Try harder! The influence of evaluative feedback on the pupil dilation response, saliva cortisol, and saliva alpha-amylase levels during listening.

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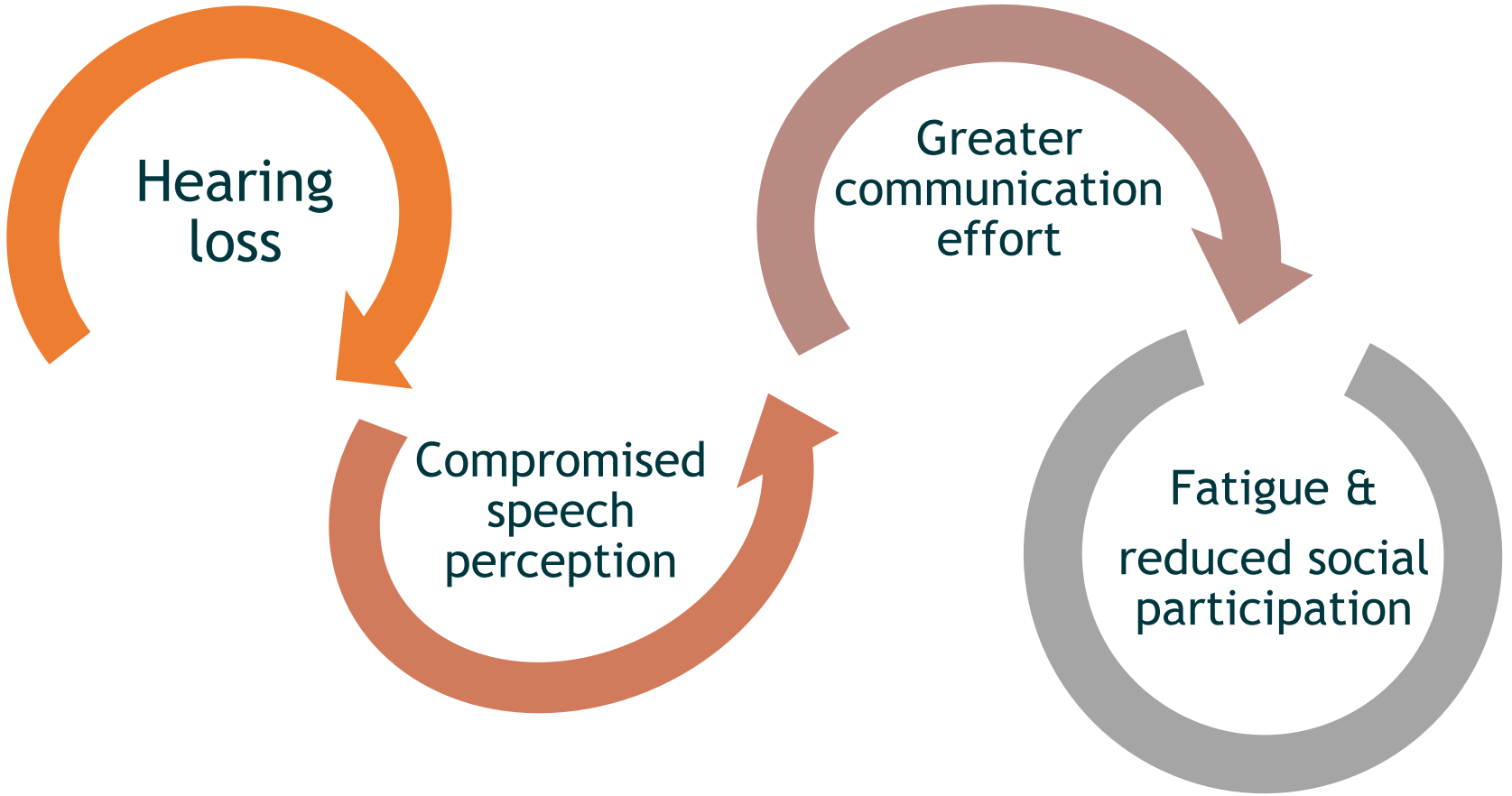
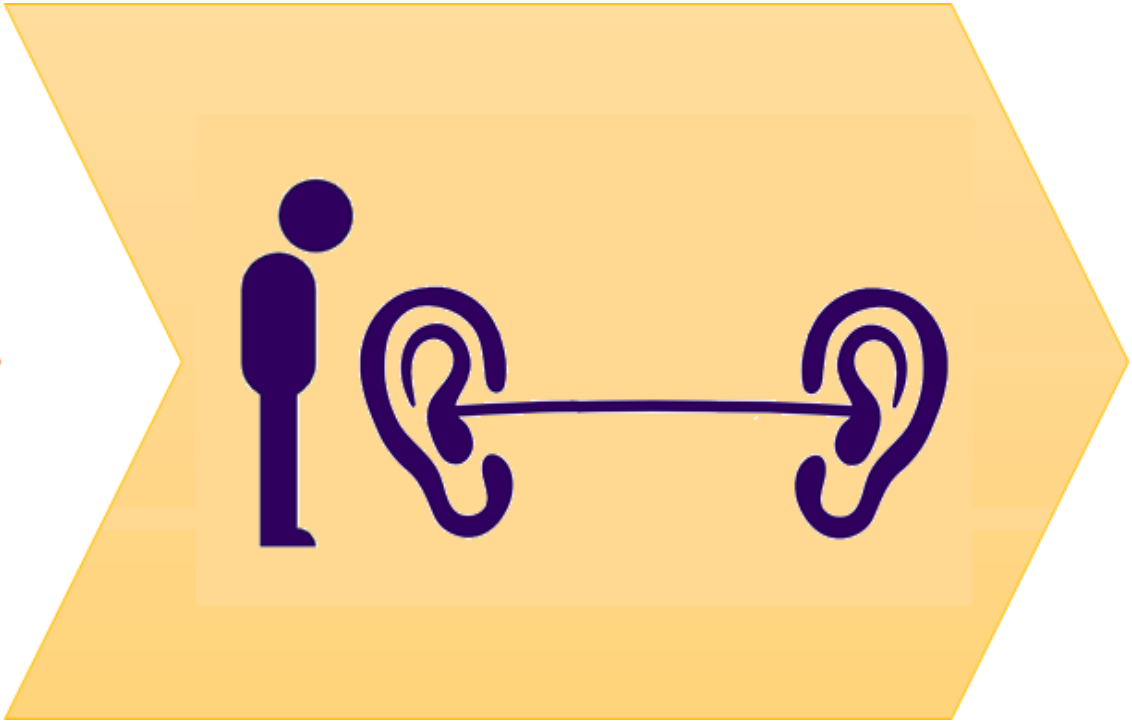
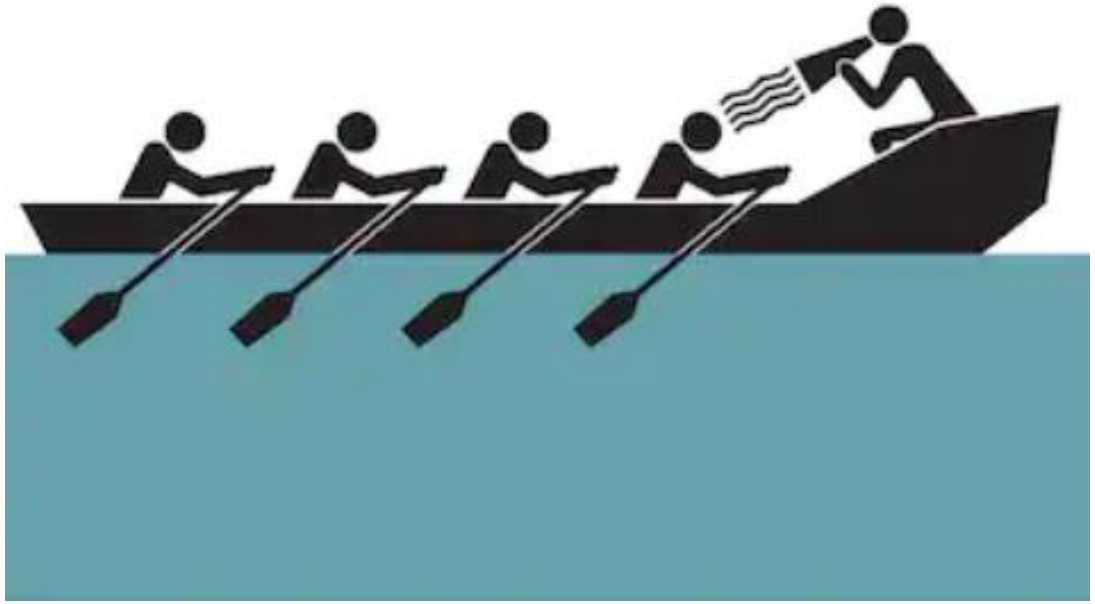
Nachtegaal et al., 2009


