Title: Delayed recall in cochlear implant users: Application of the Item-Specific Deficit Approach

Authors: Nadav Brumer~, Elizabeth Elkins~, Jake Hillyer‡, Alexandra Parbery-Clark~*

Institutional affiliations:
~Auditory Research Laboratory, Center for Hearing and Skull Base Surgery, Swedish Neuroscience Institute, Seattle, WA
‡School of Medicine, Oregon Health and Science University, Portland, OR

*Corresponding author: Alexandra Parbery-Clark, Auditory Research Laboratory, Swedish Neuroscience Institute, James Tower, 550 17th Ave., Suite 520, Seattle, WA, 98122; P: 206-215-4327; F: 206-320-1960; E-mail: Alexandra.Parbery-Clark@swedish.org

Abstract

Introduction: Delayed recall performance is a key measure for the assessment of cognitive function in older adults. However, recent research demonstrates that delayed recall tasks may pose distinct challenges for cochlear implant (CI) users. As hearing impairment and cognitive decline are increasingly prevalent in the aging population, a better understanding of delayed recall processes in CI users is needed. Here, we administered the MoCA and the CVLT-3 to experienced CI users. We specifically focused on exploring the application of a newer CVLT-3 scoring technique—the Item-Specific Deficit Approach (ISDA)—to derive deficit-centered indices of encoding, consolidation and retrieval.

Methods: 18 experienced CI users with post-lingual hearing loss were recruited for this study. Participants completed the MoCA and the CVLT-3. Both traditional CVLT-3 scoring as well as the ISDA scoring method were employed. Given that the MoCA and CVLT-3 were administered in the auditory modality, CI speech perception was quantified using the AzBio sentence test. Correlational analyses and MANOVA tests were used.

Results: Higher AzBio speech scores correlated with higher CVLT-3 performance as well as lower ISDA encoding and retrieval deficits. When split into two groups based on CI speech performance (i.e., higher and lower performers), higher performers demonstrated less encoding and retrieval deficits. Consolidation deficits were, however, equivalent between groups. Higher CVLT-3 immediate delayed recall scores related to lower ISDA encoding and consolidation deficits, with the exception of CVLT-3 learning slope. Higher CVLT-3 delayed recall scores correlated with lower ISDA retrieval scores, with the exception of CVLT-3 cued-recall scores and recognition-hits. The MoCA did not relate to any CVLT-3 measures, ISDA indices, or speech perception scores.

Conclusion: The application of ISDA scoring to CVLT-3 provides an alternate way to quantify delayed recall in this patient population. Our results indicate that the ISDA scoring metric is more sensitive to differences in CI recipient speech perception performance than both the MoCA and CVLT-3. These findings suggest that ISDA may be a useful tool for understanding these cognitive processes this patient population.

Learning objectives:

Describe the benefits of using ISDA vs traditional CVLT-3 scoring.

Compare the sensitivity of different delayed recall metrics to cognitive processing abilities.