



Understanding Speech in Noise Challenges: The Role of Personality and Mood

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Speech in Noise Perception in Adults with Normal Hearing

The Role of Personality, Mood, and Cognitive Factors

Many adults with clinically normal hearing thresholds report difficulty understanding speech in noisy environments. Traditional hearing tests measure hearing sensitivity in quiet conditions and may not fully reflect the challenges individuals experience in everyday communication settings.

This project examines why some individuals experience significant speech-in-noise difficulties despite normal audiograms.

The study explores relationships between:

- Speech-in-noise performance
- Personality traits
- Mood and emotional factors
- Real-world listening environments

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Speech in Noise Testing

- **Measuring Listening Ability in Noise**
- Speech-in-noise testing evaluates how well a listener can understand speech when background noise is present. These tests provide valuable information about functional hearing ability in realistic listening conditions.
- One commonly used clinical assessment is the Quick Speech-in-Noise Test (QuickSIN).
- The QuickSIN measures Signal-to-Noise Ratio (SNR) Loss, which reflects the additional listening advantage required for a person to understand speech compared to typical listeners.

Interpreting SNR Loss

- Typical performance ranges include:
- **0–2 dB SNR Loss** – Normal speech-in-noise performance
- **3–7 dB SNR Loss** – Mild difficulty understanding speech in noise
- **>7 dB SNR Loss** – Significant difficulty in noisy environments
- Speech-in-noise testing helps clinicians identify listening challenges that may not appear during standard hearing tests.
- However, some individuals report substantial listening difficulty despite normal speech-in-noise scores, suggesting additional influences beyond auditory sensitivity.

Why Speech in Noise Difficulties Occur

Beyond the Audiogram

The ability to understand speech in noisy environments depends on a complex interaction between auditory, cognitive, and psychological processes.

When background noise interferes with speech signals, listeners must rely more heavily on cognitive resources to interpret degraded speech.

Key cognitive processes involved include:

- Working memory
- Attention and auditory focus
- Lexical retrieval and language processing
- Contextual interpretation of speech

Psychological factors may also influence listening experiences. For example, individuals experiencing anxiety, stress, or fatigue may perceive listening tasks as more effortful.

Personality characteristics may further influence how individuals perceive communication difficulty and listening effort.

Understanding these factors helps clinicians better explain why patients may report communication challenges even when traditional hearing tests appear normal.

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Understanding Speech Perception in Noise

Speech Perception in Noise

Understanding speech in noisy environments requires both auditory and cognitive processing. Traditional hearing tests measure quiet hearing but may not reflect real-world listening challenges.

Listeners rely on cognitive resources such as:

- **Working memory** – retain speech while processing sounds
- **Attention** – focus on the target speaker
- **Lexical retrieval** – recognize and interpret words
- **Contextual processing** – infer missing or degraded speech

Psychological factors (emotional state, stress, personality) also influence listening effort and communication success.

Despite normal hearing, some individuals report difficulty in noise. This study explores why these challenges occur.

Study Design

This study examines how speech-in-noise performance relates to cognition, personality, and mood in adults with normal hearing.

Participants:

Adults **20–45 years** with normal hearing (≤ 20 dB HL from **250–8000 Hz**)

Measures:

- **Quick Speech-in-Noise Test (QuickSIN):** speech-in-noise performance (SNR loss)
- **Boston Naming Test:** lexical retrieval ability
- **Big Five Inventory:** personality traits
- **Beck Depression Inventory & Beck Anxiety Inventory:** mood symptoms

Ecological Momentary Assessment (EMA):

Participants complete smartphone surveys 3× daily to report listening environment, background noise, perceived effort, emotional state, and communication success in real time.



Hypotheses & Clinical Implication

Hypotheses

- Higher neuroticism will be associated with greater perceived speech-in-noise difficulty.
- Higher anxiety or depression will relate to increased listening effort.
- **Subjective difficulty** may not match objective performance (e.g., Quick Speech-in-Noise Test results).
- **Listening environment and emotional state** may influence communication success.

Clinical Implications

- Listening challenges may reflect auditory, cognitive, and psychological factors.
- Patients may report difficulty despite normal hearing thresholds.
- Combining speech-in-noise testing with patient-reported experiences may improve clinical counseling.

Conclusion

Speech perception in noise involves more than hearing sensitivity alone, supporting a holistic approach to audiological assessment.