Hearing loss
Compromised speech perception
Greater communication effort
Fatigue & reduced social participation

Without motivation, there is no listening effort



Can social pressure influence motivation and effort?

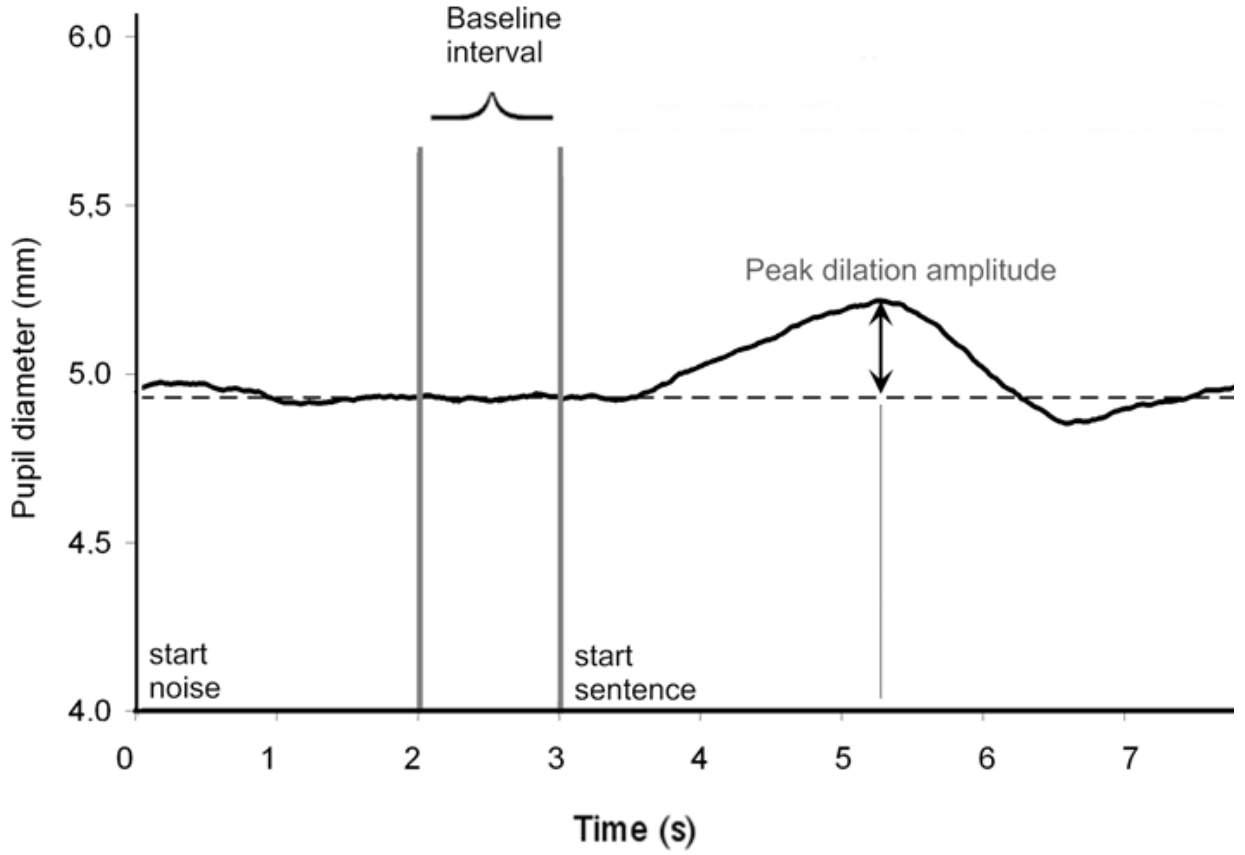


Aim: to assess the influence of “social evaluative threat” on:

- Speech perception performance,
- The pupil dilation response during listening (effort)
- Subjectively experienced hearing difficulties
- And two biomarkers sensitive to stress

Zekveld et al., 2019

Pupil dilation response: listening effort



Zekveld et al., 2010

Two stress systems: biomarkers

sympathetic system

HPA system

Two stress systems: biomarkers

sympathetic system

- Pupil dilation
- Salivary alpha-amylase

HPA system

Two stress systems: biomarkers

sympathetic system

fast

- Pupil dilation
- Salivary alpha-amylase

HPA system

- Cortisol

Speech reception threshold (SRT) test

- Monaurally presented,
- Adaptive and interleaved SRT task
- Targeting either **50% (difficult) or 71% (easy) correct perception** of the target sentence (female voice) presented in interfering speech (male voice)
- Overall intensity level: 65 dB SPL; application of NAL-R.

Participants

34 participants with normal hearing (NH):

