predicts actual associative memory performance and should be considered in clinical practice.

Categories: Memory Functions/Amnesia
Keyword 1: metamemory
Keyword 2: aging (normal)
Keyword 3: self-report
Correspondence: Caitlin Terao, Department of Psychology and Centre for Vision Research, York University, Toronto, Canada. E-mail: cterao@my.yorku.ca

3 Separating Memory Impairment from Other Neuropsychological Deficits on the CVLT-II

William F Goette, Jeff Schaffert, Anne R Carlew, David Denney, Heidi Rossetti, C. Munro Cullum, Laura H Lacritz
University of Texas Southwestern Medical Center, Dallas, Texas, USA

Objective: Learning curve patterns on list-learning tasks can help clinicians determine the nature of memory difficulties, as an "impaired" score may actually reflect attention and/or executive difficulties rather than a true memory impairment. Though such pattern analysis is often qualitative, there are quantitative methods to assess these concepts that have been generally underutilized. This study aimed to develop a model that decomposes learning over repeated trials into separate cognitive processes and then include other testing data to predict performance at each trial as a function of general cognitive functioning.
Participants and Methods: Data for CVLT-II learning trials were obtained from an outpatient neuropsychology service within an academic medical center referred for clinical reasons. Participants with a cognitive diagnosis of non-demented (ND) or probable Alzheimer's disease (AD) were included. The final sample consisted of 323 ND [M_{age} = 58.6 (14.8); M_{edu} = 15.4 (2.7); 55.7% female] and 915 AD [M_{age} = 72.6 (9.0); M_{edu} = 14.2 (3.1); 60.1% female cases. A Bayesian non-linear beta-binomial multilevel model was used, which uses three parameters to predict CVLT-II recall-by-trial: verbal attention span (VAS), maximal learning potential (MLP), and learning rate (LR). Briefly, VAS predicts expected first trial performance while MLP, conversely, predicts the expected best performance as trials are repeated, and LR weights the influence of VAS versus MLR over repeated trials. Predictors of these parameters included age, education, sex, race, and clinical diagnosis, in addition to raw scores on Trail Making Test Parts A and B, phonemic (FAS) fluency, animal fluency, Boston Naming Test, Wisconsin Card Sorting Test (WCST) Categories Completed, and then age-adjusted scaled scores from WAIS-IV Digit Span, Block Design, Vocabulary, and Coding. Random intercepts were included for each parameter and extracted for comparison of residual differences by diagnosis.
Results: The model explained 84% of the variance in CVLT-II raw scores. VAS reduced with age and time-to-complete Trails B but improved with both verbal fluencies and confrontation naming. MLP increased as a function of WAIS Digit Span, animal fluency, confrontation naming, and WCST categories completed. Finally, LR was greater for females and WAIS-IV Coding and Vocabulary performances but reduced with age. Participants with AD had lower estimates of all three parameters: Cohen's d = 2.49 (VAS) – 3.48 (LR), though including demographic and neuropsychological tests attenuated differences, Cohen's d = 0.34 (LR) – 0.95 (MLP).
Conclusions: The resulting model highlights how non-memory neuropsychological deficits affect list-learning test performance. At the same time, the model demonstrated that memory patterns on the CVLT-II can still be identified beyond other confounding deficits since having AD affected all parameters independent of other cognitive impairments. The modeling approach can generate conditional learning curves for individual patient data, and when multiple diagnoses are included in the model, a person-fit statistic can be computed to return the mostly likely diagnosis for an individual. The model can also be used in research to quantify or adjust for the effect of other patient data (e.g., neuroimaging, biomarkers, medications).

Categories: Memory Functions/Amnesia
Keyword 1: dementia - Alzheimer's disease
Keyword 2: demographic effects on test performance
Keyword 3: learning
Correspondence: William F. Goette, University of Texas Southwestern Medical Center, William.Goette@UTSouthwestern.edu

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