

# The effects of adding realism to a conventional speech-in-noise test

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## Motivation

The speech reception threshold (SRT) is routinely used in research and in the clinic to assess people's ability to understand speech in noise. The overall goal of this work was to determine whether introducing realistic aspects to speech tests can better capture individual differences and ultimately produce more relevant performance measures.

The study examined the psychometric effects of (a) transplanting a standard sentence-in-noise test into a simulated reverberant cafeteria environment, and (b) moving from sentence recall to a new ongoing speech comprehension task.

## Methods

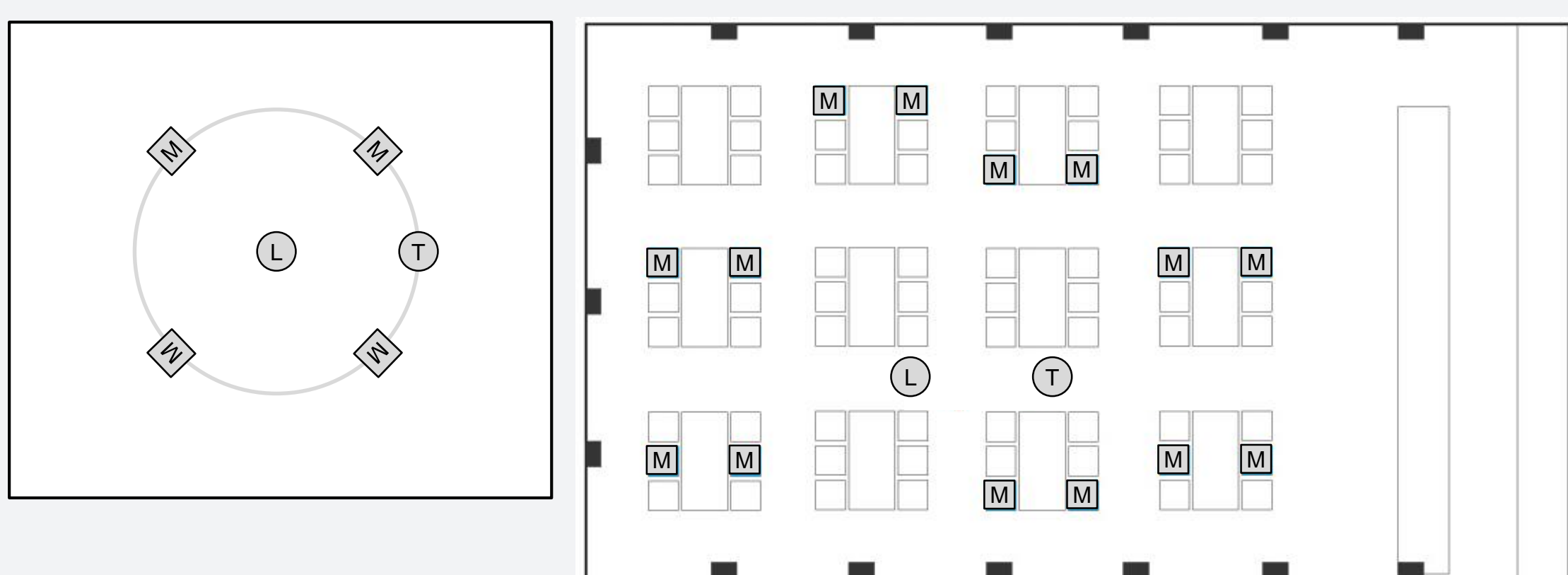
### Participants

Participants included 18 normal hearers (age 18-57) and 28 bilaterally hearing-impaired listeners (age 29-83) who were tested with and without their hearing aids.

### Environments

**Standard:** Anechoic room, with target from frontal loudspeaker and uncorrelated 8-talker babble maskers from four other loudspeakers.

**Realistic:** Simulated large reverberant cafeteria, with a frontal target and seven distracting conversations distributed in both direction and distance.



### Tasks

**Standard:** Recall of BKB sentences spoken by a male talker.

**Comprehension:** Listening comprehension task using 2-4 min passages spoken by the same talker as BKB sentences. Performance was based on 10 questions requiring on-the-go written answers. Transcripts and questions were adapted from past exam papers of the International English Language Testing System (IELTS; Cambridge University Press).

