

A decorative horizontal grid of small blue squares, with the squares in the center being slightly darker than those on the sides.

**De relatie tussen gehoorverlies en spraakverstaan
in ruis in een grote populatie ouderen**

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ERGO: The Rotterdam Study

Started in 1989
Prof A. Hofman



Large prospective cohort study in part of Rotterdam (“Ommoord”)

- >55 years old
- High participation rate (72% of invited) and excellent follow-up
- Large amount of data: MRI, cognition, blood, vision, cardiovascular, skin,
...and since 2011: hearing and balance

Hearing in The Rotterdam Study



- Pure-tone audiogram (*bone conduction at 500 Hz and 4 kHz*)
- Digits in Noise test at best ear (*Smits et al 2004*)
 - Broadband, 70 dB SPL noise level, headphone
- Questions: self-rated hearing, hearing-aid use, tinnitus

Digits in noise test



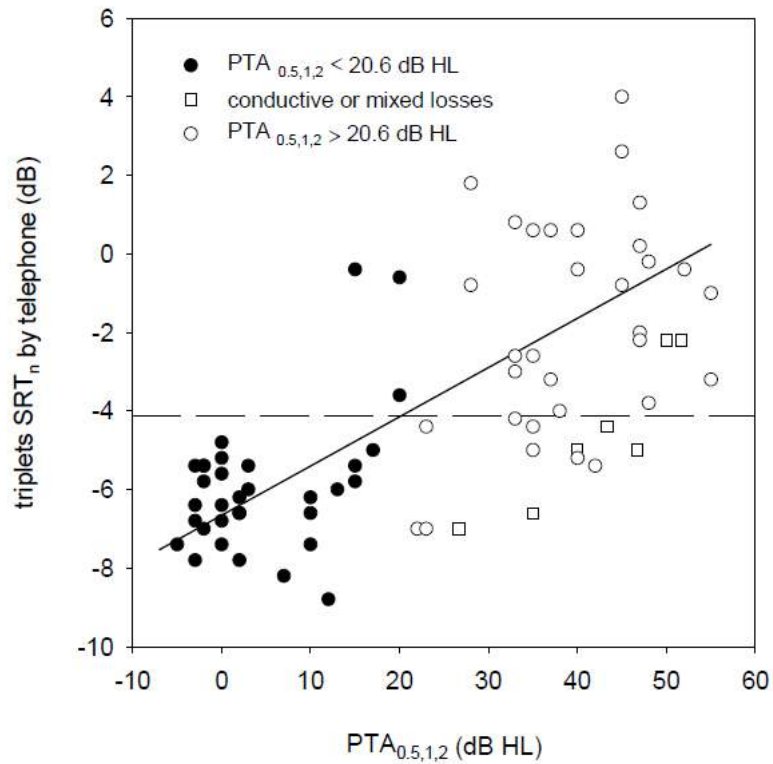
Digits in noise test

Our aim: functional test, including aspects of reduced auditory processing (both cochlear and central) and cognition

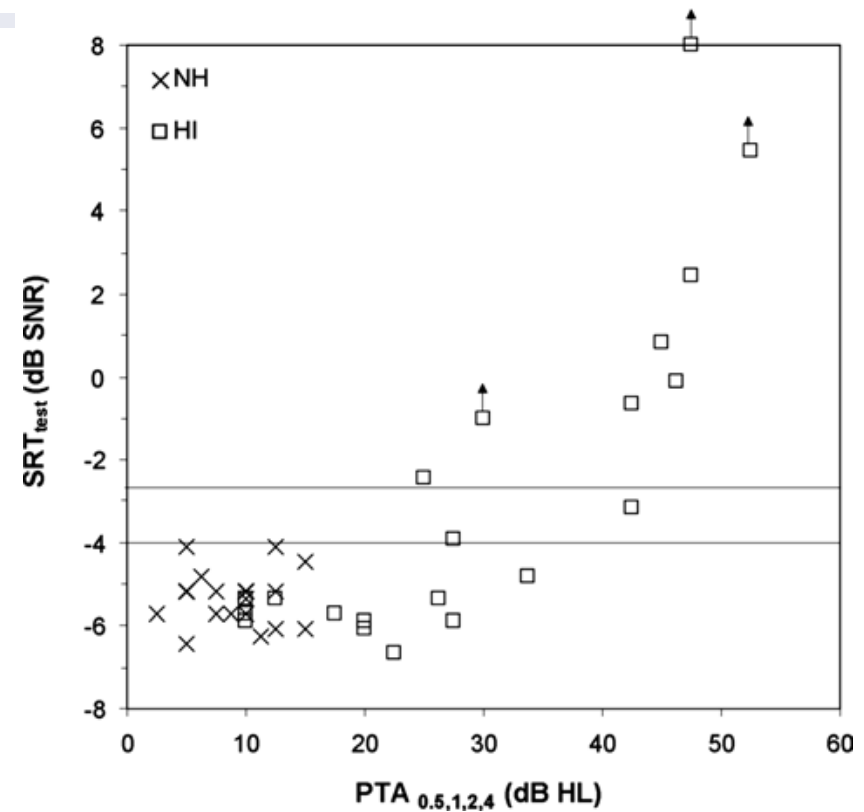
General aim: screening for significant hearing loss

