
4. „Easy“ words
5. No contrast in word prosody
6. Minimal contrast at phonemic level

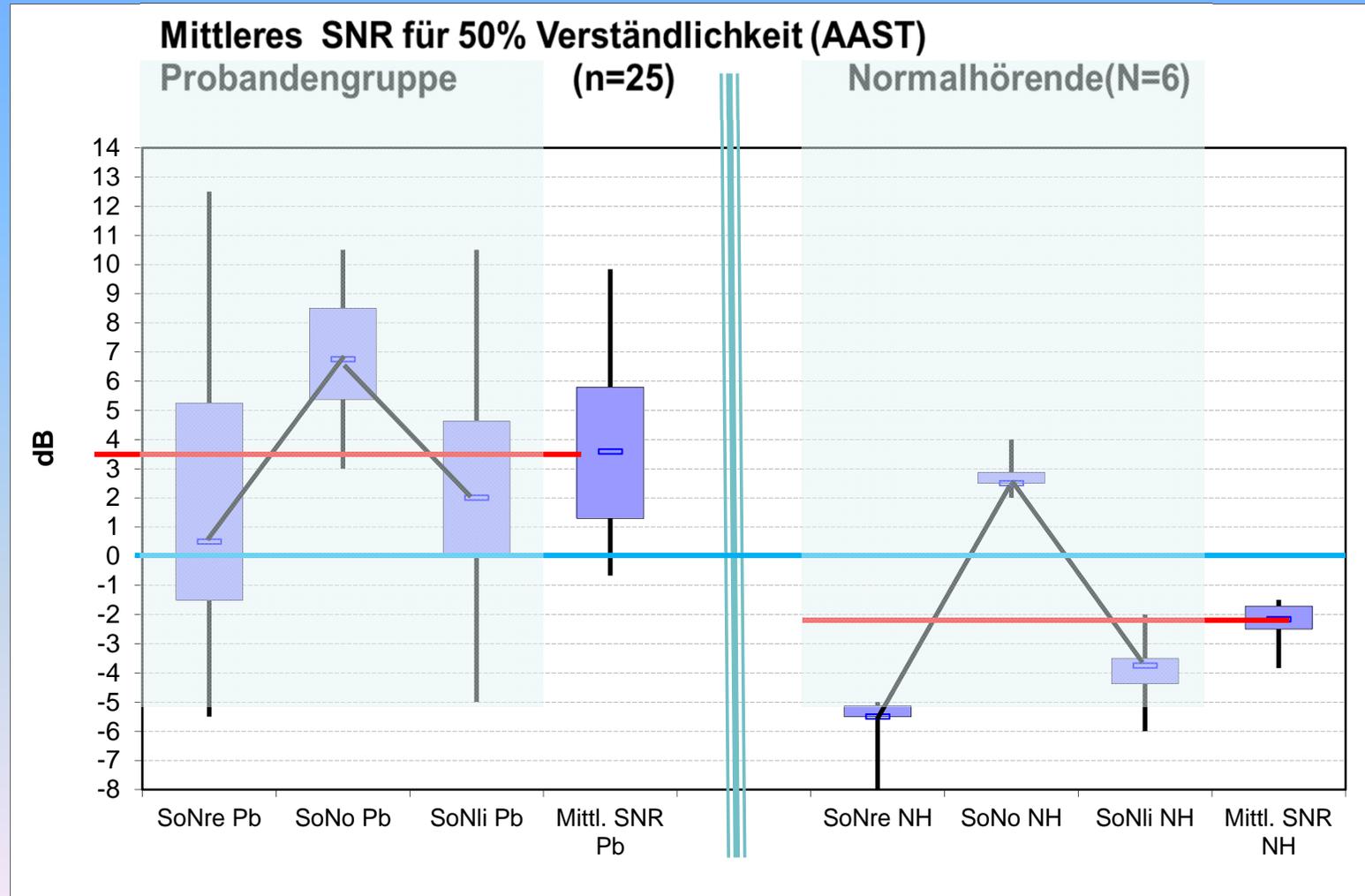


