

with (PH+) to youth without (PH-). The present study utilizes the national, prospective Adolescent Brain Cognitive Development SM (ABCD) Study to examine whether reward anticipation in the nucleus accumbens (NA) differs in preadolescents with and without parental substance use history and whether patterns of reward anticipation change over time during a two-year follow-up period. Further, it will also examine whether PHA and PHD predict similar activation patterns.

Participants and Methods: The current sample (N=6,600, Mage = 10.9; range = 9-13.8 years old; 46.7% female) was drawn from the national ABCD Study. To assess reward processing, the Monetary Incentive Delay Task (MID), a fMRI task-based paradigm, was administered at baseline and 2 year follow-up. The primary regions of interest (ROI) were the left and right NA and neutral vs anticipation of large rewards was the selected contrast. The Family History Assessment was used to assess problematic parental alcohol and drug use for both parents, with scores ranging from 0-2, with two indicating that both parents demonstrate problematic use. Three PH contrasts (PH- vs.PH+1, PH- vs.PH+2, & PH+1 vs. PH+2) were created for each group (PHA and PHD) (Martz et al., 2022). Separate linear mixed-effect models with predictors variables (parental contrasts, timepoint, and parental contrasts-by-time-point) and covariates (age, sex, race/ethnicity, income, parental education, parental warmth, parental monitoring, and the random effects of MRI model, family status, and subject) were run to predict reward anticipation.

Results: Results indicated that PHA and ,not PHD, was predictive of reward anticipation. PHA+1 youth showed greater activation in the l-NA (b= .02827, p= .03) and r-NA (b= .03476, p=.005), compared to PH- youth. Additionally, PHA+1 youth showed greater activation in the r-NA (b=-.07029, p=.008) compared to PHA+2 youth, but not in the l-NA. Those with PHA+2 demonstrated blunted activity in both the l-NA (b= -.07244, p=.02) and right nucleus accumbens (b= -.1091, p=001) when compared to those with PH-. No interactions with time were found.

Conclusions: Preadolescents with a PHA+ for both parents had blunted activity in reward anticipation, conferring a unique risk not seen in youth with only one parent with problematic alcohol use, or in youth with a PH of drug use. Future research should attempt to disentangle both genetic and environmental factors that may

explain these discrepancies in reward processing, as well as the protective factors that may mitigate it. The current study found no interaction between PHA+ and time, suggesting that during preadolescents, the pattern of reward functioning remains consistent, but future work should assess if this pattern holds up across adolescence

Categories: Drug/Toxin-Related Disorders (including Alcohol)

Keyword 1: substance abuse

Keyword 2: neuroimaging: functional

Keyword 3: adolescence

Correspondence: Gabriella Navarro, University of Wisconsin- Milwaukee, navarro@uwm.edu

24 Longitudinal Neuropsychological Functioning in Gulf War Veterans Exposed to Neurotoxicants and War-Related Trauma

Kathryn A Price^{1,2}, Leah A Orlinsky^{1,2}, Clara G Zundel³, Kimberly Sullivan², Maxine H Krenzel^{1,4}
¹VA Boston Healthcare System, Boston, MA, USA. ²Boston University School of Public Health, Boston, MA, USA. ³Wayne State University School of Medicine, Detroit, MI, USA. ⁴Boston University School of Medicine, Boston, MA, USA

Objective: Gulf War (GW) veterans were exposed to many neurotoxicants during the 1990-1991 Gulf War. Neurotoxicants included: chemical warfare such as sarin nerve gas, combustion byproducts from oil well fires and diesel fuels from tent heaters, pesticides, and prophylactic anti- nerve gas pyridostigmine bromide pills (PB); all of which have been associated with both cognitive and mood concerns. There are few longitudinal studies that have examined cognitive functioning regarding these toxicant exposures. In our longitudinal Fort Devens cohort, we found decrements over time in the area of verbal learning and memory but no differences in measures of nonverbal memory and executive function. To describe changes more accurately over time in this GW veteran cohort, we examined cognitive functioning in those with probable Post-Traumatic Stress Disorder (PTSD) versus those without.

