A REVISED SPEECH IN NOISE TEST - RSIN

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Introduction

The Speech In Noise (SIN) Test, developed by Killion and Fikret-Pasa (1993), is used to compare hearing aids. The test requires the listener to identify key words in sentences that are presented at soft and loud levels. Each level is presented at four signal-to-babble ratios (SBRs). There are 9 blocks of sentences in the original test. Testing one block involves presenting five sentences at each of four SBRs at both low and high levels. This generates 12 scores, six at each presentation level.

Bentler et al (2000) reported data showing that most of the nine blocks do not produce equivalent scores. We used Bentler's data to reallocate the test sentences to improve equivalence across blocks. In addition, to increase reliability, we combined blocks into sets of two. This generated a test comprising four "Modified Dual Blocks" (MDBs). The unused test material is employed for practice. This poster reports data on equivalence of the four MDBs for older adults (60+ years).

What is "Revised" in the RSIN?

	Original	Revised
Recording	Etymotic Research CD from Auditec.	No change
Levels	Low and High	No change
SBRs	0dB, 5dB, 10dB, 15dB	No change
Scores	1. %correct at each SBR. 2. Overall % correct. 3. SBR for 50% score.	No change
# Blocks	9	4 & practice
Sentences per block	40	80
Administration & scoring	Manual	Automated with software

HARL
### Hearing Aid Research Lab.

Subjects & Procedure

There were 42 "normal hearing" elderly subjects. All were aged 60+, mean age was 66 years. 13 were men, 29 were women. Hearing thresholds were no more than the 90th percentile of otologically normal individuals of their age and gender.

Test sentences were presented binaurally via ER-1 earphones, to simulate sound field listening.

Although sentences designated for "high" and "low" presentation levels were tested, all were actually delivered at a comfortable loudness (about 72-75 dB SPL peak level). The purpose was to determine their intrinsic intelligibility when presentation level was not a variable.

Half of the subjects listened to the sentences without any frequency shaping. The other 21 subjects listened to sentences that had been shaped to simulate the audibility conditions for someone with a mild to moderate sloping high frequency loss.
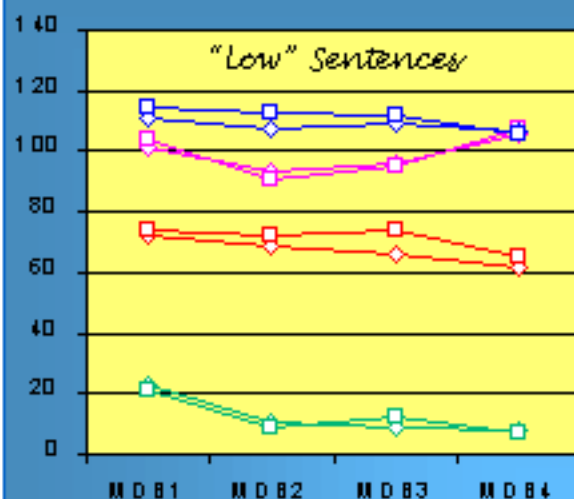
These figures depict the mean RAU score at each SBR for each Modified Dual Block (MDB).

Results for each SBR are shown using a different color.

Diamonds are used to show data for unfiltered test sentences.

Square symbols show data for low-pass filtered test sentences.

Results

- The square and diamond symbols generally depict quite similar scores for a given condition. This shows that the reduction of high-frequency audibility in the filtered sentences did not substantially affect the scores.