Some field applications and results

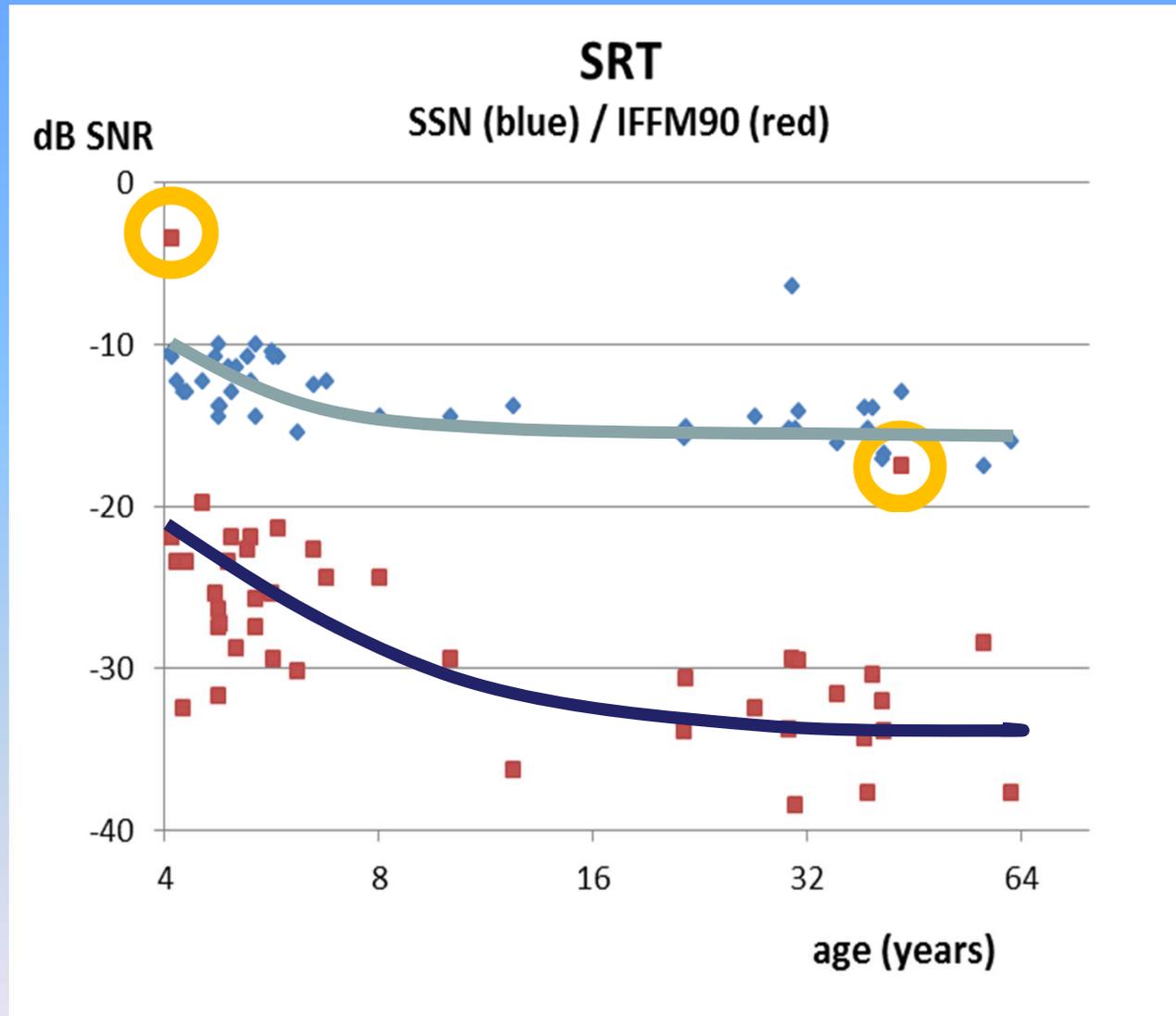
1

Mittleres SNR für 50% Verständlichkeit (AAST)