- Fast
 - Limited use of cognition and language
 - Automated procedure possible: adapted for telephone and internet
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Correlation SRT and Hearing loss



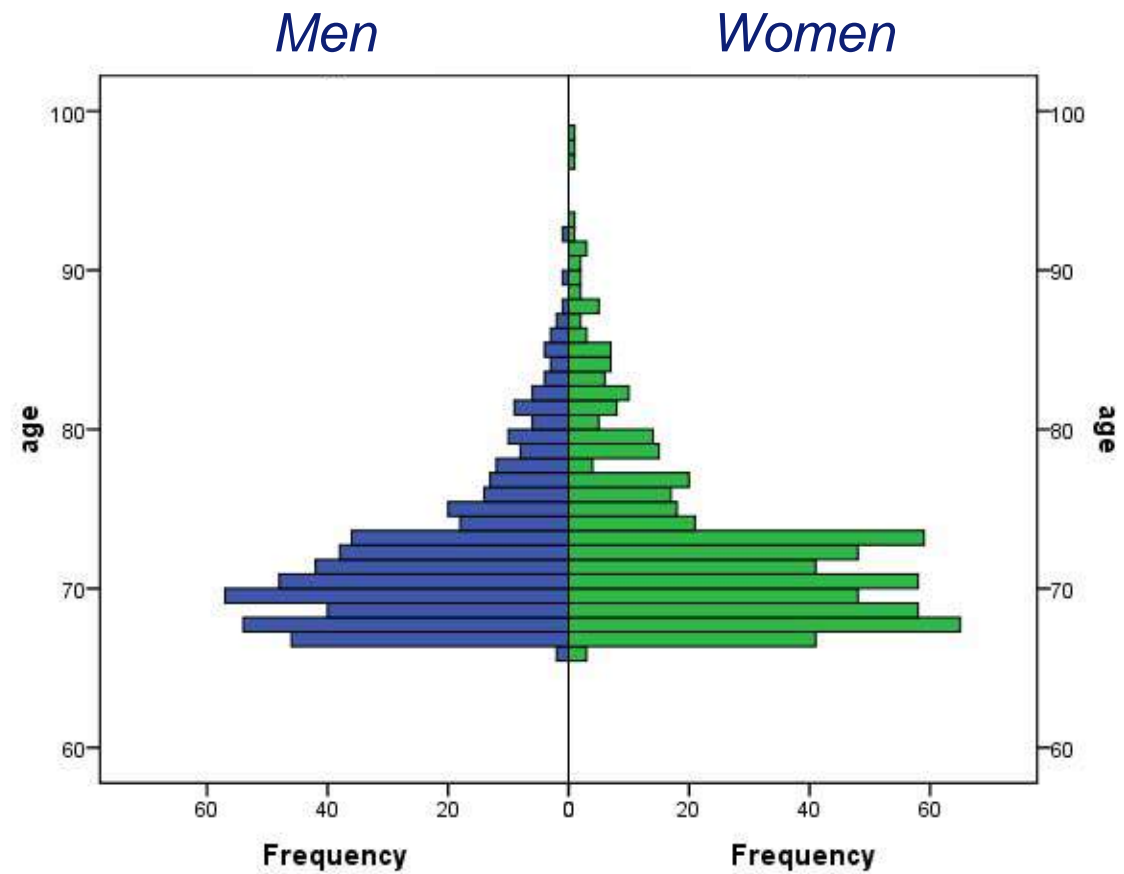
Smits et al 2004



Jansen et al 2011

Population *(RS-II cohort, third measurement)*

	n	Age ^{mean}
Men	498	72.1
Women	597	72.9

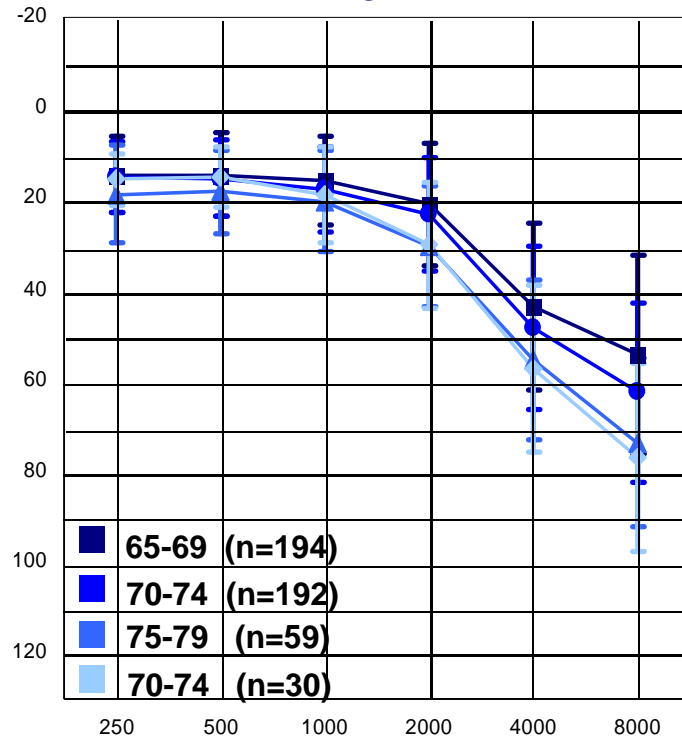


•Vanaf 2018 verkrijgen wij tenminste 150 K per jaar binnen aan externe gelden voor innovatie en onderzoek