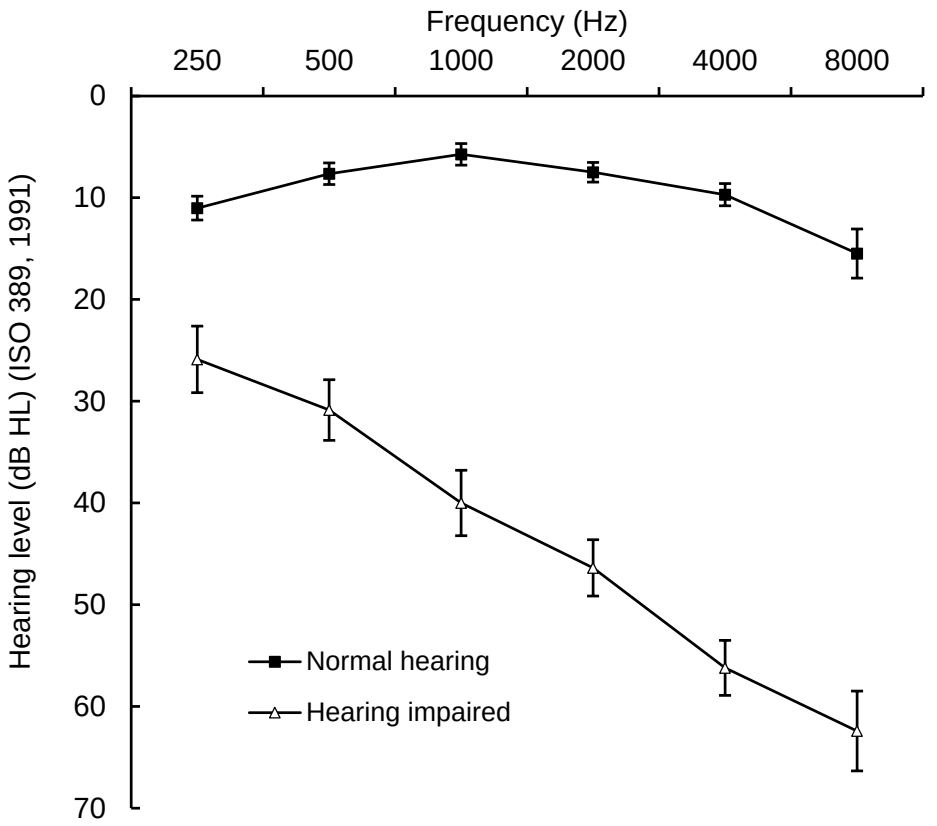
-Mean age = 52 years, age range 25-67 years;

-Mean best ear pure-tone average (PTA)

@ 1, 2 & 4 kHz = 8,1 dB HL

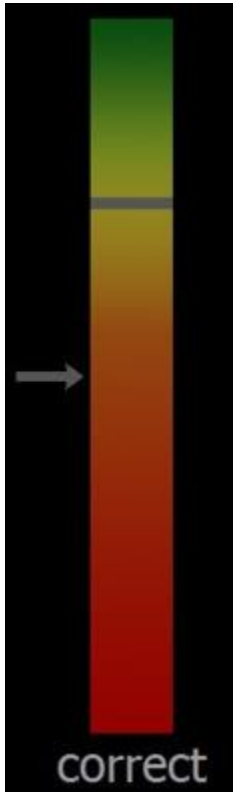
29 participants with hearing impairment (HI):

- Mean age = 52 years, age range 23-64 years;
- Mean best ear PTA @ 1, 2 & 4 kHz = 48,6 dB HL).



Feedback condition*

- Feedback (visual, after each trial)
- “Peer” performance (social evaluative threat)
- Target performance for “useful data collection” (75% correct)
- Lower actual performance (60% correct)
- Verbal feedback twice during the task



* Based upon “Montreal Imaging Stress task”

Feedback condition: between subjects

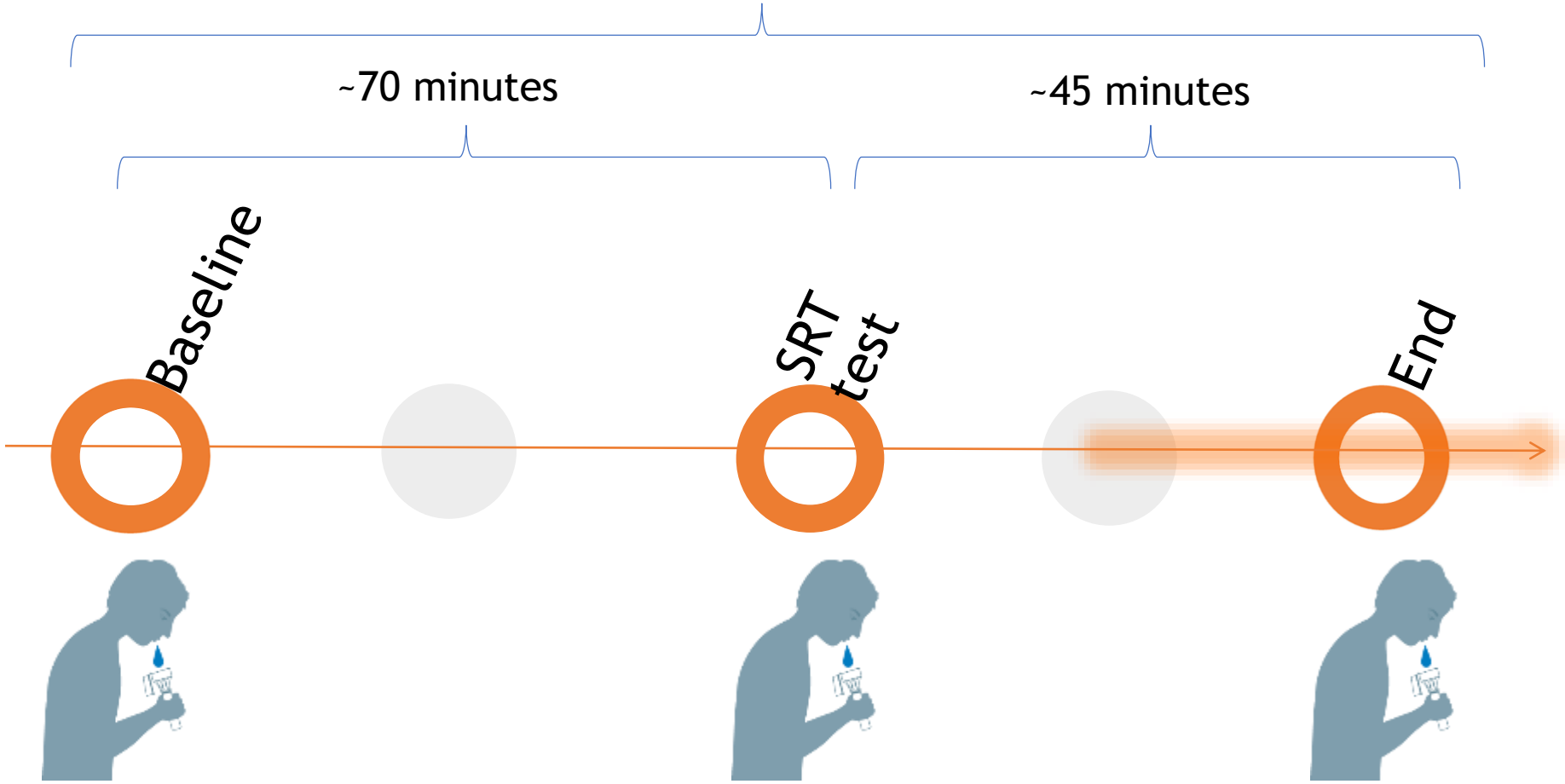
-**Standard SRT** test, **no feedback (control)**:

