Title: Effects of aging and hearing loss during rapid sound processing
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Objective: The purpose of this pilot study is to understand how memory changes with aging and if failures of working memory during rapid sound processing may account for some of the speech perception difficulties reported by older Veteran listeners especially those with hearing loss. A period of processing interference (and limitation) has been identified during rapid auditory or visual processing, called the attentional blink (AB). This has been identified as a failure of working memory consolidation. Since cognition and memory failures are common adjuncts of aging, a lengthened period of processing interference is very likely to be present among older listeners. Further, older listeners, who are more likely to have hearing loss, continue to report more problems hearing in noisy environments even with their hearing aids optimally functional.
Research Plan: Up to 72 subjects, ages 18-30 and 60-75 years will be assign to one of four groups of 15 subjects composed of young subjects with normal hearing, young subjects with no more than moderate hearing impairment, older subjects with normal hearing, and older subjects with no more than moderate hearing impairment. Each subject will be asked to listen to between 18 and 26 non-overlapping tones played at a rate of 11.1/second (90ms SOA) with two target tones embedded in the sequence. Sequences could contain (in equal probability) a) no target, b) T1 only, c) T2 only or d) both targets. At the end of each stream, the subject will be required to make an untimed judgment about whether the stream contained T1 (yes/no) and T2 (yes/no). The hypothesized findings are that young listeners with or without hearing impairment will have more difficulty reporting on T2 when it follows T1 by approximately 200-400ms than at any other interval. However, older listeners without hearing impairment will demonstrate a more prolonged period of interference (>400ms) with slightly poorer performance overall while older listeners with hearing impairment will have an even longer lasting period of processing interference and overall larger deficit (poorer performance) suggesting that increasing age and hearing impairment combine to increase the auditory AB for these participants.
Findings: This is a newly pilot funded project. However, a recent NIH summer research traineeship project comparing five young normally-hearing adults with one older normally hearing adult found that the older adult had a prolonged period of auditory processing interference (>400ms). These findings will be presented at the 2011 American Auditory Society Annual Meeting.