Changes in emotional and behavior problems, and brain morphometry following mild traumatic brain injury in early adolescence: A pre-post study design

Fanny Dégeilh, Tilmann von Soest, Lia Ferschmann, Christian K Tamnes

To cite this version:


HAL Id: inserm-03740432
https://www.hal.inserm.fr/inserm-03740432
Submitted on 29 Jul 2022
Introduction
Studies comparing children with and without a traumatic brain injury (TBI) have shown that pediatric TBI is associated with difficulties in a large range of functional domains, including emotion and behavior (Catroppa et al., 2015), as well as with changes in brain morphometry (King et al., 2019). However, whether these differences already existed before the injury remains an unsolved question. The large population-based Adolescent Brain Cognitive Development (ABCD) Study (Casey et al., 2018) provides a rare opportunity to explore it.

Objectives & hypothesis
This pre-post design study aims to examine changes in emotional and behavioral problems, and brain morphometry following pediatric mTBI. Given its exploratory nature, no a priori hypothesis is formulated.

Methods
The following baseline and 2-year follow-up data from the ABCD 4.0 curated data release will be used: 1) The Parent Ohio State TBI Screen-Short Modified report (Bogner et al., 2017) to identify children with no-TBI (n=6,394; baseline mean age = 9.9 years; 3102 girls) and children who sustained a mild TBI between baseline and 2-year follow-up (n=132; baseline mean age = 9.9 years; 58 girls); 2) The syndrome scales of the Child Behavior Checklist (Achenbach & Rescorla, 2000), and 3) Volumes and cortical thickness in 68 Desikan regions (Desikan et al., 2006) computed on T1-weighted images by the ABCD group. Scanner effects will be removed before analyses using longitudinal ComBat (Beer et al., 2020). Sex and parental education will be included as covariates.

Analysis plan
Multigroup latent change score models will be constructed with the lavaan 0.6-8 package (Rosseel, 2012) to estimate latent difference scores between baseline and follow-up for child behavior and brain structure. Group differences in 4 parameters of interest (mean of the baseline score, rate of change over time, and variances of the baseline and of the change) will be tested using chi-square difference tests (Kievit et al., 2018).