Categories: Memory Functions/Amnesia
Keyword 1: aging (normal)
Keyword 2: learning
Keyword 3: memory: normal
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3 Relation of Stress and Cortisol to Primacy and Recency Performance Patterns in Older Adult Caregivers of People with Dementia

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Objective: The serial position effect is the tendency to recall items at the beginning (primacy) and end (recency) of a word list best and middle items the worst, demonstrated by a 'U-shaped' profile. Individuals with memory impairment often demonstrate a 'J-shaped' profile, with a diminished primacy effect. An attenuated primacy effect could be one of the earliest indicators of cognitive decline in older adults. Chronic elevations in cortisol are related to hippocampal atrophy and decreased learning and recall. Given the rehearsal and encoding required to recall words at the beginning of a list, we hypothesized that reduced primacy would be related to higher cortisol levels, measured via hair cortisol concentration, in older adults, particularly caregivers of people with dementia (PWD), who are under increased stress.
Participants and Methods: Data were taken from a deidentified dataset of 60 community-dwelling older adults (≥ 50) with no evidence of dementia who participated in a larger study on memory and caregiving stress; 26 identified themselves as caregivers of PWD. The sample was 83% women and 98% White, with a mean age of 67.58 (SD=8.85) and 80% holding at least a college degree. Stress was measured with the Perceived Stress Scale. The List Learning and List Recall subtests from the Repeatable Battery for the Assessment of Neuropsychological Status were used to assess the serial position effect. Primacy and recency were determined by the first three and last three words on the list, respectively, and were measured for trials 1-4. Relative strength of primacy versus recency at delayed recall was also calculated such that positive scores indicate better primacy than recency and negative scores indicate worse primacy than recency (J-shaped profile). Hair samples were collected, and the first one cm of hair was used to assay hair cortisol concentration, reflecting the past month of cortisol.
Results: Caregivers were younger than non-caregivers ($p<.001$), but groups did not differ in gender ($p=.412$). Age was controlled for in all subsequent analyses. Caregivers reported more stress ($p<.001$), but groups were not different in hair cortisol ($p=.093$). On memory tasks, caregivers showed lower list learning raw scores ($p=.002$) and lower list recall raw score ($p=.046$); groups were not different in primacy learning ($p=.114$), but caregivers showed worse recency over learning trials ($p<.001$). Caregivers were not more likely to show the J-shaped serial position profile at recall ($p=.285$). Collapsed across groups, perceived stress was not related to cortisol ($p=.124$) but was related to recency ($p=.001$) and list learning raw ($p=.004$), but not list recall raw ($p=.485$) or primacy ($p=.109$). Cortisol was not related to primacy ($p=.277$) or recency ($p=.538$).
Conclusions: Contrary to predictions, caregivers were not worse on primacy but were worse on recency. Caregivers also reported more stress; collapsed across groups, stress was associated with recency performance. This may suggest that stress is related more to poor attention and short-term memory (recency) than encoding and recall related memory problems (primacy).

Categories: Memory Functions/Amnesia
Keyword 1: aging (normal)
Keyword 2: learning
Keyword 3: memory: normal
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4 Comparing Learning Process Variables to Memory Performance and Salivary Cortisol: Is Gender a Moderator of Relationships?

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https://doi.org/10.1017/S1355617723010652 Published online by Cambridge University Press

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Objective: Learning process variables such as the serial position effect and learning ratio (LR) are predictive of cognitive decline and dementia. Gender differences on memory measures are well documented, but there is inconsistent evidence for gender effects on learning process variables. In the present study, we examined the relationship of serial position and LR to memory performance and to cortisol levels, considering gender as a potential moderator.
Participants and Methods: Data were taken from a deidentified dataset of a study on stress and aging in which 123 healthy community-dwelling adults over age 50 completed various assessments. Our analyses included 100 participants (56% female, 93% white, Mage 60.65, Meducation 15.22 years) who completed all measures of interest. LR, primacy effect, and recency effect were calculated from the learning trials of the Auditory Verbal Learning Test (AVLT). Additional memory measures included recall measures from the AVLT and from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS). AUC cortisol was calculated from salivary cortisol samples taken across 6 time points in the study.
Results: Women performed better than men on LR, primacy, and traditional memory measures (ps=<.001 to .018) but not on recency (p=.40). LR was moderately correlated with primacy (r=.481, p<.001) and weakly correlated with recency (r=.271, p=.008), after controlling for age, gender, and education. After controlling for age, gender, and education, better LR was related to better memory performance across all measures (rs=.276-.693, ps= <.001-.007) and better recency was related to better performance on all memory measures (rs=.212-.396, ps=<.001-.038). Better primacy was related to better AVLT immediate and delayed recall and RBANS Immediate Memory Index (rs=.326-.532, p<.001) but not RBANS delayed (r=.115, p=.263).
Hierarchical linear regressions were conducted to examine gender as a moderator of relationships between learning process variables and memory performance, after accounting for age, gender, and education. There were no gender by LR (ps=.349-.830) or gender by primacy interactions (ps=.124-.671). There was an interaction between gender and recency on AVLT memory measures (ps=.006-.022), but not on RBANS measures (ps=.076-.745). For men, higher recency was related to higher AVLT immediate and delayed recall (rs=.501-.541, ps<.001), but not for women (rs=.-.029-.020, ps=.839-.888), after controlling for age and education. The relationship of AUC salivary cortisol to learning process measures was also moderated by gender (LR/gender interaction p=.055; primacy/gender interaction p=.047; but not recency/gender p=.79). Interestingly, for women, higher cortisol was related to higher LR (r=.16) and higher primacy (r=.36), while for men, it was related to lower LR (r=-.22) and not to primacy (r=-.05). Cortisol was not related to recency (rs=-.04 to -.07).
Conclusions: Women performed better on LR and primacy, as well as on other traditional memory variables, but gender did not appear to differentially impact the relationship of LR or primacy to memory outcomes. Findings suggest some differential relationships of recency to memory outcomes by gender. Results also suggested potential gender differences in the relationship of cortisol to learning process variables, but further study is necessary, especially with samples of individuals with memory impairment.

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Symposium 15: Impact of Environmental Contaminants on Child Neurodevelopment

10:45am - 12:10pm
Saturday, 4th February, 2023
Town & Country Ballroom B

Chair

Christine Till
York University, Toronto, Canada

Summary Abstract:

https://doi.org/10.1017/S1355617723010652 Published online by Cambridge University Press