

Cognition and Academic Performance of Division II Football Players During Noncompetitive and Competitive Seasons

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Introduction

Background:

- Repetitive head impacts (RHIs) are multiple sub-concussive forces that may result from either a direct or indirect impact to the head or body over a period of time that result with no presence of symptoms immediately following the mechanism.
- Football players are at an increased risk of repeated head injuries.
- Athletes who have experienced RHIs are hypothesized to have increased negative effects on their academic tolerance, mental health, and cognition compared to their peers.

Purpose:

- The purpose of this study is to compare the cognition, mental health, and academic tolerance of Division II football players during a non-competitive (2020) and competitive (2021) season.

Methods

Participants:

- 30 Division II football players from Concordia University, St. Paul with a mean age of 20.5 +/- 1.22 years and a range of 19 - 23.

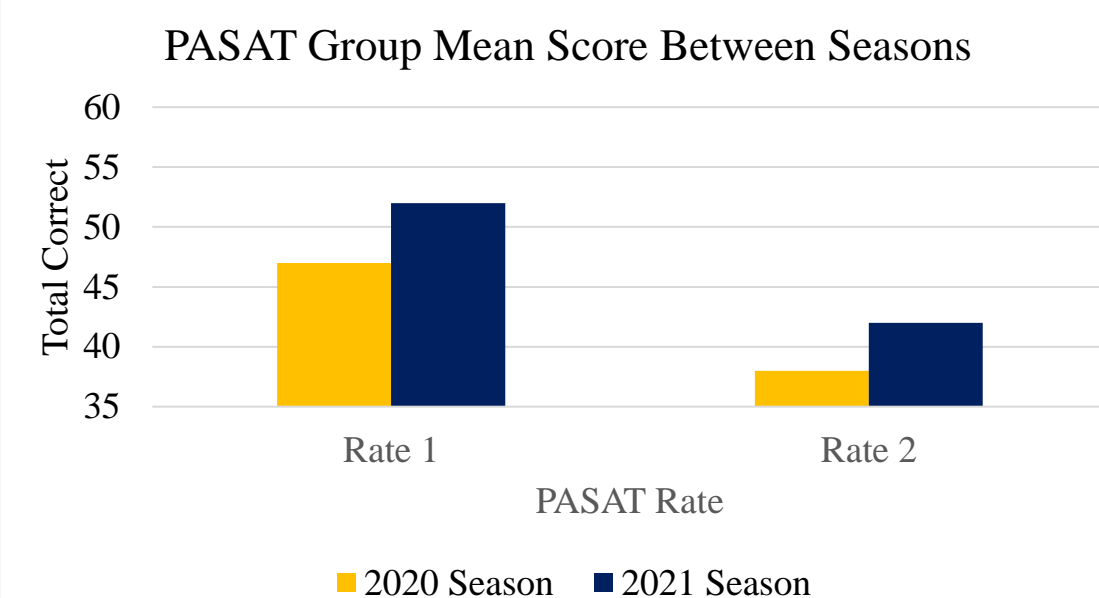
Tests and Measures:

- Paced Auditory Serial Addition Test (PASAT) for working memory
- Center for Epidemiological Studies Depression Scale (CES-D)
- Demographic survey
- Personal interview

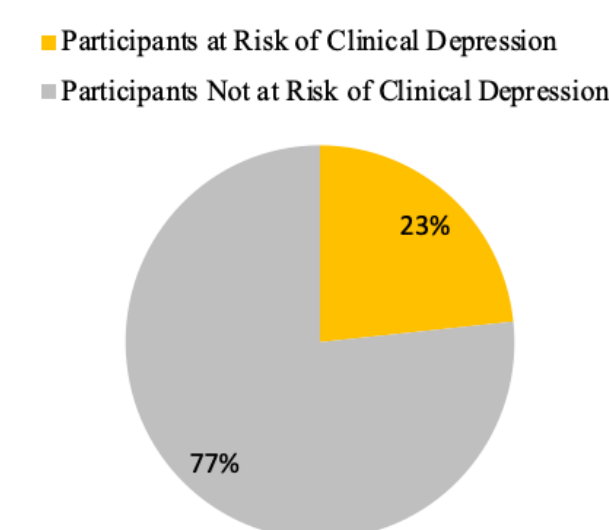
Data Analysis:

- Qualitative interviews were recorded, transcribed and de-identified then coded and analyzed on NVIVO-12
- PASAT and CES-D data were both analyzed on SPSS-28, using a Wilcoxon Signed Rank Test

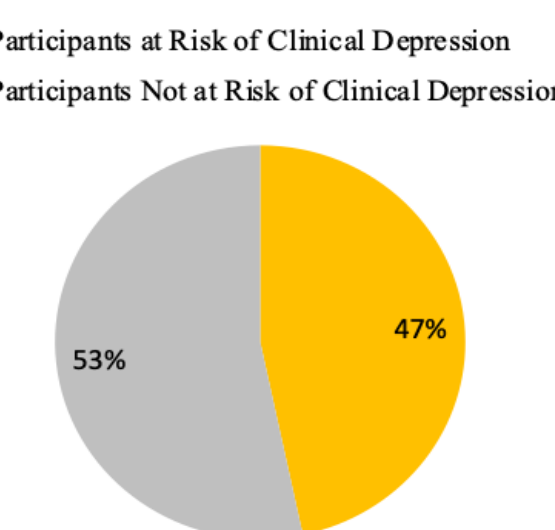
Results



2020 SEASON



2021 SEASON



Major Themes

- Effortful Mental Activity:** Cognitive exertion associated with prolonged academic demand.
- Attention:** The ability to sustain focus on a given task.
- Sensitivity to Stimuli:** Increased responsiveness or vulnerability to sensory input.
- Headaches:** A painful sensation localized to the head region.
- Slow Processing:** Increased time required to interpret, process, and respond to information or stimuli.
- Fatigue:** Physical or mental exhaustion due to internal or external sources.
- Memory:** The ability to recall past events or facts learned previously.
- Sleep Difficulty:** Inconsistent or frequently interrupted sleeping habits.

Theme Quotes

- "I have difficulty if it's going to take longer and it might not be as good of work"*
- "It's the sitting down and staring and listening for a long time. It's tough for me to stay focused on that type of stuff."*
- "I could only work a little bit of the time on a computer because it would just get worse and worse whenever I was on it"*
- "I feel pressure in my head and in my ears, sometimes around my eyes...and that would make me want to put my head down and not pay attention."*
- "And then I feel a little bit slow maybe a month or so after"*
- "In school, sometimes you have drowsiness or feeling slowed down"*
- "I tend to just not remember in the classroom during football season"*
- "I take melatonin like a sleep script."*

Conclusion

- While group cognition scores increased between years, some participants consistently scored below the age and education-based normative mean score.
- Players continue to complain of cognitive changes and worsening depressive symptoms that are consistent with what is expected from an individual suffering from a concussion though players were not actively concussed at the time of measurement.

Clinical Relevance

- There is a potential for cognition to heal or improve as evidenced by the improvement in group cognitive scores, but the long-term effects are still largely unknown.
- There may be a neuroprotective effect of exercise, as well as a high learning effect associated with the PASAT that may have impacted results.
- Depressive symptoms worsened over time which should warrant further study.
- The potential for academic struggles from RHI for collegiate football players should not be ruled out despite quantitative findings.

Acknowledgments

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