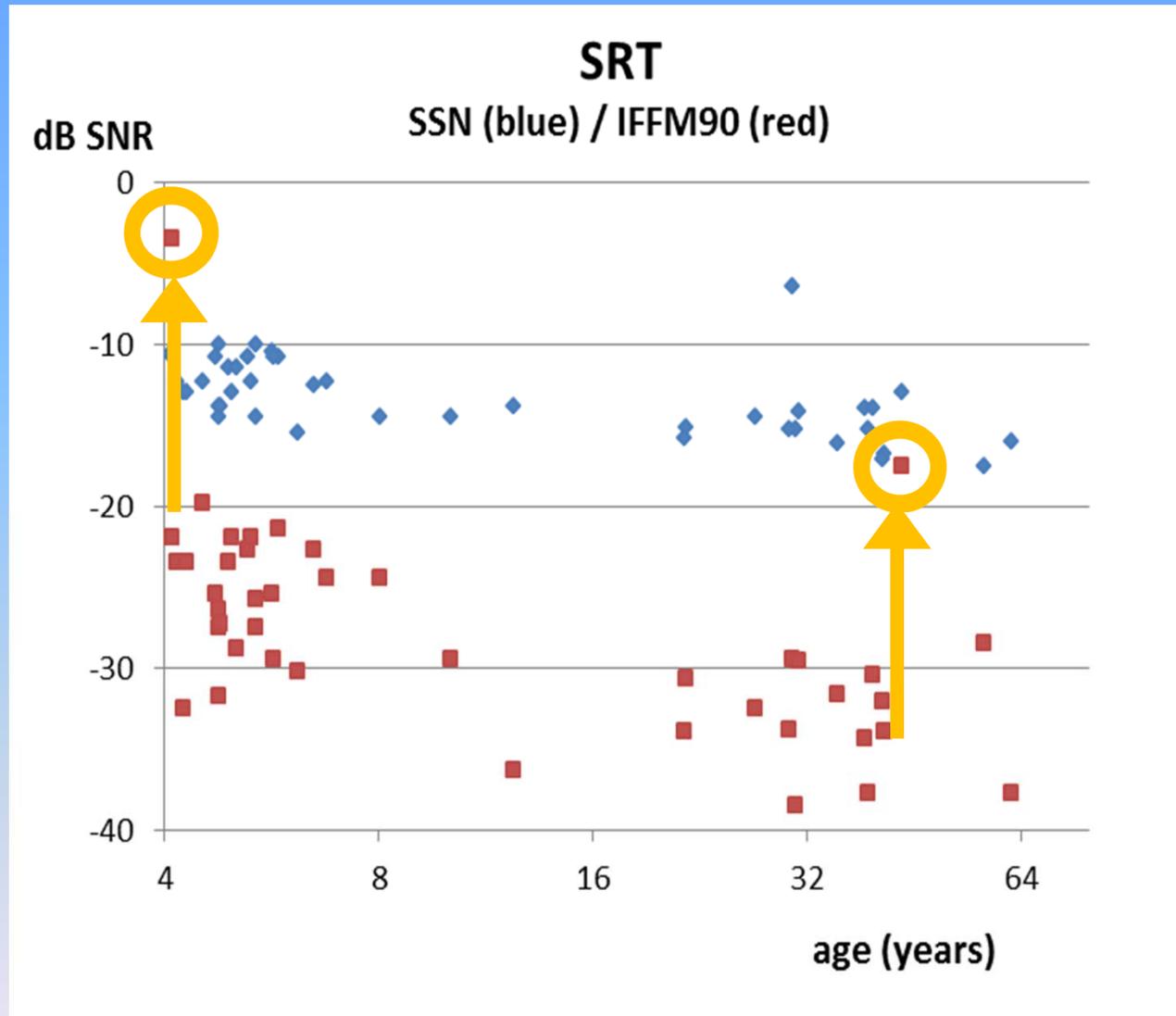
Döring, RWTH Aachen



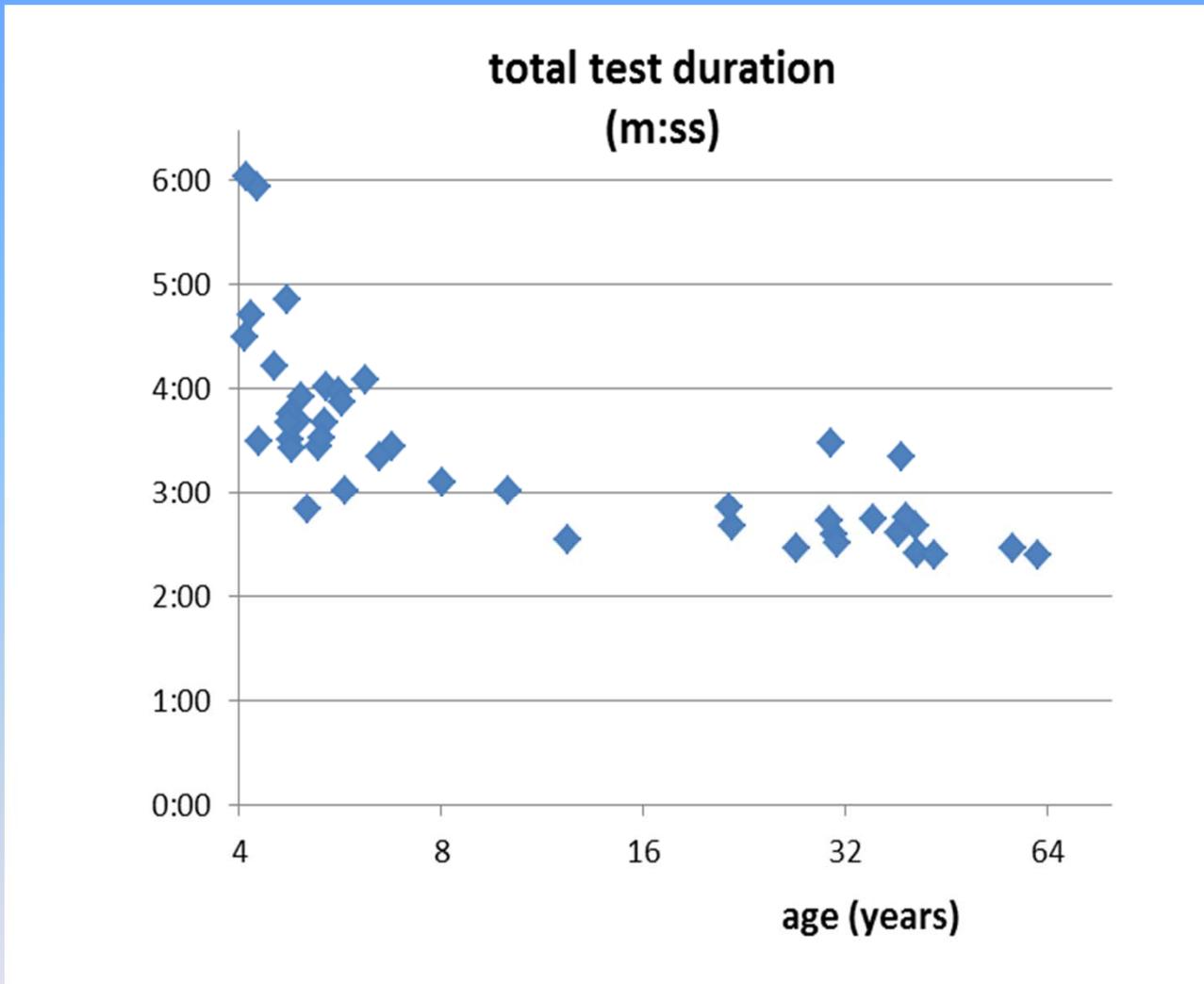
2



2



2



3

Hearing Evaluation of Auditory Rehabilitation Devices



DEVELOPMENT OF AN INTRA-EUROPEAN AUDITORY SPEECH PERCEPTION STANDARD FOR HEARING IMPAIRED CHILDREN

**Frans Coninx
Anneke Vermeulen**

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Participating Organisations/Centres

German language:

- Cologne (Hörakustiker)
- Friedberg (J.Vatterschule, M. Drach)
- Frankfurt (Univ. Klin. dr.C. Hey)
- Hannover (HZH-MHH, Prof.Lenarz, Prof. Lesinski-Schiedat)
- Hannover CIC (Dr. Eßer-Leyding)
- Innsbruck (HSS Univ. Klinik, Prof. Zorowka, Prof. Stephan)
- Mainz (Univ.Klinik, Prof.Keilmann, A.Bohnert)
- Regensburg (Univ.Klinik, Dr.Steffens)
- Solingen (Rehab Praxis „Der Ohrwurm“, K.Coninx- Wittgens)