Participants and Methods: The FDC is the longest running cohort of GW veterans with initial baseline cognitive, mood, exposure and trauma assessments in 1997-1998 and follow-up evaluations in 2019-2022. FDC veterans (N=48) who completed both time points were the participants for this study. Veterans were categorized into dichotomous (yes/no) groups of PTSD classification. The PTSD checklist (PCL) was used to determine PTSD case status. Symptom ratings on the PCL were summed (range:17-85) and a cutoff score of 36 or higher was utilized to indicate probable PTSD. Neuropsychological measures of mood (POMS) and memory (Visual Reproductions from the Weschler Memory Scale-R; California Verbal Learning Test Second Edition; CVLT2) and executive function and language; (Delis-Kaplan Executive Function System- Color Word and Verbal fluency- Animals) were compared overtime using Paired T-tests.

Results: The study sample (N=48) was 92% male and 96% reported active-duty status at the time of the GW. Mean current age was 58 years. All veterans reported exposure to at least one war-related toxicant. 48% met criteria for probable PTSD (N = 23) while 52% did not (n=25). No differences between groups were found in any of the POMS subscales, nor were differences seen in verbal memory, executive function, or language tasks. There were, however, significant differences in nonverbal memory in those with probable PTSD showing fewer details recalled during delay on the WMS-R Visual Reproductions ($p<0.05$).

Conclusions: In this longitudinal analysis, GW veterans with PTSD showed declines in nonverbal memory and consistent levels of function in all other tasks. Basic mood scales did not show decline; therefore, these results are not due to generalized changes in mood. All participants reported at least one neurotoxicant exposure and we did not have the power to examine the impact of the individual exposures, thus we cannot rule any contributing factors other than PTSD. This study highlights the importance of longitudinal follow up and continual documentation of GW veterans' memory performance and their endorsement of mood symptoms overtime. Specifically, these findings reveal that future studies should examine the prolonged course of memory and mood symptomatology in GW veterans who have endorsed a traumatic experience.

Categories: Drug/Toxin-Related Disorders (including Alcohol)

Keyword 1: neuropsychological assessment

Keyword 2: post-traumatic stress disorder

Keyword 3: memory complaints

Correspondence: Kathryn Price, Boston University School of Public Health 715 Albany Street Boston, MA 02118, Email: kaprice@bu.edu

25 Longitudinal Decline in Memory in 1991 Gulf War Veterans: Where you Start Matters.

Leah A Orlinsky^{1,2}, Kathryn A Price^{1,2}, Clara G Zundel³, Kimberly Sullivan¹, Maxine H Krenzel^{2,4}

¹Boston University School of Public Health, Boston, MA, USA. ²VA Boston Healthcare System, Boston, MA, USA. ³Wayne State University, Detroit, MI, USA. ⁴Boston University College of Medicine, Boston, MA, USA

Objective: Memory complaints have been a concern of Gulf War (GW) veterans since their return from the war in 1991, and over time it has been reported that exposures to neurotoxicants during the war have been associated with memory decline from premorbid levels. However, many of the studies that have shown slight or no memory decrements only looked at one time point and have not followed participants to document trajectory of symptoms over time. Longitudinal design is an optimal way to document change in cognitive function over time and the Fort Devens cohort (FDC), the longest running cohort of GW veterans, is ideal for assessing such change. This prospectively designed non-treatment seeking cohort were assessed at multiple timepoints with neuropsychological assessments and surveys. Initial neuropsychological assessments from 1997 showed above average scores on tests of verbal memory (California Verbal Learning Test) and average nonverbal memory (Wechsler Memory Scale-R) performances. A follow-up study of neuropsychological testing was completed between 2019-2022. This study was designed to document change in cognitive status between the two time points.

Participants and Methods: Participants (N=50) from the original 1991 cohort were again tested from 2019-2022. Neuropsychological tests included California Verbal Learning Test-