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**Title:** Aging, Cognition and Hearing Aids

**Abstract:** Why do older adults have trouble hearing in background noise?   Why do so many hearing aids end up in the drawer?   In this talk, I will explore the role that cognition may play in answering these questions.

When perceiving sounds in real-world listening environments, older adults encounter several sources of degradation that can interfere with the perceptual process. Target signals (i.e., the sounds that a listener wants to focus on) have specific physical characteristics (spectral and temporal content) that the auditory system must encode and resolve. The fidelity of these physical cues may be altered due to the presence of competing sounds in the environment. Older listeners may also encounter target-signal degradations due the presence of cochlear hearing loss, hearing aid signal processing, and age-related changes in higher-level processing. In addition to making sounds harder to detect (reduced audibility), cochlear hearing loss may cause degradations in the analysis of the spectral and temporal properties of the target signal. Another concern is that digital signal processing algorithms in hearing aids, which are designed to improve perception by listeners with hearing loss, generate unwanted distortion along with desired signal modifications. Finally, processing that occurs up-stream from the cochlea also impacts the older adult. Listeners with fewer cognitive processing resources have more difficulty making use of top-down processing when decoding the degraded input coming from the auditory periphery.

Our research on aging and hearing loss considers the role working memory plays in listening in noisy environments and in hearing-aid outcomes.   A particular focus of our current work is to identify ways that advanced signal processing algorithms in hearing aids can be optimized for individual listeners.  Our recent data suggests that measures of working memory may play a significant role in this optimization process.