- N = 17 NH, mean age = 52 years,
- N = 15 HI, *M* age = 49 years;

Adapted SRT test **with feedback**:

- N = 17 NH, *M* age = 52 years, and
- N = 14 HI, *M* age = 55 years;

Time line: 2 hour test session (afternoon)

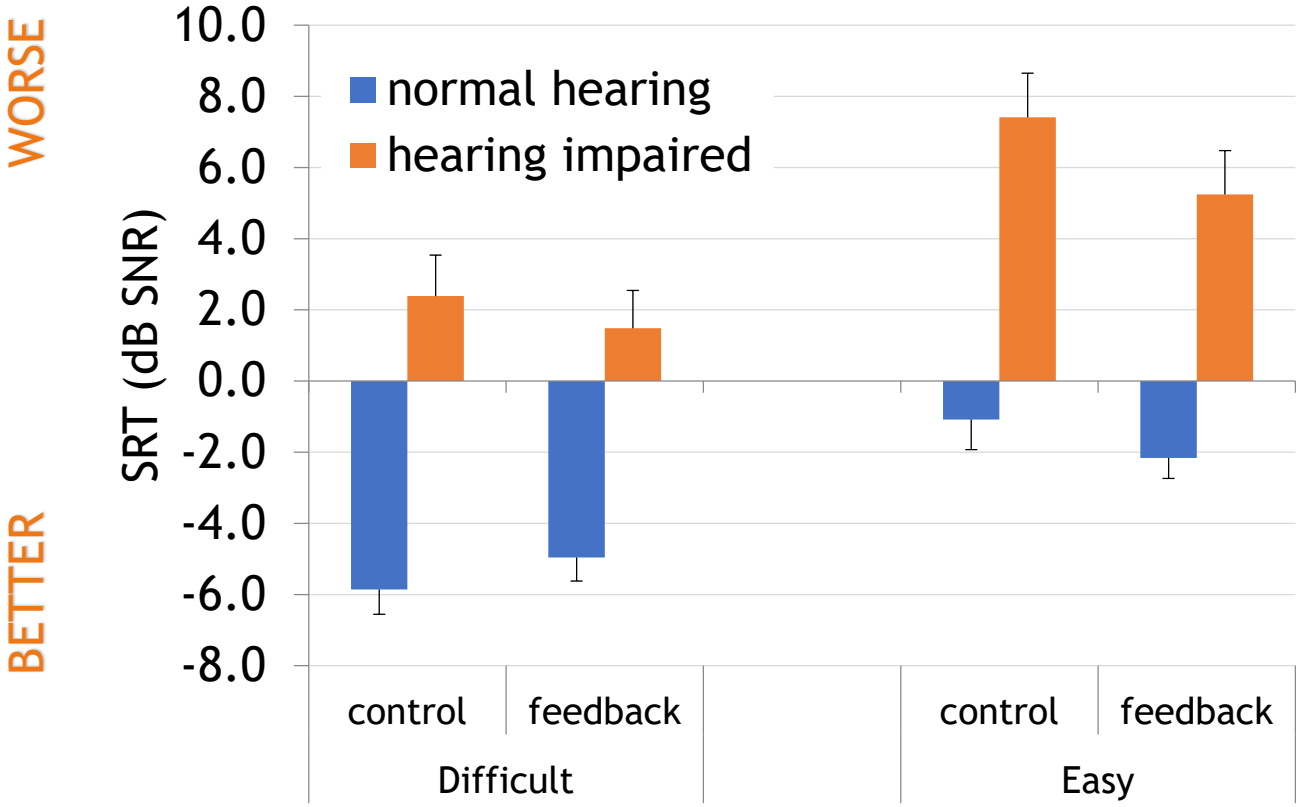


Hypotheses

Feedback associated with:

