The relationship between self-reported anxiety and cognition in individuals with mild traumatic brain injury
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Purpose
Mild traumatic brain injury (mTBI) is an often overlooked injury in the US, and anxiety is often a co-morbid symptom (Lamontagne et al., 2021). The goal of this study was to determine the relationship between anxiety and cognition in adults with mTBI by investigating processing speed performance of individuals with mTBI and self-reported anxiety as measured by the Neurobehavioral Symptom Inventory (NSI) compared to individuals with mTBI and no self-reported anxiety. Processing speed performance was measured using the Weschler Adult Intelligence Scale (WAIS-IV) Processing Speed Index. As exploratory measures, we included measures of cognition (National Institute of Health [NIH] Toolbox Cognition Battery) and language (Controlled Oral Word Association Test [COWAT]).

Study Aim
Aim: To determine whether there is a significant difference between cognitive performance among adults with mTBI and anxiety compared to adults with mTBI without anxiety.

Hypothesis: We predict that adults with mTBI and anxiety will perform significantly poorer on measures of cognitive performance when compared to adults with mTBI without anxiety.

Methods
- **Design:** Retrospective study
- **Setting:** Academic medical center in South Texas
- **Participants:** Two groups were included in the study: mTBI with anxiety and mTBI without anxiety. Those who scored a 0, 1, or 2 on the NSI questionnaire question #19, “feeling anxious or tense” were included in group one (mTBI – anxiety) and those who scored a 3 or 4 were included in group two (mTBI + anxiety).
- **Procedures:** Participants were recruited from UTSHA and the local community via flyers, social media postings and a university hosted recruitment website “Find-A-Study” from February 2018 to February 2020. Interested individuals provided oral consent to determine eligibility via telephone screen and enrollment in the study was based on the inclusion and exclusion criteria (Table 1). Participants completed the NSI, NIH Cognition Toolbox, COWAT, and WAIS-IV during an in-person study appointment with lab personnel. Questionnaires were completed on paper and NIH Toolbox was administered via IPAD. The WAIS-IV and COWAT measures were completed using the traditional administration methods as described in the respective test administration manuals.

**Analyses:** Data were analyzed using SPSS version 29. Independent sample t-tests and Pearson correlation analyses were performed on the final data set.

Results
A total of 109 individuals were included in the final sample with 92 participants in the no anxiety group and 17 in the anxiety group. The WAIS-IV Processing Speed Index score, the NIH Toolbox Cognition Battery composite score fully corrected, and the COWAT standard score are reported for each group.

Analyses revealed significantly different WAIS-IV processing speed scores $t(107) = 2.297, p = .012$ between participants with mTBI and anxiety and participants without anxiety.

There were no significant differences in NIH Cognition Battery or verbal fluency scores (Table 2). Using a Pearson correlation, anxiety and processing speed performance were found to be negatively correlated, $r = -.217, p<0.05$ (1-tailed).

Discussion
Results of this study suggest that adults with mTBI without anxiety symptoms outperform those with mTBI and anxiety on measures of processing speed. However, we did not observe this phenomenon in measures of verbal fluency or general cognition. Future studies should further explore the significant connection between anxiety symptoms and processing speed in adults with mTBI.

One limitation of this study is the significant difference in sample size between the two groups. With equal group sizes, the average scores between the NIH Cognition Toolbox, WAIS-IV PSI, and COWAT could be more equally compared.

References


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