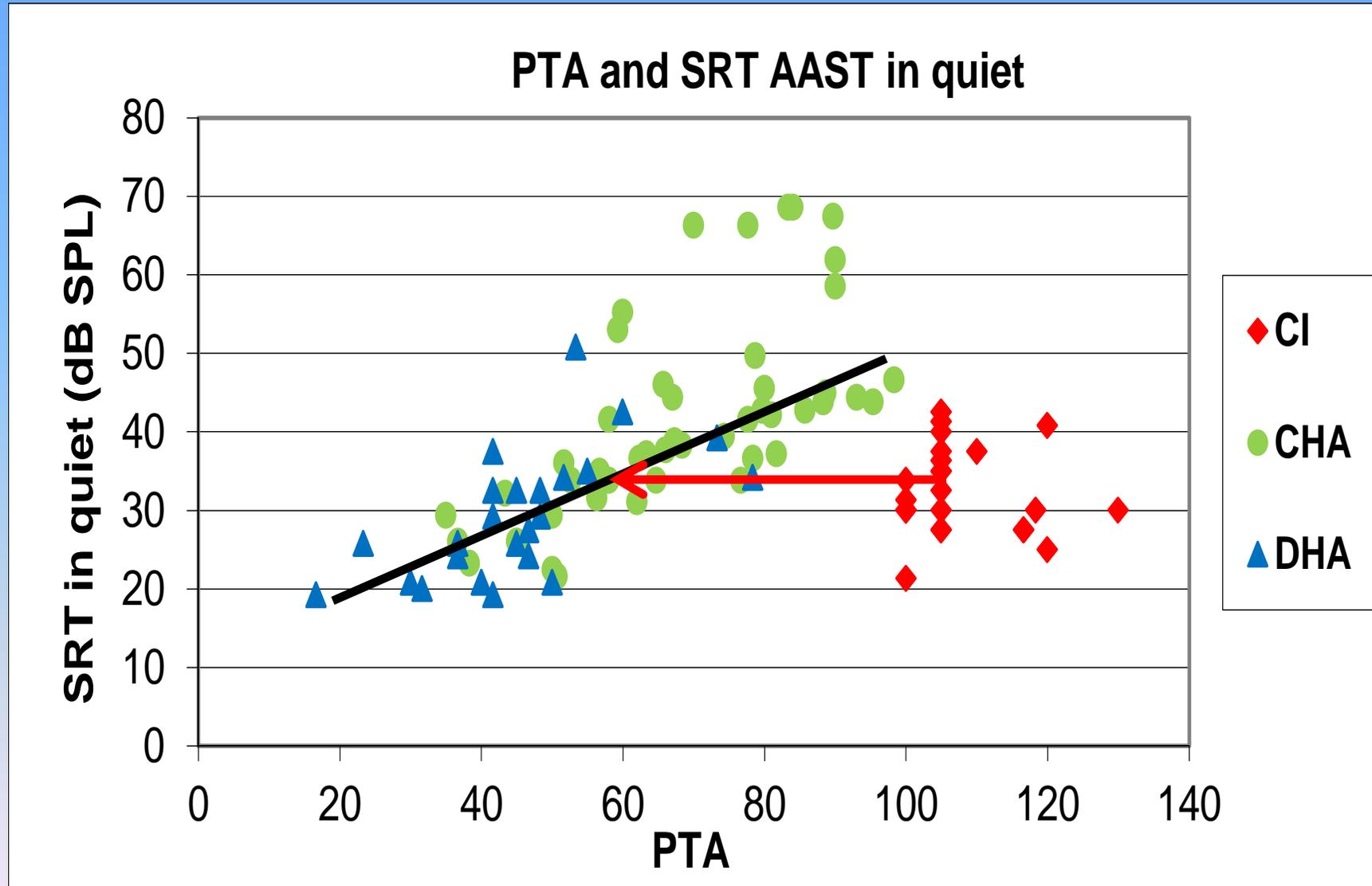
Polish language

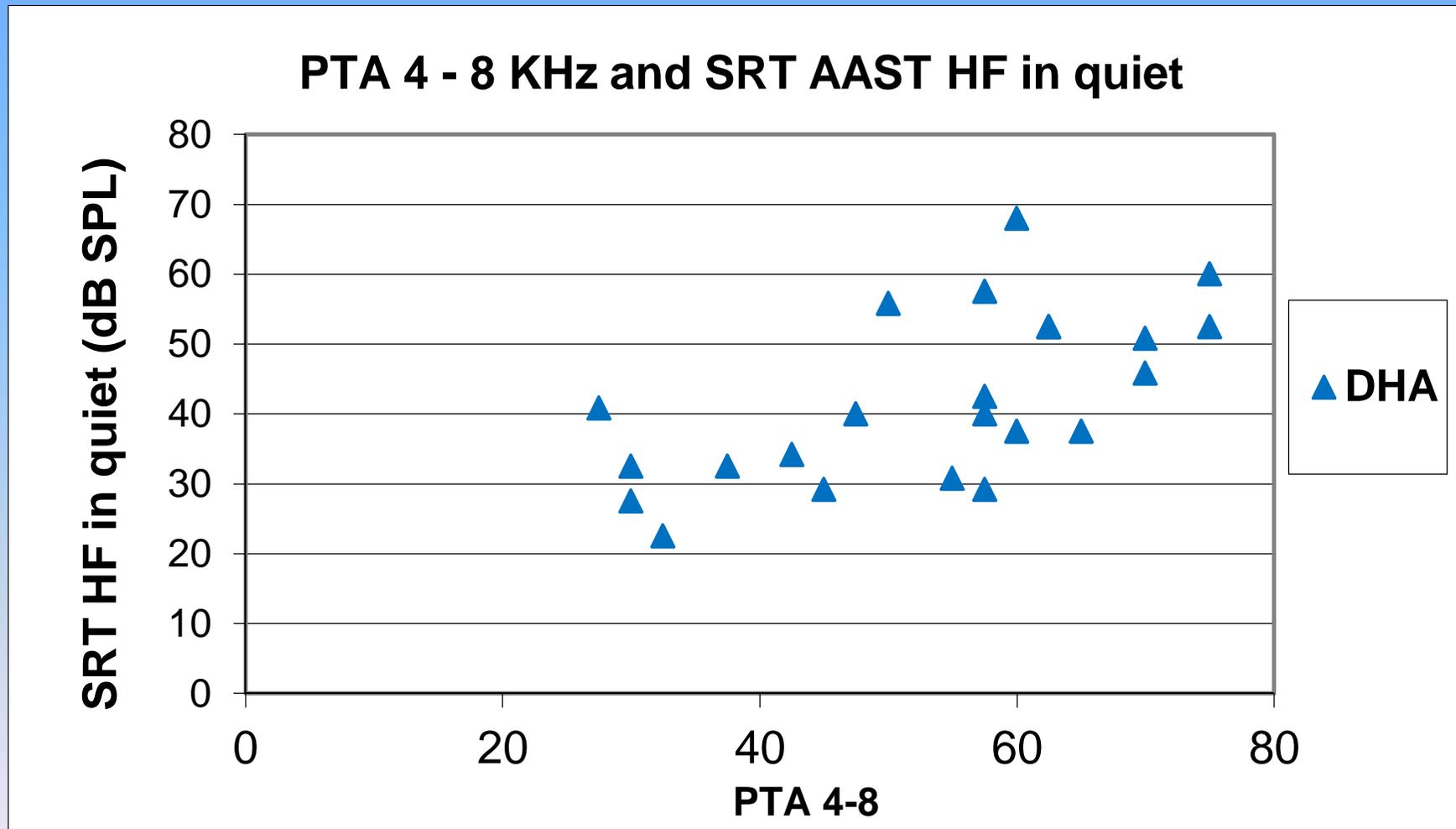
- Kajetany/Warsaw (Int.Ctr. of Hearing & Speech, Prof. Skarzynski, Dr. Lorens)