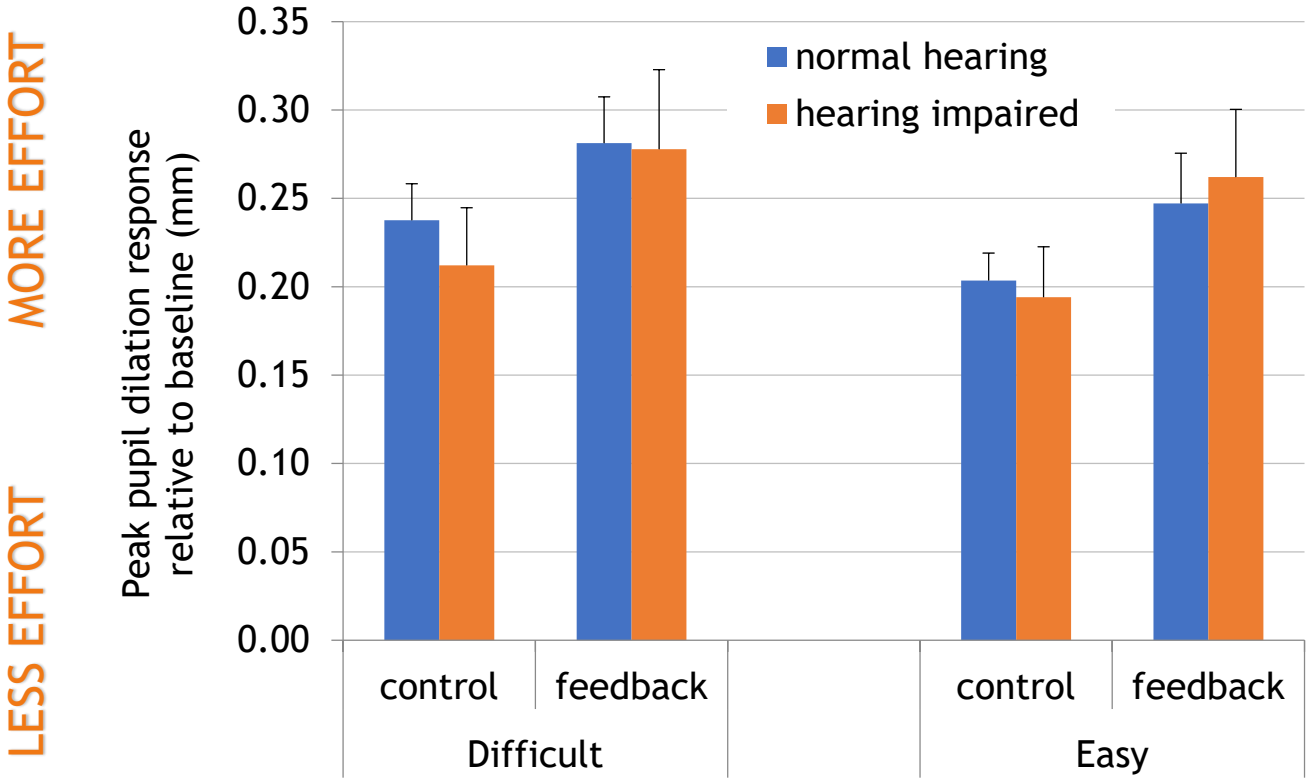
- Better performance
- More effort (pupil)
- Higher stress levels (biomarkers)
- Higher subjectively experienced effort / stress level

Speech reception thresholds (SRTs)



