

concussion network, vomiting was less central and sensitivity to noise and mentally foggy more central.

Conclusions: PCSS network structure at acute post-concussion is altered, suggesting concussion may disrupt symptom networks and certain symptoms' associations with the experience of others after sustaining a concussive injury. Future research should compare PCSS networks later in recovery to examine if similar structural changes remain or return to baseline structure, with the potential that observing PCSS network structure changes post-concussion could inform symptom resolution trajectories.

Categories: Concussion/Mild TBI (Child)

Keyword 1: concussion/ mild traumatic brain injury

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65 Examining Neuropsychological Outcomes Among Youth Concussion Patients With and Without Neurodevelopmental Learning Disorders

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Objective: The increasing incidence rates of concussive injuries, specifically among the youth age demographic, has led to the Center for Disease Control and Prevention to classify these injuries as a "silent epidemic." While symptoms from concussion typically remit within four weeks, many experience symptoms that persist beyond what is typically expected. For children, the persistence of symptoms can have damaging side-effects that impact daily functioning and the progression through developmental and educational milestones. Recent research highlights factors that modify the nature of outcomes after a concussive injury. For youth-aged individuals, one such factor is the presence of premorbid conditions. A growing body of research suggests children with learning disorders (LDs) may be more susceptible to negative symptom outcomes across neuropsychological domains. Therefore, the purpose of this study is to further examine the

influence of developmental learning disorders on concussion outcomes among youths.

Participants and Methods: Youths between 7 and 19 years of age that sought care at a concussion specialty clinic were screened for inclusion in the current study. The final sample included 54 patients who reported having a neurodevelopmental LD between the ages of 8 and 17 and 54 patients without LDs matched on age, race/ethnicity, and gender to serve as paired case-controls. Measures of post-concussive physical symptoms (Modified Balance Error Scoring System; Quality of Life in Neurological Disorders: Neuro-QoL-SD, Neuro-QoL-F), emotional state (BAI, BDI), parent report measure of behavioral manifestations of cognitive functioning (Behavioral Rating Inventory of Executive Function), and select measures from the CogState automated test battery (i.e., One-Back, Two-Back, Groton Maze Learning, and Groton Maze Recall) were administered during the patient's first examination at the clinic. Patients were instructed by the provider to follow-up at the clinic between two-three weeks for a repeat examination. The current study examined concussion outcome variables via two (group: LD, control) by two (time: initial examination, follow-up examination) repeated measures ANCOVAs where time between injury and the first examination was included as a covariate to control for the duration of elapsed days since injury.

Results: Regarding cognitive symptoms, parent reported behaviors associated with executive functioning symptoms increased over time to reach clinically significant levels for the LD group, while symptoms decreased and remained within normal limits for the control group. Performance-based measures of cognition revealed no significant interactions or group/time differences. Additionally, the LD group showed more intense balance problems compared to the control group and symptom trends suggest LD participants may be more susceptible to prolonged, clinically significant, balance problems. With respect to sleep disturbances and fatigue, symptoms remained within normal limits across groups and time. Depression and anxiety symptoms remained within normal limits across groups and time as well.

Conclusions: Results highlight more intense balance problems and parent-reported executive dysfunction following concussion for youths with LDs compared to those without LDs. Additionally, though not significantly different

than the control group, results reveal several symptom domains in which the level of dysfunction meets clinical significance for the LD group participants only. As such, this study highlights the continued need for the scientific study of risk factors for vulnerable populations to aid in assessment and prevention efforts, especially for youths with LD.

Categories: Concussion/Mild TBI (Child)

Keyword 1: concussion/ mild traumatic brain injury

Keyword 2: learning disabilities

Keyword 3: neuropsychological assessment

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67 Extending Evidence of Validity for Symptom Severity Classification of the PostConcussion Symptom Inventory (PCSI)

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Objective: External validation of symptom severity classification levels for the PostConcussion Symptom Inventory (PCSI).

Participants and Methods: Two distinct samples of parents and children, ages 8-18, participated from a: (1) prospective multicenter cohort study (Predicting Persistent Post-concussive Problems in Pediatrics, 5P) (Zemek et al., 2016), including parents (n=2,852), adolescents (n=1,087; mean age=15.13; 54% male), and children (n=1,271; mean age=10.70; 65% male) and (2) published clinic sample at Children's National Hospital (CN) including parents (n=1,197; adolescents, n=835; children, n=326) (Gioia et al., 2019). Participants completed the age-specific Post-Concussion Symptom Inventory (PCSI): Mean time post-injury = 8 hours (5P), 6 days (PCSI2), generating a post-pre-injury difference (RAPID) score. The distribution of the RAPID scores for the Total Symptom and 4 subscales (physical, emotional, cognitive, sleep/fatigue) were

examined to define 4 symptom severity classification levels (minimal – within the CI for recovered, low <20th %tile, moderate 21-79th %tile, high >80th %tile) for the respective samples. These severity distributions were compared between the two distinct datasets.

Results: ANOVAs were performed to examine group differences in the mean scores for each of the 4 classification levels. No significant differences were found for all the RAPID score distributions with minimal effect sizes (<.1% variance) for the parents, adolescents and children. PCSI RAPID Total Score ranges for the severity classifications were as follows: Minimal-Parent and adolescent groups 5P<=5, Clinic <=5; Children: 5P<=3, Clinic<=3; Low- Parents 5P 6-15, Clinic 6-13; Adolescents 5P 6-19, Clinic 6-16; Children: 5P 4-7, Clinic: 4-7; Moderate-Parents 5P 16-49, Clinic 14-47; Adolescents 5P 20-56, Clinic 17-51; Children 5P 8-17, Clinic: 8-18; High- Parents: 5P>=50, Clinic >=48; Adolescents 5P >=57, Clinic >=52; Children 5P >=18, Clinic >=19).

Conclusions: Our findings reveal a parallel distribution of RAPID scores in the two distinct 5P and Clinic patient populations, yielding nearly identical severity classification level parameters across all five PCSI symptom domains (total score, physical, cognitive, emotional, and sleep/fatigue). The present investigation provides evidence of validity for the use of these severity classification levels across the ED and specialty clinic settings.

Categories: Concussion/Mild TBI (Child)

Keyword 1: concussion/ mild traumatic brain injury

Keyword 2: pediatric neuropsychology

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68 The Impact of Pain Catastrophizing on Neuropsychological Performance in Youth with Persistent Post Concussive Symptoms

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