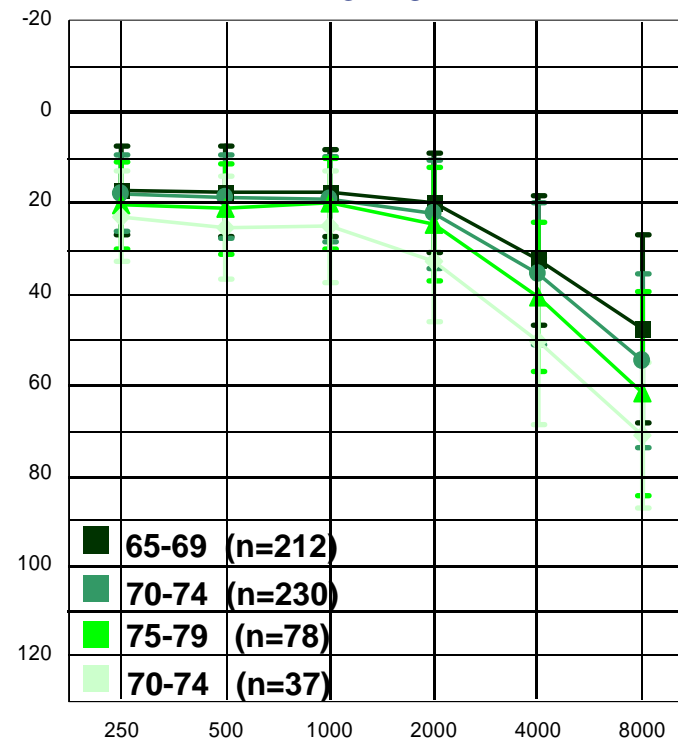


Hearing loss (best ear)