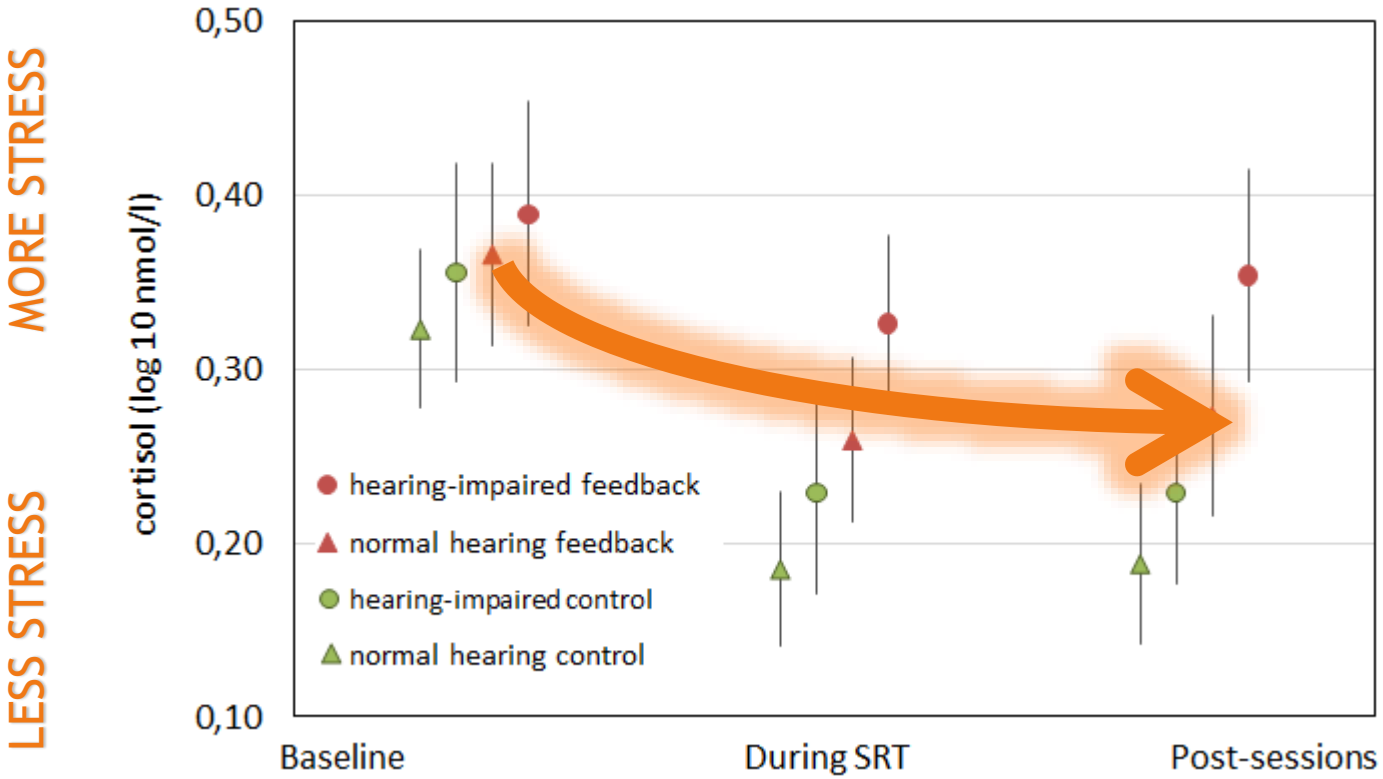
- Normal hearing: better performance than hearing impaired
- Difficult < Easy
- Feedback: better performance in easy condition

Pupil response (listening effort)



- Larger pupil dilation for difficult (compared to easy) condition
- Larger pupil dilation in feedback condition

Cortisol (stress)



- **No effect** of Feedback or Hearing status
- At baseline: higher cortisol than later in test session; *reflects daily pattern*
- Alpha-amylase: similar pattern of results