Dutch language

- Eindhoven (Audiological centre Brabant, M.Dorjee, Ter Huurne, Van Roy)
- Hasselt (KIDS, drs. L. De Raeve), Ghent, Brussels, Antwerp, Woluwe
- Nijmegen (Univ.Clinic EN,T AC and CI centre , Prof. Snik, Dr. Langereis)

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AAST platforms

www.auritec.de

1. Handheld device „AuriCheck“

f.coninx@ifap.info

2. Commandline module winXP, win7, win8

f.coninx@ifap.info

3. Test module in BELLS platform



AuriCheck





Functions

- **Management platform for the handheld AuriCheck device**
- **Data base: detailed inspection, standard printing & advanced reports, archives, export (to EXCEL, SPSS etc)**
- **Intelligent test management: batch files with randomisation etc**
- **Noise-based trial rejection**

- **„Ready-to-use“ versions**
- **R&D-versions**



Test modules

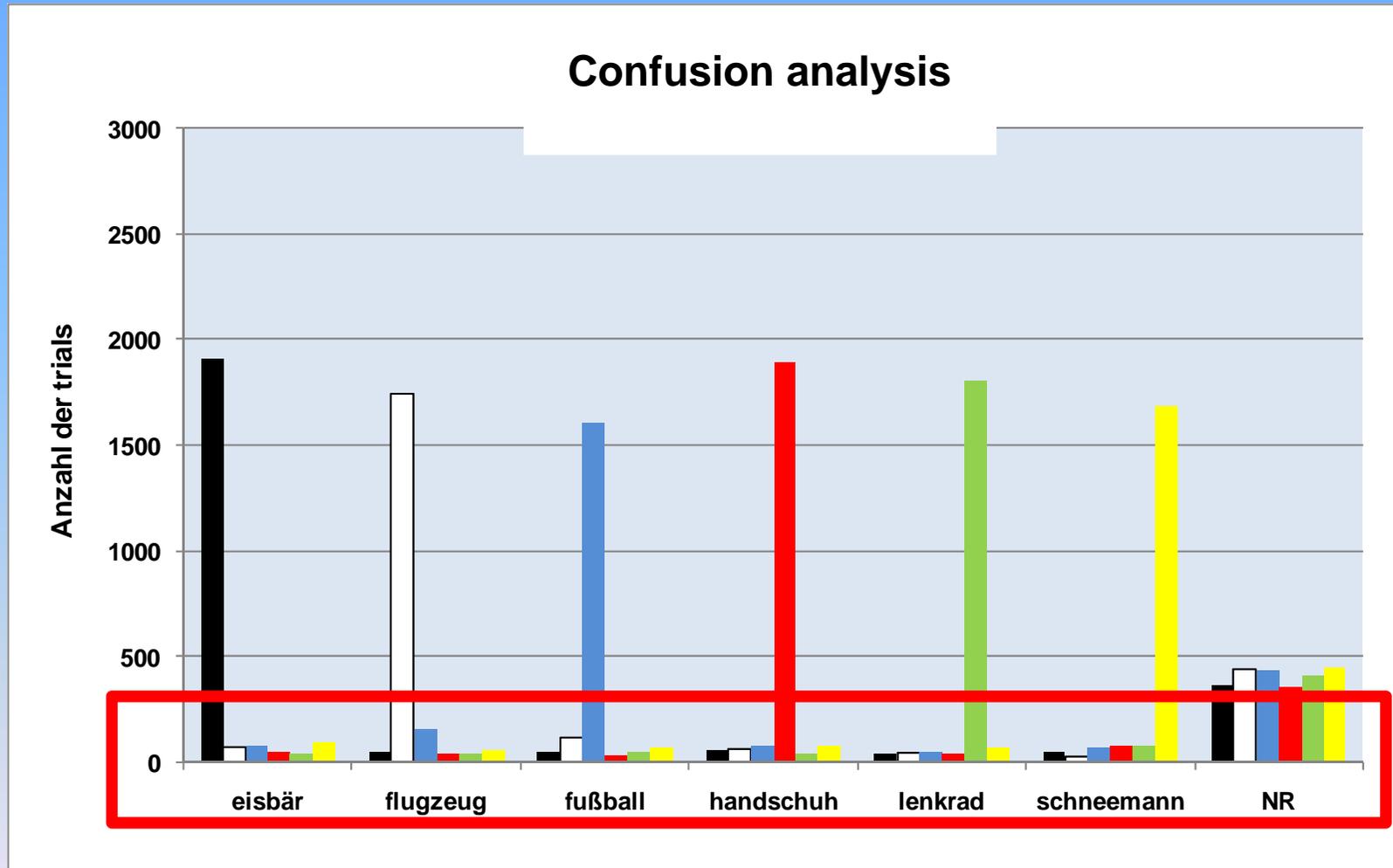
- **File Audiometry, f.i. using Ling Sounds (Coninx)**
- **TTT: teetahtoo (Coninx)**
- **SAT: Sustained Attention Test (Baas)**
- **VideoMarker tool for VRA, APA (Coninx)**
- **SDT: simple dichotic test**
- **WRIST: Word Recognition In Sentences Test (Nekes, Vermeulen)**
- **QUEST: questionnaires (like LittleARS-AQ, hEARd data mask)**
- **FLAST: Fixed Level AAST**
- **....**