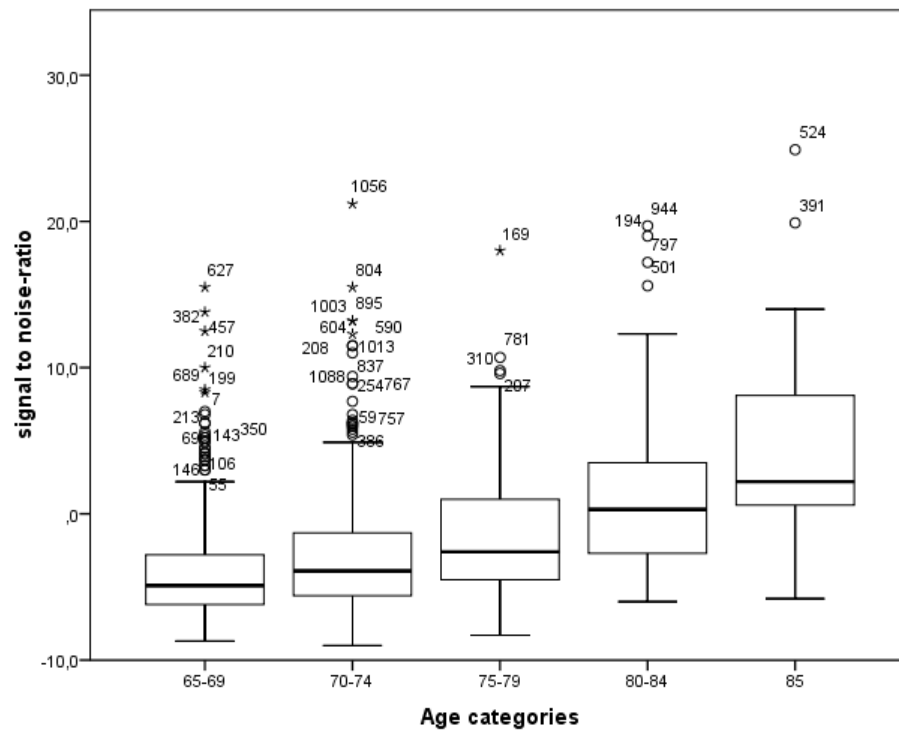
Men



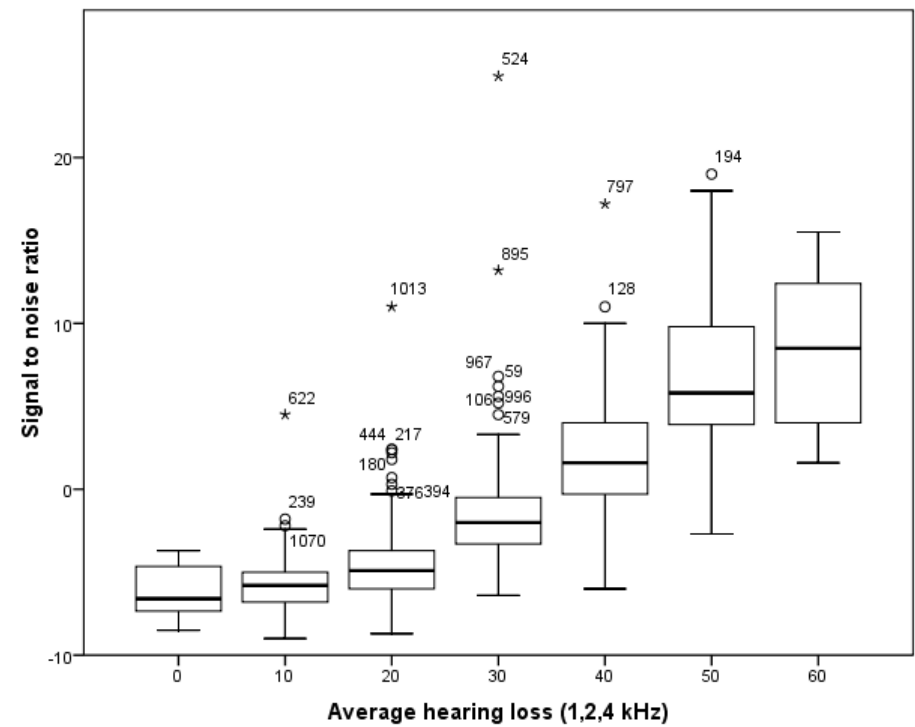
Women



Correlation SNR with age and hearing loss



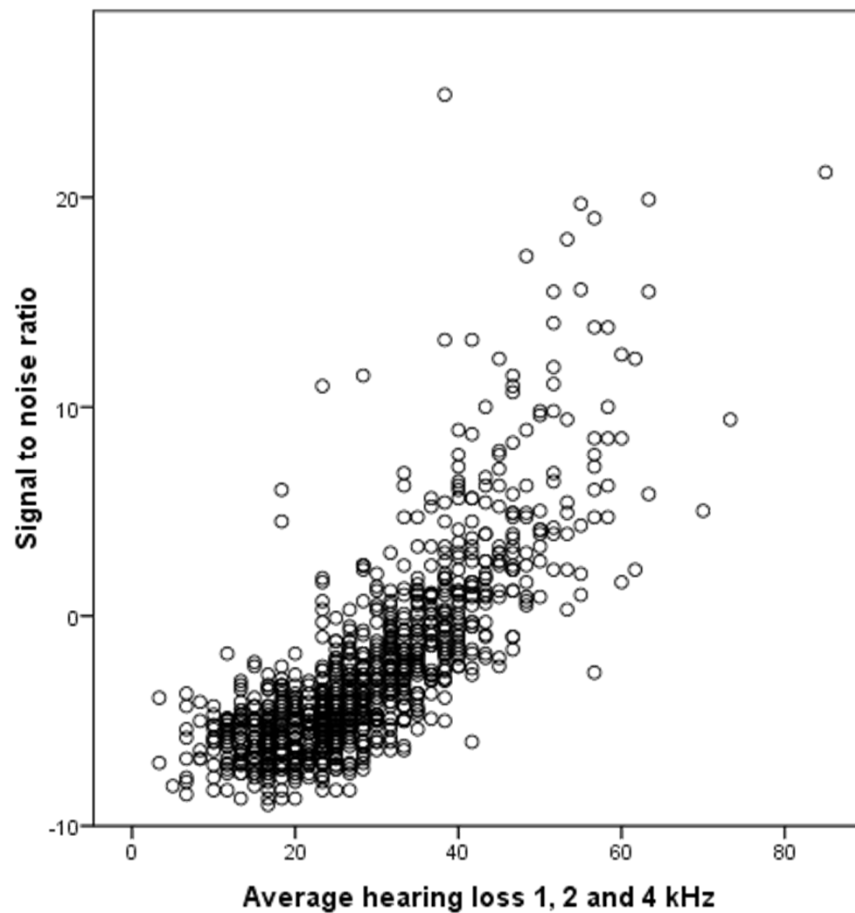
