UK Biobank

Hearing ‘Speech-in-Noise’ Test: Suggested Further Reading

Version 1.0

http://www.ukbiobank.ac.uk/

April 2014

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Background

The speech-in-noise hearing test was designed by researchers at the Institute of Sound and Vibration Research, University of Southampton. The test determines how well the participant can hear three spoken numbers played with a rushing noise in the background, also known as the digit triplet test. Further details of how the test was administered can be found here.

Suggested Further Reading

For researchers wishing to understand more about the reliability and validity of the speech-in-noise test, please consult the following table for details of suggested further reading:

	Transducer	Method	SRTn (dB)	SD (dB)	ME (dB)	Slope (%/dB)	Comments
Broadband triplets	TDH-49 monaural	Fixed SNR	−12.0	-	0.33	18.2	Phipps (2007) **digit** scoring. Slope for LR fit to mean values = 16%/dB. Ear used for telephone. N = 10 participants.
Broadband triplets	TDH-49 monaural	Fixed SNR	−11.1	-	-	-	Phipps (2007) **triplet** scoring. Slope for LR fit to mean values = 17%/dB. Ear used for telephone. N = 10 participants.
Broadband triplets	TDH-49 monaural	Fixed SNR	−12.1	0.86	1.09	19.4	Morgan (2010) **triplet** scoring. N = 20 participants (10F/10M).
Broadband triplets	TDH-49 monaural	Adaptive	−12.6	0.78	0.77	-	Morgan (2010). N = 20 participants (10M/10F).
Telephone test	Telephone receiver	Adaptive	−7.8	1.46	-	-	Cripps (2009). Ear used for telephone. N = 25 participants (12F/13M).
Telephone material	TDH-49 monaural	Adaptive	−8.57	1.18	1.10	-	Ying (2010). Ear used for telephone. N = 20 participants.
Telephone material	Loudspeaker	Adaptive	−8.9	0.6	1.18	-	Mathers (2010). ME calculated from run 2 and 3. N = 17 participants (13F/7M).

Notes
ME = Measurement Error = SD of difference on replication divided by √2
SRT and slope for fixed SNR calculated from logistic regression fit by averaging SRT and slope for each individual
Telephone test means the test administered from the RNID system via the telephone network landline to a standard desk handset
Telephone material means digital materials used for RNID test, which are pre-mixed at SNRs of −14 to + 6 dB in steps of 2 dB then sample rate reduced to 8 kHz and data compressed to 8 bits using A-law algorithm in Adobe Audition.
Noise in all tests is white noise filtered to have exactly same frequency spectrum as the 27 cut digit segments (9 digits, 3 positions)
SNR is defined in terms of the average spectrum of the 27 cut digit segments (signal) and spectrum of noise as defined above.

References

Phipps, H. (2007) Assessment of telephone bandwidth on the English number recognition in noise test. Unpublished MSc dissertation, University of Southampton.

Morgan D (2101) Normative data for the UK Triplet Test in stationary and time varying noise. Unpublished MSc dissertation, University of Southampton.

Cripps H (2009) A comparison of hearing screening tests by telephone and internet in listeners with normal hearing. Unpublished BSc dissertation, University of Southampton.

Ying G (2010) Evaluation of the RNID telephone hearing test using hearing impairment simulation. Unpublished MSc dissertation, University of Southampton.
Mathers H. A validation of the Royal National Institute for the Deaf (RNID) online hearing screening test using the English Triplet Test. Unpublished BSc dissertation, University of Southampton.