AAST

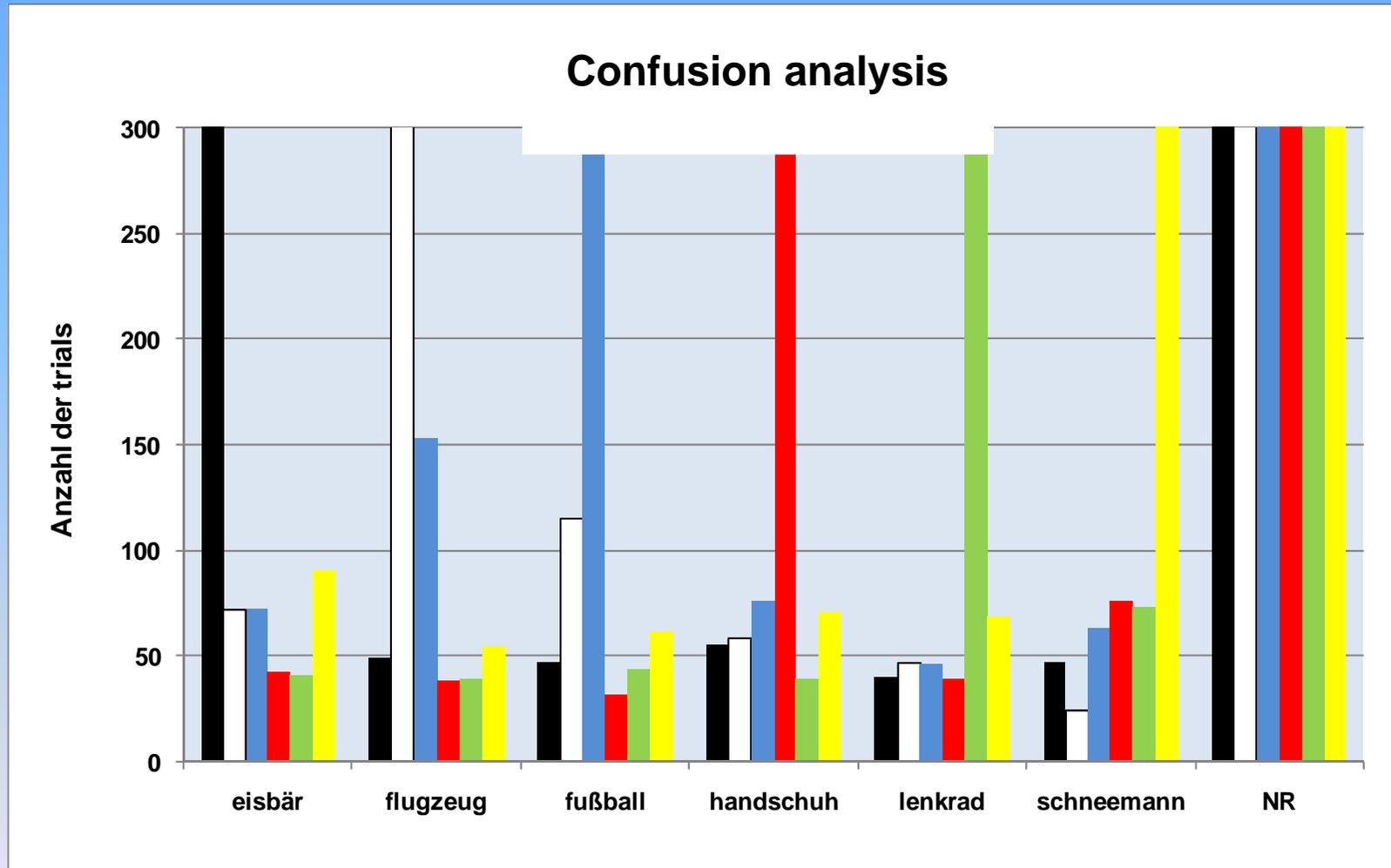
Confusions

- **Semantically ?**
- **Phonetically?**

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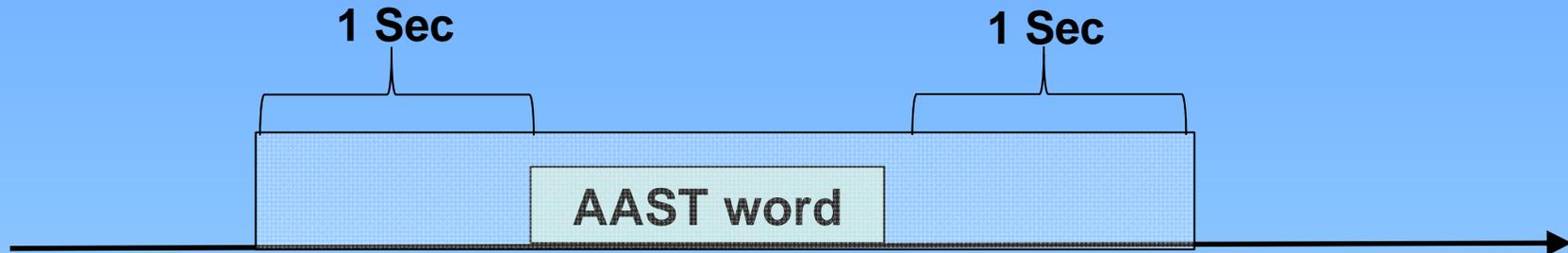


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AAST - adaptations

Noise-based trial rejection



SPL in time window > MAX?

•YES:

- Answer ignored
- Level → unchanged

•NO:

- answer „correct“: level → -5 dB (in noise -2 dB)
- answer „wrong“: level → +10 dB (in noise +4 dB)

Data mask

Bells Files View Help

New Prev. AAST FA PTA EXE Batch Quest Cnf ECC

Questions 1-9

Per side
 Right Left

Comment

L.

etiology of deafness

type of aetiology
 congenital acquired perinatal acquired postnatal unknown

age at onset of HL
 0-6 6-12 >12

date at first HA or date at first fitting (subcolumns)
 0-6 6-12 12-18 18-24 >24

type of first fitting device
 conv ha digital hē F-transp CI EAS-hyt other

specify type, specific settings

type of present fitting device
 conv ha digital hē F-transp CI EAS-hyt other

specify type, specific settings

conductive loss > 30 dB
 yes no uncertain

disproportionate loss ... dB
 yes no uncertain

Childs communication mode during clinical visit to test leader

questions 10-14

10. Childs communication mode during clinical visit to parent
 spoken target language spoken other language
 sign supported sign language other

11. Multiple handicap influencing speech perception?
 yes no

12. tympanogram (on same ear as in#1)
 A curve flat

12a. conductive loss suspected
 yes no uncertain

12b. pressure

12c. compliance

PTA data

13. PTA for L/R ear at clinical assessment visit

	500	750	1000	1500	2000	3000	4000	6000	8000
unaided									
aided									

13a. remarks

14. Open set speech perception scores
 65 70 75

14a. word score (%)

14b. phoneme score(%)

Questions 15-21

15. Judgement of clinician of quality of de in the period prior to the testing
 ...

15a. DSL measure, quality of gain previous
 optimal sufficient p

15b. Map CI idem
 optimal sufficient p

16. Non verbal (performal) IQ

17. Type of additional handicap (cognitive, learning disability, autistic spe

18. Degree of additional handicap
 moderate severe p

19. Spoken language level compared to h
 above average average t

19a. spoken language quotient

20. Educational settings
 mainstream unit p

20a. other, namely

21. SES of family
 above average average t

Press F1 for help Patients:11 Selected:1

start Bells_manual_DE_AA... Bells_manual_DE_04b... 1&1 Webmailer 2.0 - ... Bells NL 21:33