elevated BRIEF-2 scores. Disrupted EF development may be more noticeable after longer time periods as children age and self-regulatory demands increase. Overall, OPN was found to more consistently predict EF outcomes than GCS score and other injury markers. This could be because OPN is a marker of inflammation, which may be particularly predictive of TBI cognitive outcomes.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: traumatic brain injury
Keyword 2: executive functions
Keyword 3: child brain injury
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34 Severity of Traumatic Brain Injury Predicts Neurobehavioral Outcomes and White Matter Microstructure

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Objective: Pediatric traumatic brain injury (TBI) is the leading cause of disability in children under the age of 15, often resulting in executive function deficits and poor behavioral outcomes. Damage to white matter tracts may be a driving force behind these difficulties. We examined if whether 1) greater TBI severity was associated with worse neurobehavioral outcome, 2) greater TBI severity was associated with tract-based white matter microstructure, and 3) worse neurobehavioral outcome was associated with white matter microstructure.
Participants and Methods: Twelve children with complicated-mild TBI (cmTBI; Mage=12.59, nmale=9), 17 with moderate-to-severe TBI (msTBI; Mage =11.50, nmale=11), and 21 with orthopedic injury (OI; Mage =11.60, nmale=16), 3.94 years post injury on average, were recruited from a large midwestern children's hospital with a Level 1 Trauma Center. Parents completed the Behavior Rating Inventory of Executive Function (BRIEF) and Child Behavior Checklist (CBCL) while children completed 64-direction diffusion tensor imaging in a Siemens 3T scanner. White matter microstructure was quantified with FMRIB's Diffusion Toolbox (FSLv6.0.4). Tract-Based Spatial Statistics computed fractional anisotropy (FA) and mean diffusivity (MD) for the cingulum bundle (CB), inferior fronto-occipital fasciculus (IFOF), superior longitudinal fasciculus (SLF), and uncinate fasciculus (UF), bilaterally.
Results: Group differences were assessed using one-way ANOVA. Children with msTBI were rated as having worse Sluggish Cognitive Tempo on the CBCL than children with cmTBI and OI (p=.02, eta2=.143); no other parent-rated differences reached significance. Group differences were found in left SLF FA (p=.031; msTBI<cmTBI=OI) and approached significance in left UF FA (p=.062, eta2=.114; msTBI<OI). Group differences were also found in right IFOF MD (p=.048; msTBI>OI) and left SLF MD (p=.013; msTBI>cmTBI=OI). Bivariate correlations assessed cross-domain associations. Higher left IFOF FA was associated with better BRIEF Metacognitive Skills (r=-.301, p=.030) and CBCL School Competence (r=.280; p=.049). Higher left SLF FA was associated with better BRIEF Behavioral Regulation and Metacognitive Skills (r=-.331, p=.017 and r=-.291, p=.036, respectively), and CBCL School Competence and Attention Problems (r=.398, p=.004 and r=-.435, p=.001, respectively). Similarly, higher right UF FA was broadly associated with better neurobehavioral outcomes, including Behavioral Regulation and Metacognitive Skills (r=-.324, p=.019 and r=-.359, p=.009, respectively), and School Competence, Attention Problems, and Sluggish Cognitive Tempo (r=.328, p=.020, r=-.398, p=.003, and r=-.356, p=.010, respectively). Higher right CB MD was associated with worse Behavioral Regulation (r=.327, p=.018) and more Attention Problems (r=.278, p=.046); higher left and right SLF MD was associated with Sluggish Cognitive Tempo (r=.363, p=.008, r=.408, p=.003, respectively).
Conclusions: Children with TBI, particularly msTBI, were rated as having cognitive slowing; while other anticipated group differences in neurobehavioral outcomes were not found, this

appears driven by milder difficulties in cmTBI and OI groups. In fact, across CBCL and BRIEF subscales, children with msTBI were rated as approaching or exceeding a full standard deviation deficit based on normative data. TBI severity was also associated with white matter microstructure and cross-domain associations linked microstructure with observable neurobehavioral morbidities, suggesting a possible mechanism post-injury. Future longitudinal studies would be useful to examine the temporal evolution of deficits.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: child brain injury
Keyword 2: cognitive functioning
Keyword 3: brain structure
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35 Preliminary reliability of the Coma Recovery Scale, Revised (CRS-R) in children with a history of disorders of consciousness after acquired brain injury

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Objective: The Coma Recovery Scale-Revised (CRS-R) is the gold standard assessment of adults with disorders of consciousness (DoC); however few studies have examined the psychometric properties of the CRS-R in pediatric populations. This study aimed to demonstrate preliminary intra-rater and inter-rater reliability of the CRS-R in children with acquired brain injury (ABI).
Participants and Methods: Participants included 3 individuals (ages 10, 15, and 17 years) previously admitted to an inpatient pediatric neurorehabilitation unit with DoC after ABI who were followed in an outpatient brain injury clinic due to ongoing severe disability. ABI etiology included traumatic brain injury (TBI; n=2) and encephalitis (n=1). Study participation took place on average 4.6 years after injury (range 2-9). The Glasgow Outcome Scale-Extended, Pediatric Version (GOS-E Peds), a measure of outcome after pediatric brain injury, was administered as part of screening. Two participants were placed in the GOS-E Peds “lower severe disability” category (i.e., score of 6) and one was placed in the “upper severe disability” category (i.e., score of 5). The CRS-R includes 6 subscales measuring responsivity including Auditory (range 0-4), Visual (range 0-5), Motor (range 0-6), Oromotor/Verbal (range 0-3), Communication (range 0-2), and Arousal (range 0-3) with higher scores indicating higher-level function. Subscales are totaled for a CRS-R Total score. Behaviors shown during the CRS-R are used to determine state of DoC [Vegetative State (VS), Minimally Conscious State (MCS) or emergence from a minimally conscious state (eMCS)] based on 2002 Aspen Guidelines. Participants were administered the CRS-R three consecutive times on the same day. Administrations were completed by two raters in this order: Rater 1 (1A), Rater 1 (1B) and Rater 2. Intra-rater reliability was deemed by percent agreement across the 6 subscales between Rater 1A and 1B. Inter-rater reliability was deemed by percent agreement across the 6 subscales between 1A and 2.
Results: Mean CRS-R Total score for Rater 1A was 22 (SD=1.73, range 20-23), Rater 1B was 22 (SD=1.73, range 20-23), and Rater 2 was 21.33 (SD=2.08, range 19-23). Intra-rater reliability was 100% and inter-rater reliability was 94% across all subscales. All participants were deemed eMCS at all 3 ratings.
Conclusions: Data from this very small sample of children suggests that the CRS-R demonstrates both intra-rater and inter-rater reliability in patients with a history of DoC after ABI. Given that all children were at the high end of the scale (eMCS), further research is needed with a larger sample of children with a range of states of DoC.

Categories: Acquired Brain Injury (TBI/Cerebrovascular Injury & Disease - Child)
Keyword 1: psychometrics
Keyword 2: brain injury
Keyword 3: test reliability
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36 Exploring Neuropsychological Care for Pediatric Patients in Neurocritical Care and Outpatient Follow-Up

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