

present study aimed to examine the effects of competitive participation in the United States' four most popular sports on executive function among youth athletes. The most popular sports, as defined by viewership, revenue, and youth participation in the U.S. are American football, basketball, baseball, and soccer (Injai, 2022; Aspen Institute, 2020).

Participants and Methods: Data from the following three executive functioning subtests were analyzed in a sample of youth athletes ($n=76$), aged 8-18 years (mean age=11.94): Delis-Kaplan Executive Function System Trail Making Letter-Number Sequencing (cognitive flexibility), Wechsler Intelligence Scale for Children Fourth Edition Working Memory Index, and Golden Stroop Color-Word Inhibition. Participants completed these measures as part of a larger neuropsychological baseline assessment. Multivariate General Linear Model (GLM) regression was used to examine the influence of total cumulative years playing in one or more of the four most popular sports on executive functioning. A multivariate GLM regression also investigated the unique contributions of total years playing soccer ($n=40$; mean age=12.40) and total years playing American football ($n=32$; mean age=12.03) on subtest performance. The unique contributions of basketball ($n=14$) and baseball ($n=21$) were not analyzed due to small sample size.

Results: Total cumulative years playing \geq one of the four most popular sports significantly predicted cognitive flexibility ($p=.007$) and working memory ($p=.002$), but not inhibition ($p=0.639$). Total years playing soccer also significantly predicted cognitive flexibility ($p=.029$) and working memory ($p=0.05$), but not inhibition ($p=.310$). Total years playing American football did not significantly predict performance on tasks requiring cognitive flexibility ($p=.186$), working memory ($p=0.150$), or inhibition ($p=0.277$).

Conclusions: In congruence with previous research, sports participation predicted enhanced cognitive flexibility and working memory on certain executive tasks. Among youth athletes, prolonged competitive participation in one or more of the four most popular sports in the U.S. predicted better performance on measures of cognitive flexibility and working memory. Furthermore, protracted participation in soccer predicted enhanced performance on measures of cognitive flexibility and working memory, whereas extended participation in American football did not. Future

research should examine this effect in larger samples within all four sports. Examining the cumulative length of competitive participation in these popular sports on executive function could present a favorable developmental outcome of youth participation if competitive participation is sustained. Additionally, the present data on executive function performance between lasting soccer participation and lasting American football participation suggests that executive function development and performance may be influenced by the sport played. The direction of this possible influence is unclear. More research is needed to establish this observed difference, and to better understand its existence and directionality.

Categories: Executive Functions/Frontal Lobes

Keyword 1: executive functions

Keyword 2: sports-related neuropsychology

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88 Light and Vigorous Bouts of Acute Aerobic Exercise Positively Impact Sustained Attention and Inhibition but not Pattern Separation in Young Adults

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Objective: The current study had two primary objectives: 1) To assess the dose-response relationship between acute bouts of aerobic exercise intensity and performance in multiple cognitive domains (episodic memory, attention, and executive function) and 2) To replicate and extend the literature by examining the dose-response relationship between aerobic exercise intensity and pattern separation.

Participants and Methods: 18 young adults (mean age = 21.6, $sd = 2.6$; mean education = 13.9, $sd = 3.4$; 50% female) were recruited from The Ohio State University and surrounding area

(Columbus, OH). Participants completed control (no exercise), light intensity, and vigorous intensity exercise conditions across three counterbalanced appointments. For each participant, all three appointments occurred at approximately the same time of day with at least 2 days between appointments. Following the rest or exercise conditions and after an approximately 7 minute delay, participants completed a Mnemonic Similarity Task (MST; Stark et al., 2019) to assess pattern separation. This task was always administered first as we attempted to replicate previous studies and further clarify the relationship between acute bouts of aerobic exercise and pattern separation by implementing an exercise stimulus that varied in intensity. After the MST, three brief cognitive tasks (roughly 5 min each) were administered in a counterbalanced order: a gradual-onset continuous performance task (gradCPT; Esterman et al., 2013), the flanker task from the NIH toolbox, and a face-name episodic memory task. Here we report results from the gradCPT, which assesses sustained attention and inhibitory control. Heart rate and ratings of perceived exertion were collected to validate the rest and exercise conditions. Repeated-measures ANOVAs were used to assess the relationship between exercise condition and dependent measures of sustained attention and inhibitory control and pattern separation.

Results: One-way repeated-measures ANOVAs revealed a main effect of exercise condition on gradCPT task performance for task discrimination ability (d') and commission error rate (p 's < .05). Pairwise comparisons revealed task discrimination ability was significantly higher following the light intensity exercise condition versus the control condition. Commission error rate was significantly lower for both the light and vigorous exercise conditions compared to the control condition. For the MST, two-way repeated-measures ANOVAs revealed an expected significant main effect of lure similarity on task performance; however, there was not a significant main effect of exercise intensity on task performance (or a significant interaction).

Conclusions: The current study indicated that acute bouts of exercise improve both sustained attention and inhibitory control as measured with the gradCPT. We did not replicate previous work reporting that acute bouts of exercise improve pattern separation in young adults. Our results further indicate that vigorous exercise did not detrimentally impact or improve pattern

separation performance. Our results indicate that light intensity exercise is sufficient to enhance sustained attention and inhibitory control, as there were no significant differences in performance following light versus vigorous exercise.

Categories: Executive Functions/Frontal Lobes

Keyword 1: executive functions

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89 Depression and Executive Function in a Mexican Population

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Objective: Depression is a mood or emotional state that is characterized by feelings of sadness (i.e., a loss of interest in activities, low self-worth) for a minimum of two weeks. Executive function is a set of mental processes that are necessary for cognitive control of behavior to achieve and successfully execute a specific goal (e.g., inhibition). Researchers have reported that people with abnormal symptoms of depression (ASD) demonstrate worse executive functioning abilities (e.g., planning) compared to persons with normal symptoms of depression (NSD). Currently, there is a lack of research studies examining how depressive symptoms influence executive functioning in people that identify as Mexican. The purpose of the present study was to evaluate the influence of depression on executive functioning in a healthy Mexican