acutely post-injury (both $p < .01$; $d = 1.09$-0.93). The magnitude of group differences between the OI and HC groups declined over time ($p > .05$; $d = 0.68$), whereas the mTBI group continued to show significantly lower performance following clinical recovery compared to the HC group ($p = .02$; $d = 0.81$). The mTBI, OI, and HC groups did not exhibit significant differences in working memory, explicit memory, or processing speed acutely post-injury and following clinical recovery (all $p > .05$; all $d = 0.52$ - 0.05). No significant effects of group ($p = .16$), time ($p = .67$), or the interaction ($p = .45$) were found on the Crystalized Cognition Composite.
Conclusions: Adolescents with mTBI demonstrated deficits on the NIHTB-CB measures of attention and executive functions acutely post-injury and extending beyond clinical recovery compared with healthy controls in this study. These subtle yet persistent deficits in cognitive performance lend support to the growing body of literature suggesting that alterations in neurotransmission may persist beyond resolution of clinical symptoms of mTBI. Further work is needed in larger samples to better understand trends in cognitive deficits and to identify clinical correlates persisting beyond clinical recovery from mTBI.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: traumatic brain injury
Keyword 2: executive functions
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39 Measuring Psychological Resilience as a Predictor of mTBI Recovery: Is There Value Added to the Clinical Exam?

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Objective: Recent studies have begun to explore the role of psychological resilience in pediatric mTBI recovery, with findings associating higher levels of resilience with shorter recovery and lower levels of resilience mediated by pre-injury anxiety and depression associated with persistent symptoms. The purpose of this study is to extend the current literature by further exploring the relationship between resilience, post-injury emotional changes, and length of recovery from pediatric mTBI. Based upon previous literature, we predicted that resilience would explain a unique portion of the variance in length of recovery above and beyond acute post-injury emotional symptoms in adolescents recovering from mTBI compared with orthopedic injured (OI) controls.
Participants and Methods: The current study pulled data from a larger project utilizing a prospective cohort design in two cohorts of high school student-athletes aged 14-18 (N = 32). Participants with mTBI (n = 17) or OI (n = 15) sustained during sport were recruited within 10 days of injury from a quaternary care setting. Participants completed a neuropsychological screening evaluation within one week of enrollment, including self-report rating scales of resilience (Connor-Davidson Resilience Scale-10; CD-RISC) and self- and parent-reported post-concussion symptoms (Post-Concussion Symptom Inventory, Second Edition; PCSI-2). Hierarchical regression analysis was performed with days from injury to recovery as the dependent variable. Predictors were entered in three steps: (1) group (mTBI/OI) and sex, (2) PCSI self- and parent-reported post-injury change in emotional symptoms, and (3) CD-RISC raw score. Bonferroni correction was utilized to control for multiple comparisons.
Results: Group and sex did not provide significant prediction when entered into the first block of the model ($p = .61$). Introducing PCSI emotional ratings in the second block showed statistically significant improvement, $F(2,26) = 5.12$, $p < .01$), accounting for 31% of the variance in recovery length. Addition of the CD-RISC in the third block was not statistically significant ($p=.59$). Post hoc testing indicated parent ratings on the PCSI were significantly associated with recovery length $t(32) = 3.16$, $p < .01$, while self-reported ratings were not ($p=.54$).
Conclusions: Findings indicated that psychological resilience did not explain a unique portion of the variance in length of recovery above and beyond acute parent report of post-injury emotional symptoms in adolescents recovering from mTBI compared with orthopedic injured (OI) controls. Interestingly, sex, group (mTBI vs. OI), and self-reported acute post-injury emotional symptoms were not significant predictors of recovery length in this sample. Results highlight the significant role of acute

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changes in emotional symptoms in adolescents recovering from mTBI and OI in predicting length of recovery, as well as the importance of obtaining separate caregiver report. A more robust understanding of factors contributing to recovery from injury can help inform and improve preventive measures and treatment plants for those at risk or impacted; however, psychological resilience may not uniquely contribute to predicting length of recovery in acutely injured adolescents, limiting value added to the clinical exam. Future studies should explore the relationship between type of injury and recovery time in larger samples.

Categories: Concussion/Mild TBI (Child)
Keyword 1: concussion/ mild traumatic brain injury
Keyword 2: child brain injury
Keyword 3: sports-related neuropsychology
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40 APOE x BDNF Genetic Interaction is Associated with Poorer Cognitive Outcomes in Veterans with Histories of mTBI

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Objective: Many Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF) Veterans have sustained a mild traumatic brain injury (mTBI) during their military service and a substantial “miserable minority” frequently report significant cognitive complaints long after injury. Although existing studies have shown associations between genetic factors (e.g., apolipoprotein E [APOE] and brain-derived neurotrophic factor [BDNF]) and cognitive performance in this vulnerable population, the TBI-genetics literature has generally been varied and inconsistent. Although past findings suggest that individuals who possess APOE ε4 and BDNF Met alleles have worse cognitive outcomes after mTBI, this has not been consistently reported. Additionally, the influence of any gene-by-gene interactions on cognition has not been sufficiently explored and therefore remains a critical area of interest. Thus, we examined relationships between APOE and BDNF genotypes on neuropsychological function in a well-characterized sample of younger Veterans with mTBI histories.
Participants and Methods: Participants included Veterans with a history of mTBI who adequately completed performance validity testing. In total, 78 Veterans (84.6% male; age: M=32.95, SD=7.00; race/ethnicity: 51.3% White, 28.2% Hispanic/Latino, and 20.5% Another Race/Ethnicity) completed a structured clinical interview to collect detailed information on TBI history and underwent a comprehensive neuropsychological exam. A buccal swab was also collected to determine APOE and BDNF allele status for each participant. Three cognitive composite scores were computed reflecting memory (8 items), attention/processing speed (7 items), and executive functioning (10 items). Two-way analyses of covariance (ANCOVAs) adjusting for age, sex, and race/ethnicity were used to assess the effects of APOE (ε4+ vs. ε4-) and BDNF (Met+ vs. Met-) on cognitive functioning (ε4+/Met-: n=12, ε4+/Met+: n=8, ε4-/Met-: n=35, and ε4-/Met+: n=23).
Results: ANCOVAs revealed no significant main effects for APOE or BDNF genotypes on cognitive functioning; however, there was a significant APOE x BDNF genotype interaction for all three cognitive composites (memory: p=.026, ηp2=.068; attention/processing speed: p=.045, ηp2=.055; and executive functioning: p=.031, ηp2=.064). Specifically, the interaction was such that Veterans in the ε4+/Met+ group demonstrated the poorest cognitive functioning relative to all other allele group combinations (ε4+/Met-, ε4-/Met+, ε4-/Met-).
Conclusions: The results of this preliminary study demonstrate that, compared to the other genetic subgroups in the TBI sample, Veterans with APOE ε4 and BDNF Met alleles demonstrated the poorest cognitive functioning across several domains known to be negatively affected in the context of head injury (i.e., memory, attention/processing speed, and executive functioning). These findings are the first to show an APOE x BDNF interaction in Veterans with histories of mTBI. Further

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