[1]Ohio University, Athens, OH, USA. [2]University of Rochester Medical Center, Rochester, NY, USA

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.

Categories: Memory Functions/Amnesia
Keyword 1: aging (normal)
Keyword 2: learning
Keyword 3: memory: normal
Correspondence: Kendra Pizzonia, Ohio University, ka104818@ohio.edu

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:

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Children are exposed to toxic chemicals throughout development and the long-term consequences of this exposure can be profound. Despite decades of research documenting the vulnerability of the developing brain to environmental contaminants, there has been little progress in protecting against developmental neurotoxicity. This symposium will discuss recent research in developmental neurotoxicology using a "developmental origins of health and disease" (DOHaD) framework that examines the context in which environmental contaminants exert their effects. We will examine the timescale for developmental toxicity, windows of vulnerability, and the bases of individual differences in vulnerability, including sex-specific effects of chemical exposures. This symposium will feature new pregnancy and birth cohort studies that have implicated fluoride as a developmental neurotoxin and endocrine disruptor. In addition, we will discuss emerging issues in epidemiology, including how environmental contaminants may interact with non-chemical stressors and have lifelong impacts on cognition and behaviours. This symposium will be capped with a discussion of the public's knowledge, attitudes, and behaviours related to developmental toxicity and strategies to reduce exposure. All speakers will be asked to draw conclusions on research priorities, and discuss how to balance regulators' need for "ideal evidence" with a public health strategy that aims to protect the public from critical environmental hazards.
The symposium will consist of the following five presentations, each 12 minutes in length, followed by a 15 minute discussion.
1. John Krzeckowski, PhD, York University, Toronto, Canada.
TITLE: *Applying a Dimensional Framework to the Study of Developmental Neurotoxicity*
2. Carly Goodman, PhD candidate, York University, Toronto, Canada
TITLE: *Sex difference of Developmental Neurotoxicants on Intellectual abilities: A systematic review and meta-analysis*
3. Meaghan Hall, PhD candidate, York University, Toronto, Canada.
TITLE: *Fluoride Exposure and Hypothyroidism in Pregnant Women: A Potential Mechanism of Fluoride Neurotoxicity*
4. Ashley Malin, PhD, University of Florida, Florida, USA.
TITLE: *Urinary Fluoride Levels and Metal Co-Exposures among Pregnant Women in Los Angeles, California*
5. Rivka Green, PhD, The Hospital for Sick Children, Toronto, Canada.
TITLE: *Translating developmental neurotoxicity for the public: A large, multi-country, randomized-control trial investigating children's environmental health literacy*
Keyword 1: neurotoxicity
Keyword 2: environmental pollutants / exposures

Keyword 3: prenatal factors

1 Applying a dimensional framework to the study of developmental neurotoxicity

John Krzeczkowski
York University, Toronto, ON, Canada

Objective: In recent decades, a large body of evidence has linked prenatal exposure to environmental neurotoxins to adverse intellectual, neurodevelopmental, and psychiatric outcomes in offspring. This evidence has clearly highlighted the widespread impact of neurotoxin exposure on the developing brain; however, it is unclear how and why these exposures alter brain development in a way that appears to increase risk for multiple, seemingly disparate outcomes.
Participants and Methods: Shifting our focus from describing links between neurotoxin exposure and symptoms of offspring mental/cognitive problems considered categorically, to investigating how neurotoxins adversely affect domains of functioning known to cut across risk for multiple problems in offspring may be critical to answering these questions. This presentation will discuss how combining research in developmental neurotoxicology with novel systems that take dimensional approaches to understanding emotions, cognition, and behaviour (i.e., the NIHM Research Domain Criteria (RDoC)) may provide a fruitful future research direction for the field. The RDoC framework aims to understand neuropsychological outcomes (i.e., mental health, mental illness, IQ) across major domains

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