*Correlation = 0,405***



*Correlation = 0,781***

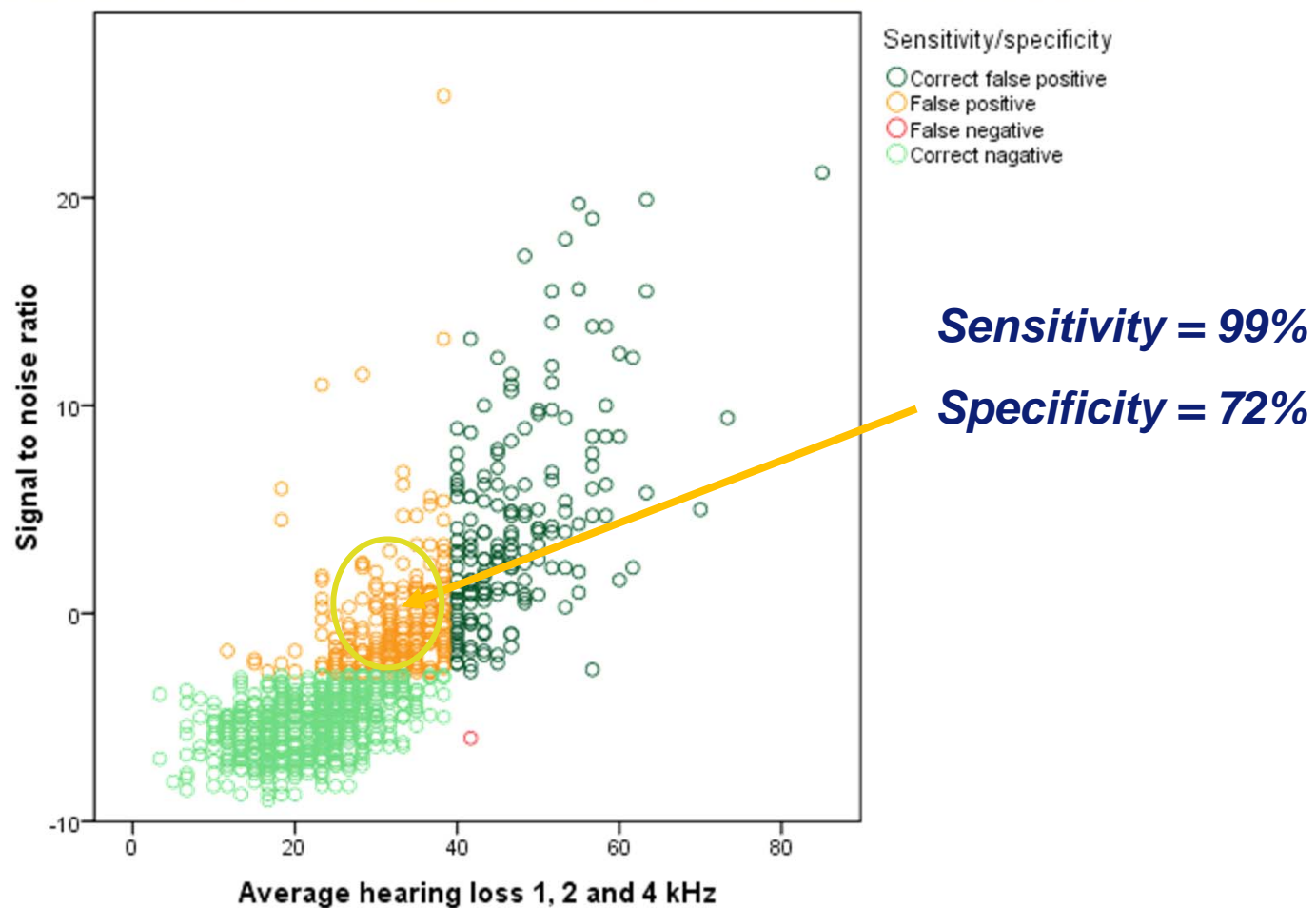
****Correlation is significant at the 0.01 level (2-tailed).**

Correlation SRT and Pure Tone Average (PTA)

