

Supplemental Material S2. Protocol details.

Both the Aging and Cognitive Health Evaluation in Elders (ACHIEVE) and the Atherosclerosis Risk in Communities Neurocognitive Study (ARIC-NCS) administered the Quick Speech-in-Noise (QuickSIN) test to assess participants' understanding of speech in noise in a sound-treated testing booth.^{1,2} The test consists of a practice list and two test lists (lists 1 and 2). Each list has a list of 6 sentences spoken by a woman talker. The sentence materials were derived from the IEEE (Institute of Electrical and Electronics Engineers) sentences, which were designed to be not predictable based on contextual cues and language knowledge.³ The sentences are presented under successively higher level of background noise as multi-talker babble, which is similar to noise encountered in daily settings. The background noise increases, with signal-to-noise ratio (SNR) decreasing in 5-dB steps, from 25 dB (easiest) for the first sentence to 0 dB (most difficult) for the last sentence. After the presentation of each sentence, participants are instructed to repeat back the sentence as much as they can. Each sentence has 5 target words, and the scoring is based on the correct identification of target words. Total QuickSIN score for each list ranges from 0 to 30 (6 sentences \times 5 words). For analysis, scores from two test lists are averaged to represent mean number of words correctly identified and higher score represents better speech-in-noise performance.

In the ACHIEVE study, the QuickSIN test was administered in a sound field with channel 1 and channel 2 routed to separate RadioEar SP90 speakers.⁴ The sentences were presented at 0-degrees azimuth on channel 1 using a fixed level of 70 dB SPL whereas the background noise (four-talker bubble) was presented at 180-degrees azimuth on channel 2. In the ARIC-NCS, the QuickSIN test was administered using E•A•RTone insert earphones or TDH headphones if excessive/impacted cerumen or other foreign objects were presented in the eardrum. The sentences were presented binaurally at a fixed level of 70 dB HL.

References:

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3. "IEEE Recommended Practice for Speech Quality Measurements," in *IEEE Transactions on Audio and Electroacoustics*, vol. 17, no. 3, pp. 225-246, September 1969, doi: 10.1109/TAU.1969.1162058.
4. Walker G, Dillon H, Byrne D. Sound field audiometry: recommended stimuli and procedures. *Ear Hear*. 1984 Jan-Feb;5(1):13-21. doi: 10.1097/00003446-198401000-00005. PMID: 6706021.