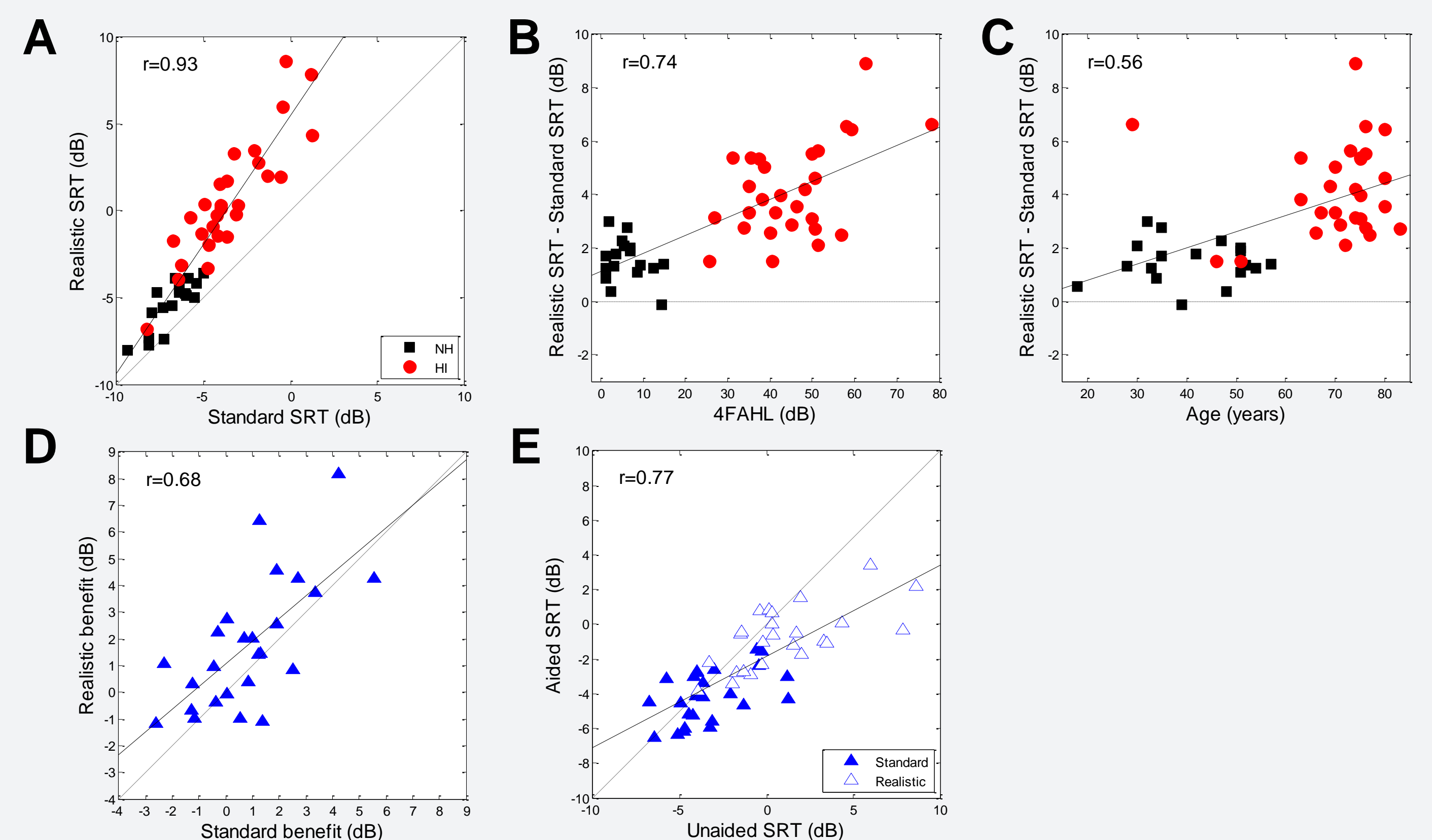
### Procedure

Performance scores in % correct were obtained at three SNRs. For each participant, a logistic function was fitted to data and the 50% SRT was extracted.