- The lines showing mean scores across the 4 MDBs for a given SBR usually are not flat. This means that the "revised" blocks of sentences are still not fully equivalent.
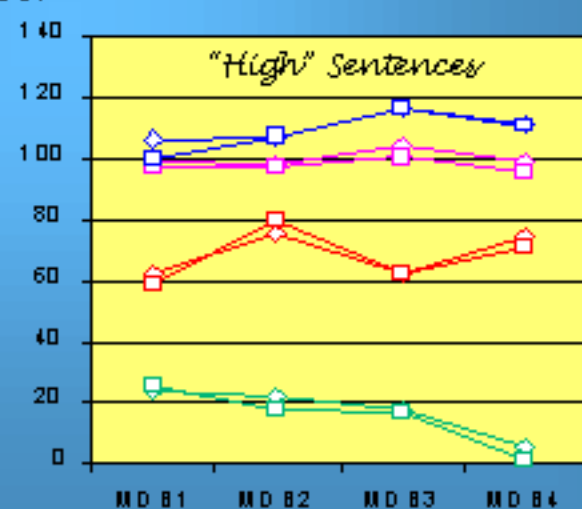
Still not equivalent! Now what??

Because the revised sentence blocks were still not fully equivalent, we derived weights to use for scoring each SBR of each MDB for both "Low" and "High" sentences.

It was assumed that the "true" score for an individual at a particular SBR was the mean of the four scores (one for each MDB). The relationship of test scores to true scores was derived to determine the weight for each test score.

There were no differences between weights for unfiltered and low-pass filtered MDB scores, so data from both were combined to derive composite weights. This implies that the same weights can be used for flat and moderately sloping hearing losses.

- These figures show mean RAU scores for each condition after weights were used for individual scores.
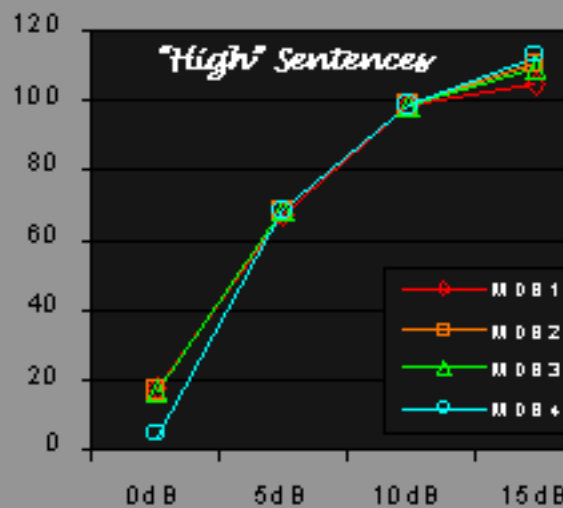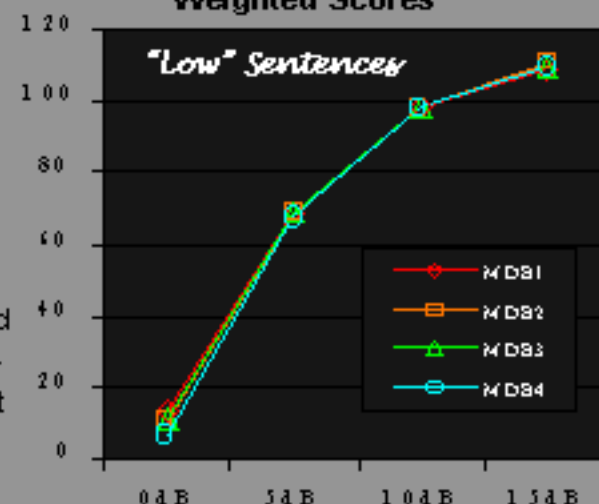- The four MDBs are now almost equivalent.
- Some scores at 0dB and 15 dB SBRs in the "High" sentences are still not equivalent.
- This occurs because of floor and ceiling effects with some blocks.
- Thus, weighting scores does not equalize the MDBs when a listener scores 100% or 0%.

What Next?

- Explore use of RSIN with listeners wearing hearing aids.
- It should be useful as an objective measure of fitting outcome.
- In particular, the RSIN is well suited to demonstrate the efficacy of WDRC hearing aids.

Finally...

Software has been developed to administer and score the RSIN. Check www.ausp.memphis.edu/harl for availability and price.