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## Background

Speech tests are often poor predictors of the performance of individual listeners in the real world. This may be in part because they do not adequately engage all of the auditory and cognitive processes involved in real communication tasks. Our aim is to create new speech tests that provide more relevant performance measures. Here we examined the effects of (a) introducing a more realistic acoustic environment, and (b) moving to a more natural and engaging speech task on the speech reception threshold in noise (SRTn).

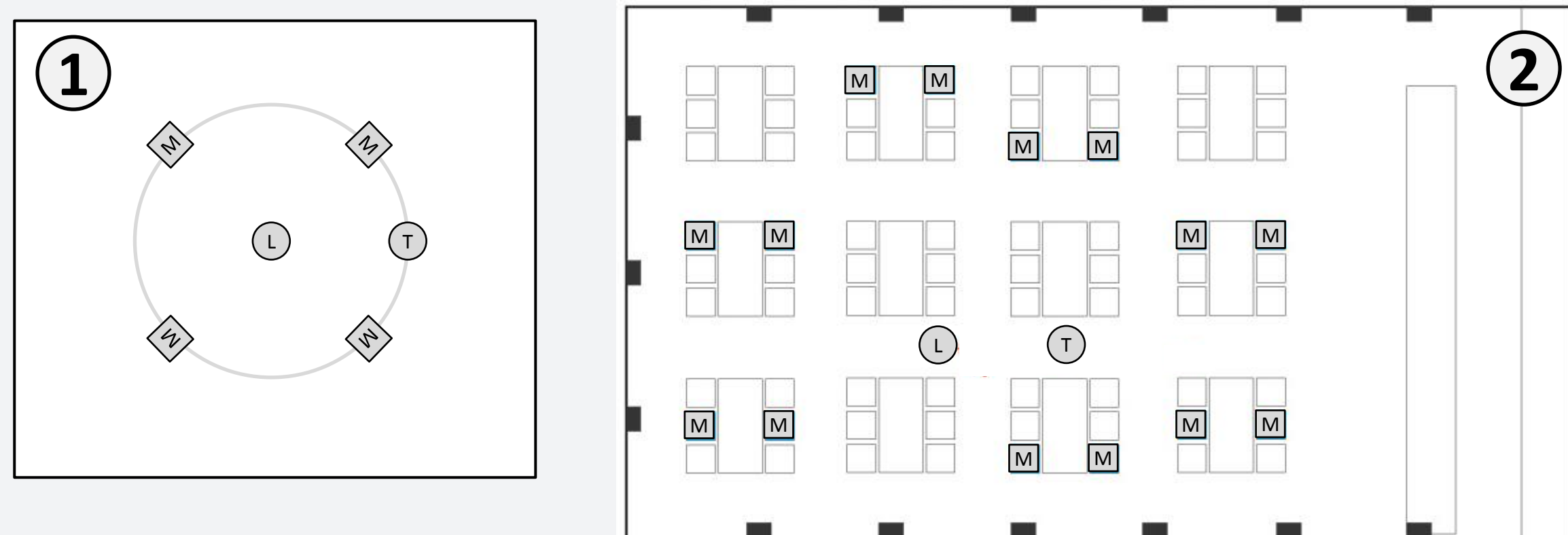
## Methods

### Participants

- 45 participants (18-83 years).
- 17 with normal hearing, 28 with bilateral sensorineural hearing loss, including 25 hearing aid wearers tested with and without their own aids.

### Environments

- Standard: Target presented from frontal loudspeaker and diffuse 8-talker babble from four loudspeakers (1).
- Realistic: Target and seven distracting conversations presented in a simulated noisy reverberant cafeteria (2).



### Tasks

- Standard: Sentence recall task using BKB sentences.
- Comprehension: Listening comprehension task based on short (2-4 min) informative passages. Same talker as BKB sentences. 10 questions requiring on-the-go written answers (3).

**3** You will hear the organiser of a rock festival talking to the exhibitors and performers at a planning meeting.

Label the plan of the rock festival site below.

Complete the sentences below.

Write **NO MORE THAN TWO WORDS** for each answer.