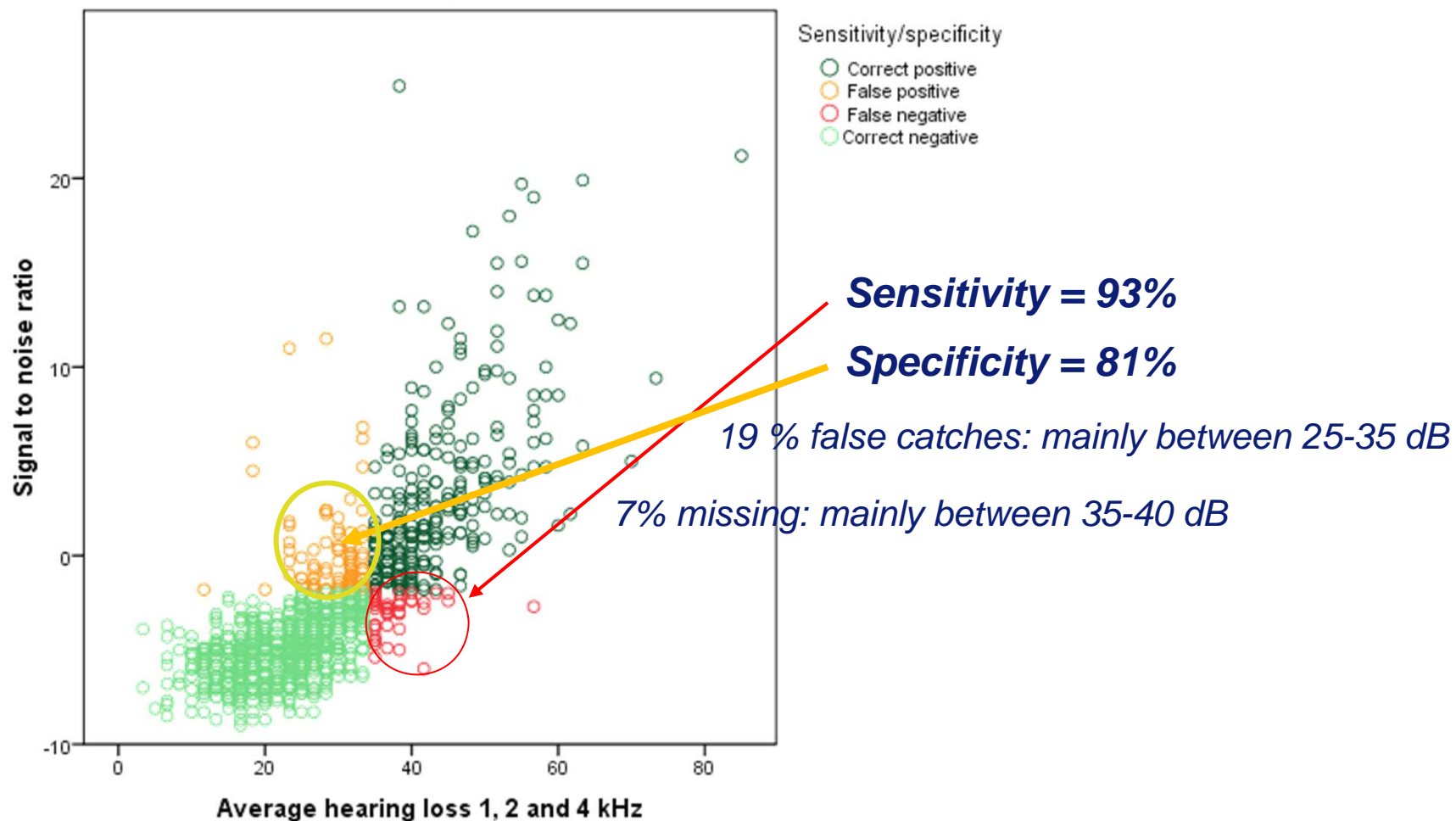


0,5-4 kHz	1-4 kHz	2-4 kHz	0,5-2 kHz
0.77**	0.78**	0.76**	0.66**

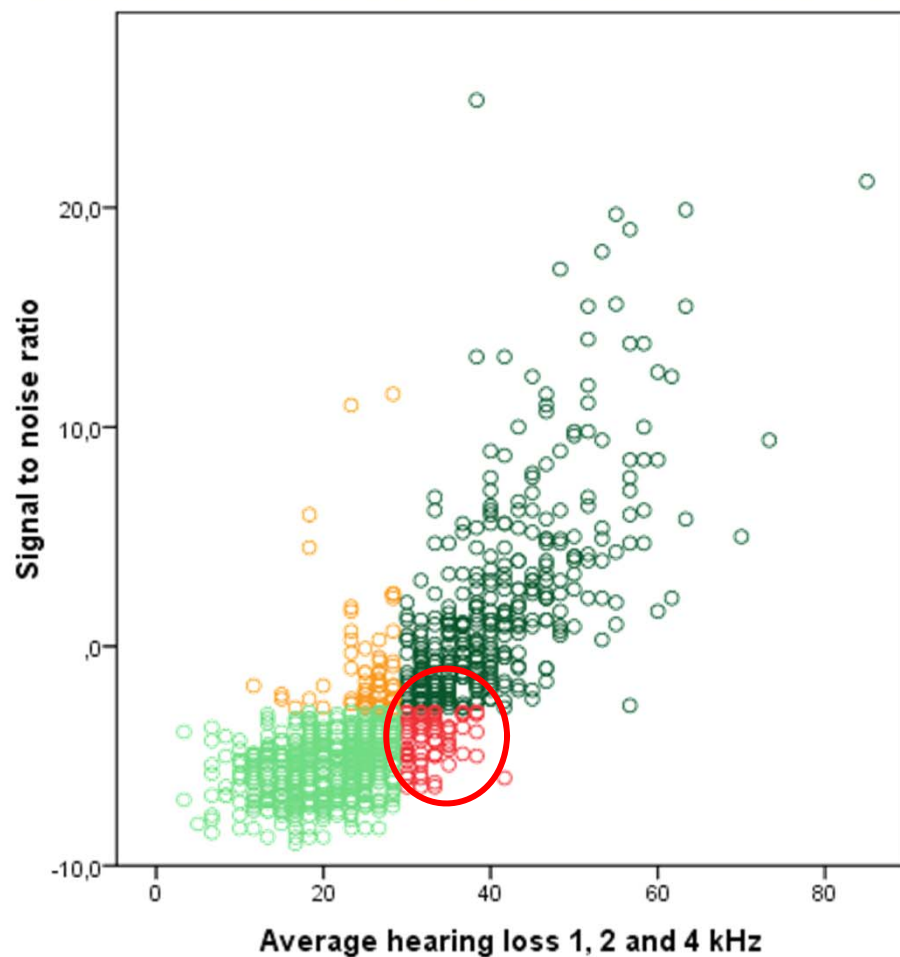
S/N > -3 and hearing loss ≥ 40 dB



S/N > -3 dB and hearing loss ≥ 35 dB



S/N > -3 dB and hearing loss ≥ 30 dB



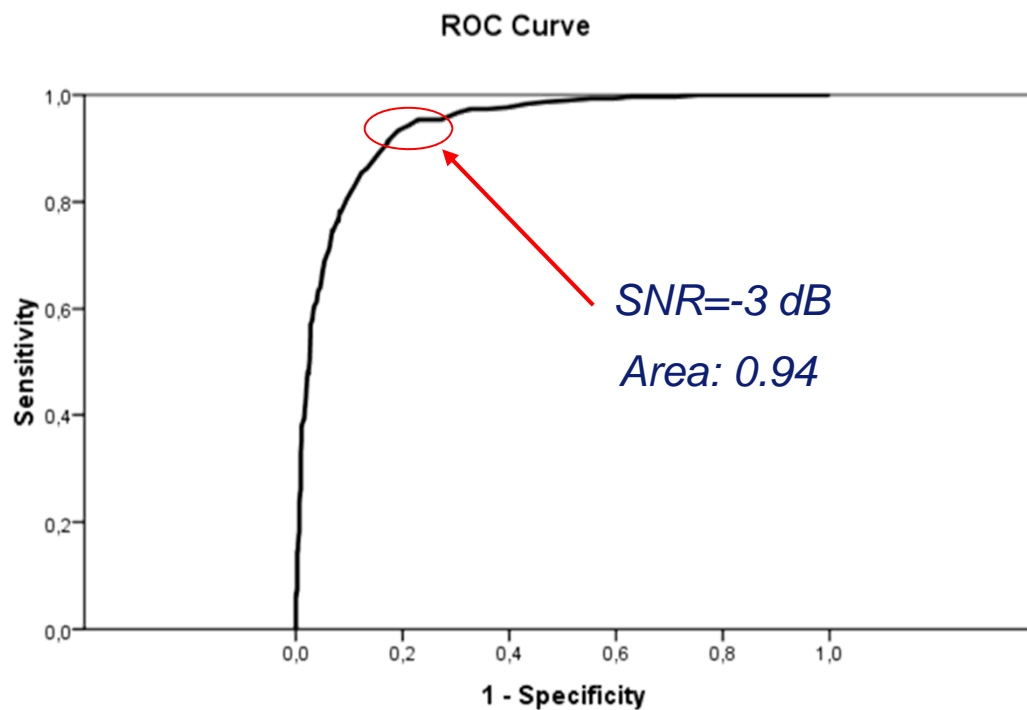
Sensitivity/specificity

- Correct positive
- False positive
- False negative
- Correct negative

Sensitivity = 82%

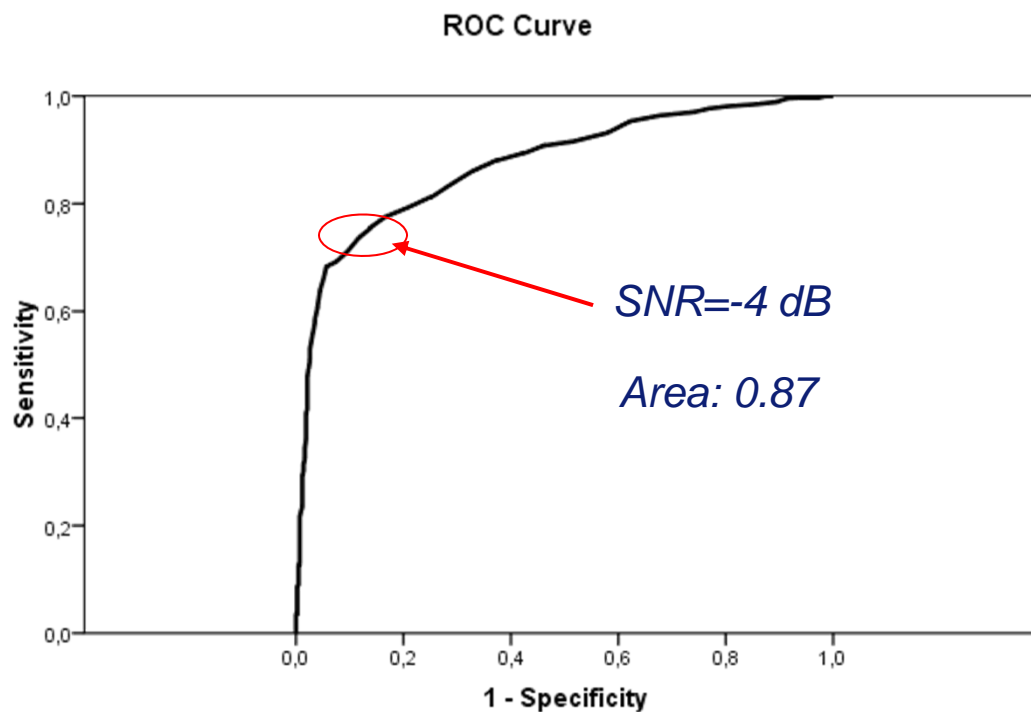