## Results

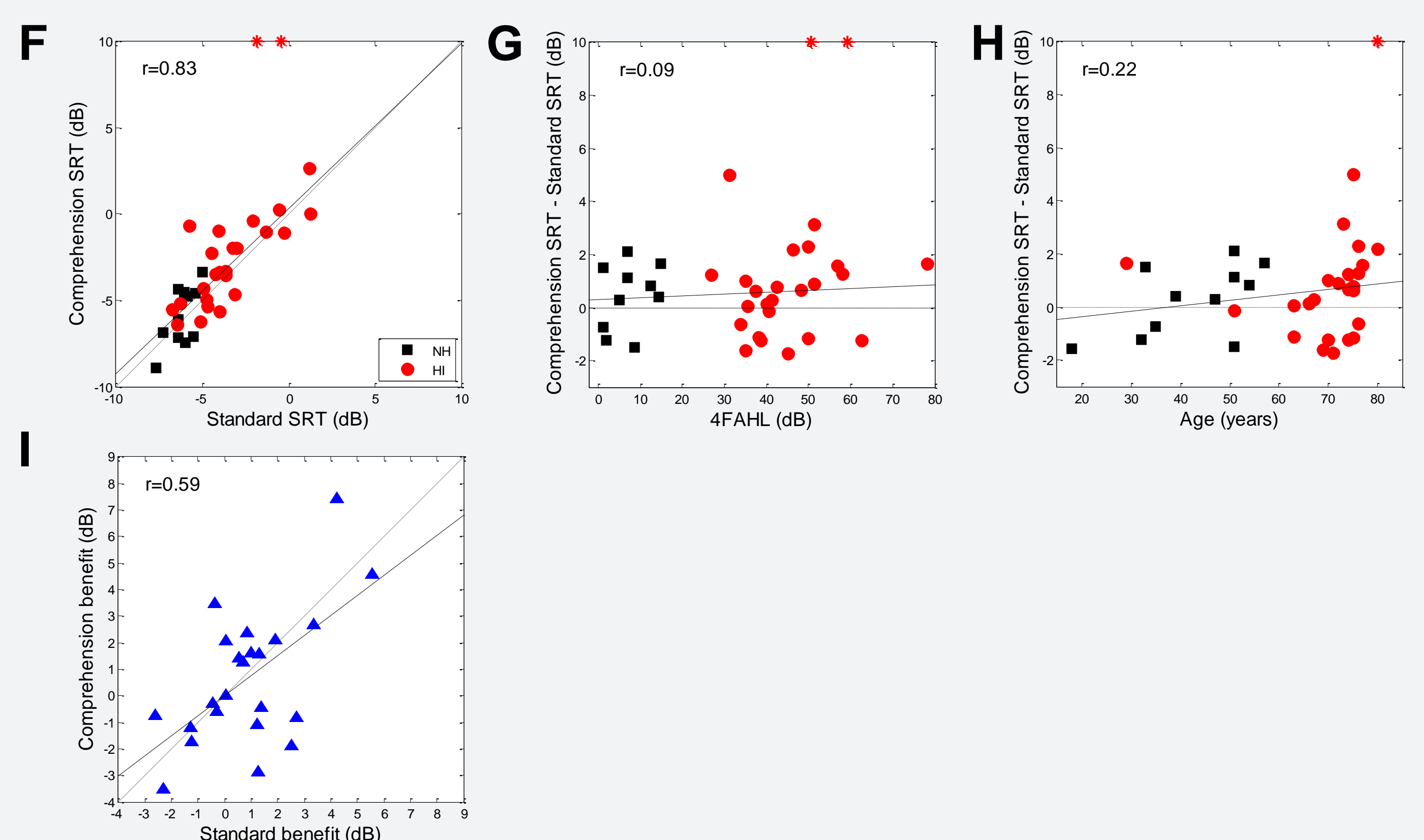
### Effect of realistic environment

SRTs were correlated across environments (A). The realistic environment increased SRTs, with the size of the increase related to hearing loss (B) and hence age which is highly correlated with hearing loss (C). **Hearing loss may exacerbate the effect of reverberation in the realistic environment.** Hearing aid benefits were weakly correlated across environments (D) but tended to be larger for the poorer listeners in the realistic environment (E). **This may be a result of testing at higher SNRs.**



### Effect of comprehension task

SRTs were correlated across tasks (F). The effect of task was not strongly related to hearing loss or age (G, H) but listeners most affected by the comprehension task were >70 years old (two could not perform the task at all). **The ongoing task may better reveal effects of cognitive ageing.** Hearing aid benefits were weakly correlated across tasks (I).



## Conclusion

These manipulations promise to be useful for the creation of more realistic speech-in-noise tests that are controlled enough to be useful for psychophysical experiments and clinical evaluations.