18 To show you are an official visitor, you have to wear the ..... provided.

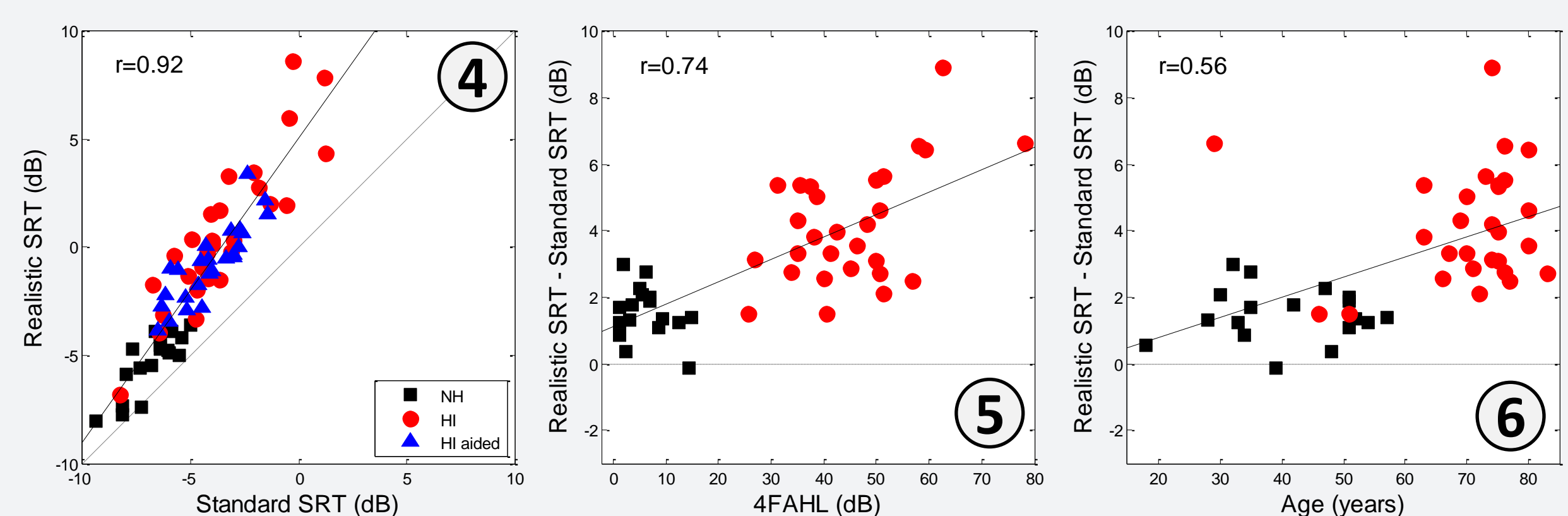
19 Cars blocking paths could prevent access by ..... in an emergency.

20 To reclaim items from storage, you must show your .....

## Results

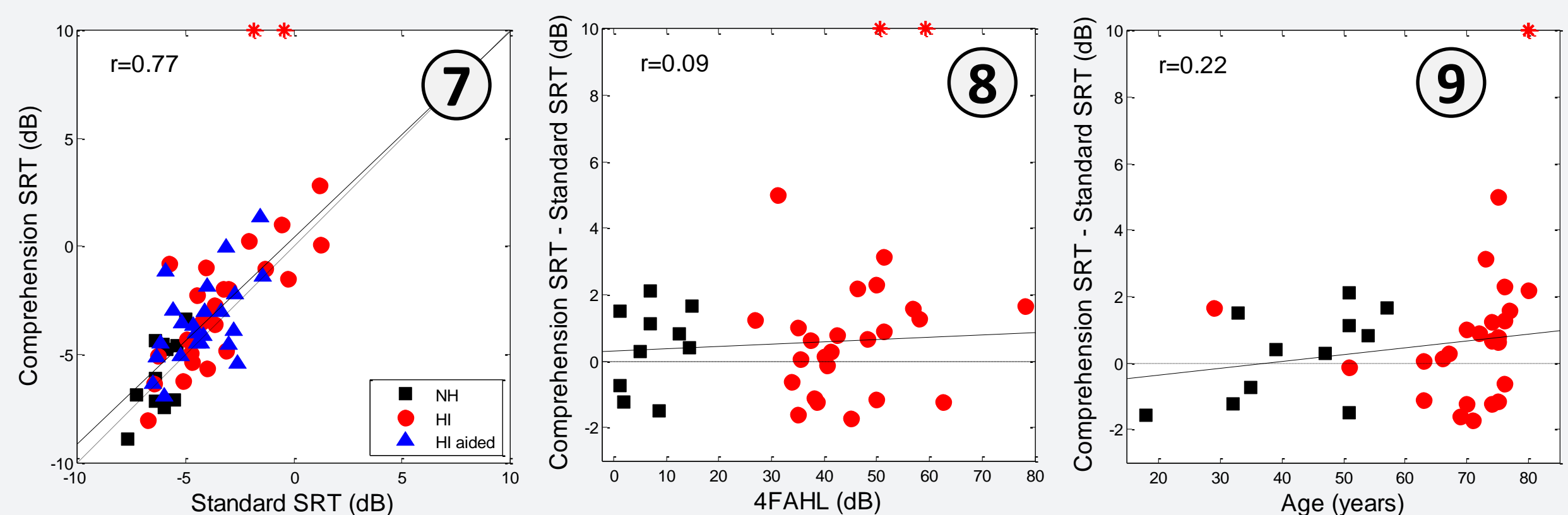
### Effect of using a more realistic environment

- The SRTns measured in the two environments were strongly correlated (4), but generally higher in the realistic environment (slope of least square fit = 1.41 dB/dB), which was reported to be more distracting.
- The realistic environment was more sensitive to both degree of hearing loss and age (5),(6).
- The effect of the realistic environment was more strongly correlated with degree of hearing loss (5), possibly due to the added reverberation.



### Effect of using a speech comprehension task

- The SRTns measured for the two tasks were significantly correlated (7) and similar (slope of least square fit = 0.96 dB/dB), although the comprehension test was reportedly more engaging and challenging.
- Two of the oldest listeners could not perform the comprehension task at all despite producing expected SRTns in the sentence recall task (7), possibly due to cognitive aging (i.e. reduced explicit memory, speed of processing, and/or executive control).
- The effect of comprehension was not significantly correlated with hearing loss (8) or age (9), although the poorest performers were >70 years old (9).



## Conclusions

The manipulations implemented in this study promise to be useful for the creation of realistic laboratory tests that are engaging and challenging, yet controlled enough to be useful for psychophysical experiments.