Specificity = 89%

ROC-curve: PTA 1,2 & 4 kHz > 35 dB HL



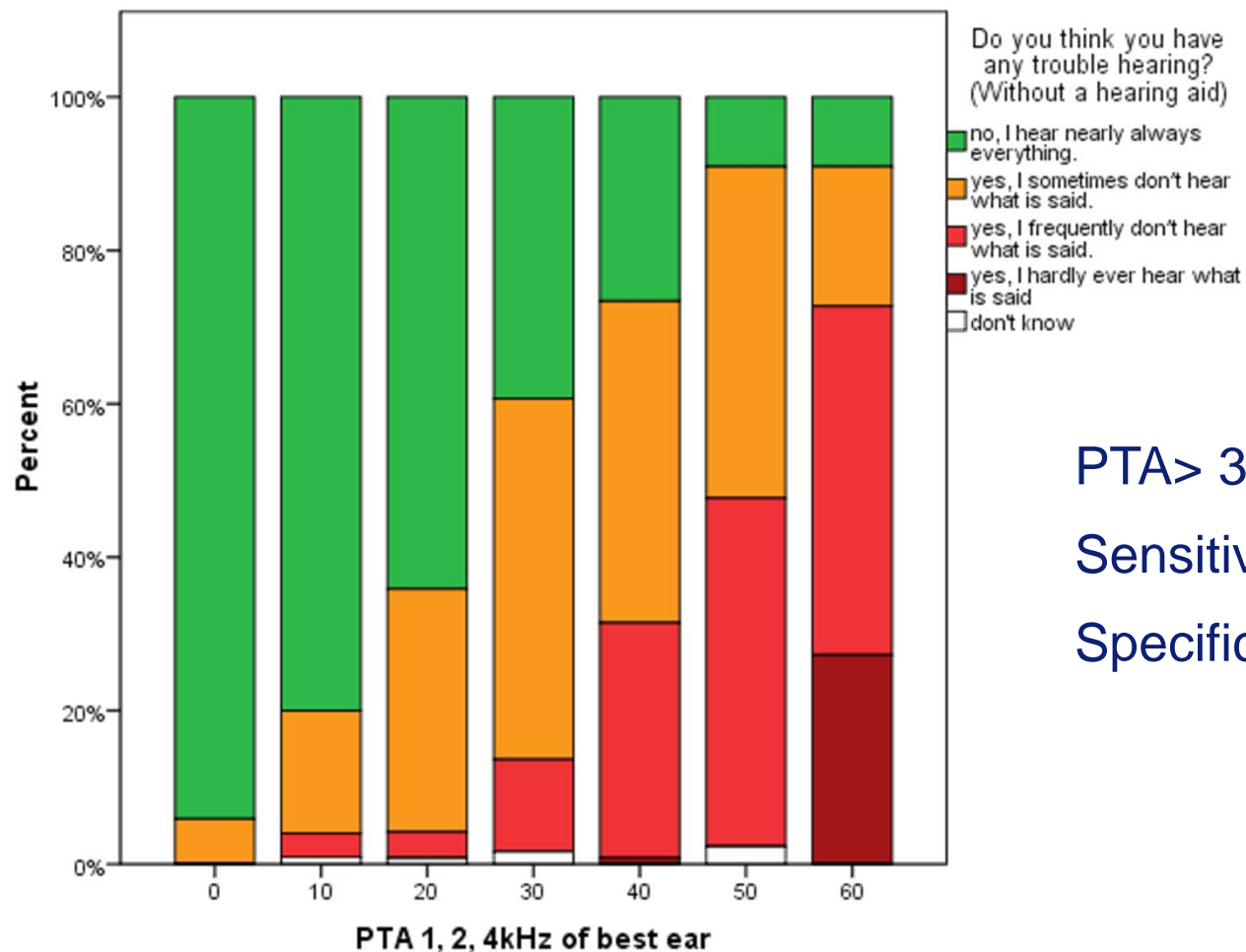
Adequate test for screening purposes

ROC-curve: PTA 1,2 & 4 kHz > 25 dB HL



Less adequate: sensitivity too low

Self-rated hearing as function of hearing loss



PTA > 35 dB:

Sensitivity = 0.68

Specificity = 0.66

Undertreatment!



Candidates hearing aid (>35 dB HL): N=299 (27,5%)

Hearing-aids users: N=49 (17% of candidates)



Conclusie

Sterke correlatie spraakverstaanbaarheid in ruis met gehoorverlies in een representatieve groep ouderen:

- 4 kHz-drempel bepalend, correlatie van bijna 0,8
 - gehoorverlies primaire factor in auditief functioneren, secundaire rol voor cognitie/centrale verwerking
 - DIN is potentieel een goed screeningsinstrument om gehoorverlies van >35 dB HL bij ouderen op te sporen
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