Subjective ratings

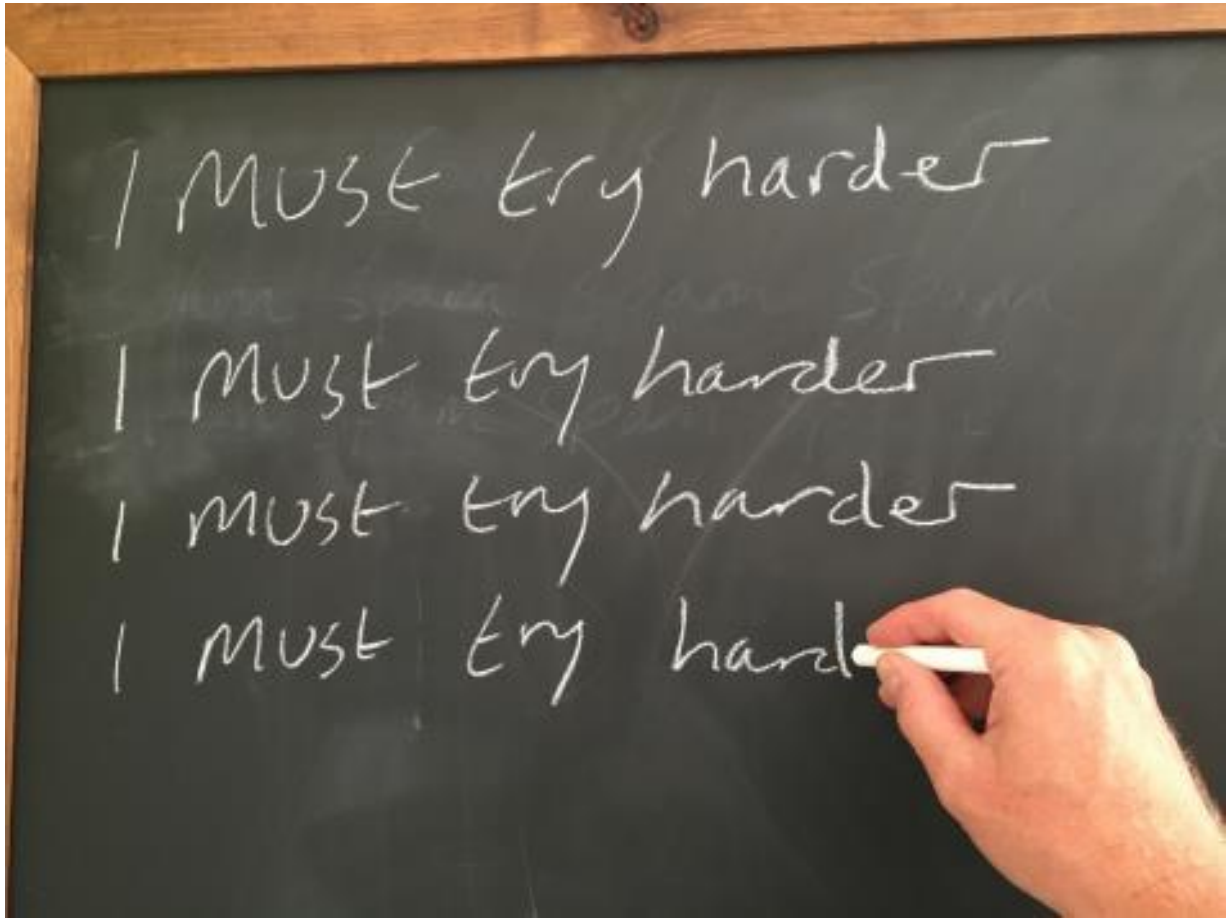
- No effects of Hearing status

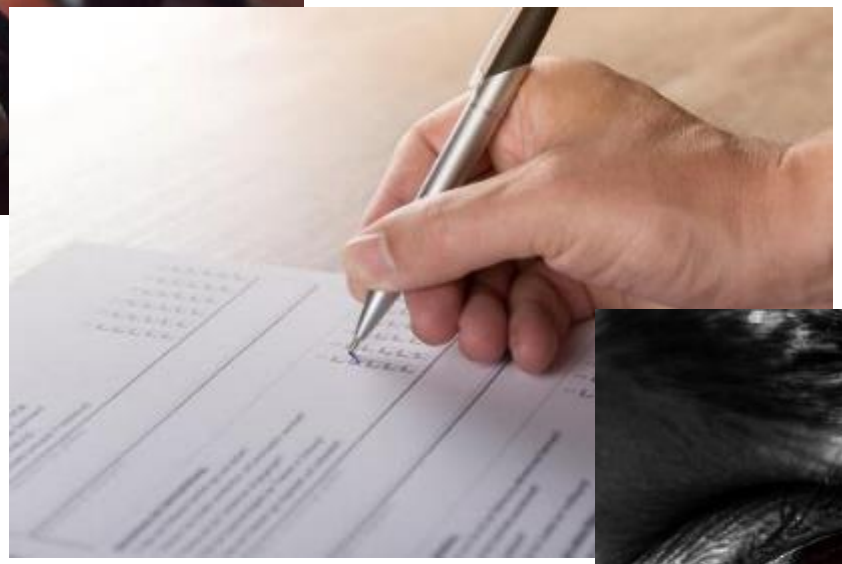
- Effects of Feedback:

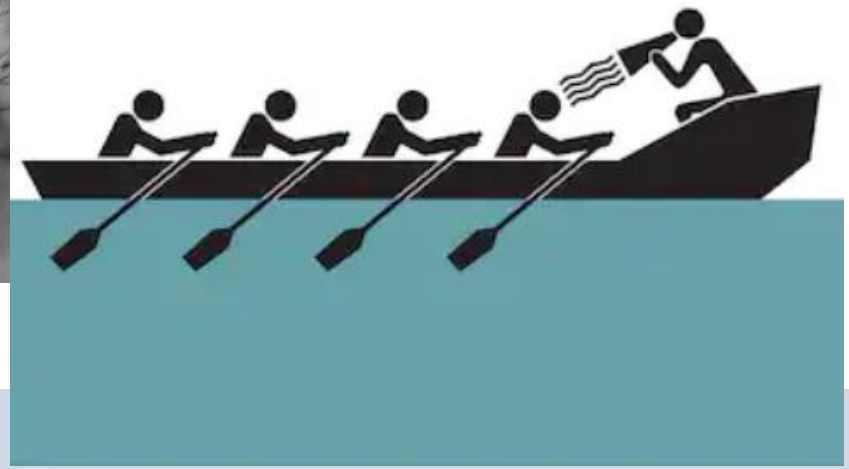
Conclusions

- Feedback influences:
  - Speech perception performance,
  - Subjective difficulties
  - The pupil dilation response / effort

- No effect on stress biomarkers (cortisol, alpha-amylase)







Thank you for listening