Relationship Between Pickleball-playing and Cognition Among Older Adults: An 18-month Longitudinal Study

Abbie Hutton

Faculty: Rui Ni

Department of Psychology, Fairmount College of Liberal Arts and Sciences

INTRODUCTION: Inevitably, physical and cognitive abilities decline with age. The population of those over the age of 65 is currently doubling, so care of this population needs to increase (Passel & Cohn, 2008). Cognitive functioning is crucial when carrying out basic tasks. Contrary to previous literature on traditional aerobic exercises, open skill exercise (e.g. racquet sports), involving complex movements and an unpredictable environment, have be shown to improve cognitive functioning (Guo et al., 2016; Jafarzadehpur et al., 2012). Pickleball is one of the most rapidly growing sports in the U.S. and is recommended for older adults because of the smaller court size, social interaction, and is easy to learn, yet is moderate in intensity (Ryu et al., 2018). Previous research on pickleball lacks how it affects cognition

PURPOSE: The purpose of this study was to determine if an open skilled exercise, such as pickleball, can have more benefits than traditional aerobic exercise. We hypothesized that older adults who participate in regular pickleball-playing will show greater cognitive improvements than aerobic exercise.

METHODS: A non-experimental, longitudinal study was used to compare 83 healthy older adults between the ages of 55 and 85. The participants were assigned into groups based on exercise characteristics (advanced pickleball (AP), novice pickleball (NP), aerobic (AE), and inactive (IN)). A battery of four baseline and four cognitive assessments (Multiple object tracking-MOT), Useful Field of View-UFOV), Flanker, & N-back) were given at the pre-test, six-month, and 18-month sessions. An attrition rate of 62.7% occurred on the 18-month post-test.

RESULTS: A mixed modeling approach was used to analyze the relationship between exercise group and processing speed (UFOV), response time (Flanker), accuracy (MOT), and accuracy (N-back). <u>UFOV</u>: The AE group had faster processing speed ($b = -0.14$, $SE = 0.05$, $t = -2.74$, $p = 0.01$) and the IN had slower processing speed ($b = 0.09$, $SE = 0.05$, $t = 1.79$, $p = 0.08$). Overall, participants had faster processing speeds at the 18-month post-test ($b = -0.03$, $SE = 0.02$, $t = -1.92$, $p = 0.06$) when compared to the overall mean. <u>Flanker</u>: Participants had slower response times at the 18-month posttest ($b = 0.02$, $SE = 0.002$, $t = 9.5$, $p < 0.000$). The IN group had slower response times compared to the overall mean ($b = 0.08$, $SE = 0.03$, $t = 2.7$, $p = 0.0097$). <u>MOT</u>: The AP group was more accurate ($b = 0.58$, $SE = 0.20$, $z = 2.97$, $p = 0.03$) and the IN group was less accurate ($b = -0.45$, $SE = 0.18$, $z = -2.46$, $p = 0.01$) when compared to the overall mean. <u>N-back</u>: The model indicated no significant differences in accuracy on the N-back task.

CONCLUSION: Cognitive aging is unavoidable, but there are ways to maintain the quality of life. Pickleball can not only improve physical well-being and life satisfaction, but can potentially improve cognitive functioning.