

FOOTBALL PRACTICE IN MALES AND FEMALES ADOLESCENTS: FIT, SMART AND VIGILANT

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I. Introduction

The study of the effects of physical exercise on cognitive processing is increasing in recent years. Many studies show how physical exercise modulates cognitive processes in different population groups¹. Here, we focused on football practice and physical fitness level as a key factors involved in vigilance and academic achievement in female and male adolescents.

II. Method

Two groups of participants (n=75) aged from 13 to 14 years old (13.7±0.6) were selected on the basis of their training habits. Participants were evaluated in two separate occasions. On the Psychological Assessment session, participants completed the Psychomotor Vigilance Task². On the Fitness Assessment Session, participants performed the Leger Multi-stage fitness test. Additionally, the final mean course grade (0 to 10) from the recent semester was recorded for each participant. Two-tailed t-tests for independent samples were used to compare the two groups.

III. Results

The analyses revealed that the two groups significantly differed in terms of fitness level: VO_{2max} , $t(73) = 11.07$, $p < .001$. The two groups also were different in *Resting HR*, $t(73) = 7.19$, $p < .001$, $d = 2.4$; but not in *BMI*, $t(73) = 0.06$, $p = .94$.

The results also revealed significant difference ($p < .001$) between groups in terms of psychological measurements. Footballers responded faster and

committed fewer lapses than non-athletes: *MeanRT*, $t(73)= 4.04$, *10% Fastest Responses*, $t(73)= 3.33$, *Number of Lapses* (>500ms responses), $t(73)= 4.08$, *Mean Academic Grade* $t(73)= 3.18$, was also significantly greater for the athletes comparing with non-athletes.

Regarding sex differences, we found significant differences ($p<.001$) between males athletes and females non-athletes in *VO₂max*, $t(37)= 12.56$, *MeanRT*, $t(39)= 2.97$, *10% Fastest Responses*, $t(39)= 3.90$, *Number of Lapses*, $t(39)= 3.32$ and marginal differences in *Mean Academic Grade*, $t(39)= 2.02$, $p<.05$ interestingly enough, we only found differences between males and females athletes in *VO₂max*, $t(37)= 2.81$, $p<.001$.

IV. Conclusion

Football systematic practice was considered in this research as an important variable mediating physical fitness and influencing the vigilance and academic performance in the adolescence. The results confirmed our predictions showing better academic achievement and improved performance in the PVT in football practice group than in the non-athletes group.

Regarding sex differences our results are in line with Silverman³, who has proposed that the engagement of girls in fast-action sports is one reason for decreased differences between the sexes in simple visual reaction time across time.

Crucially, the present study, together with previous research⁴, point to the important role of sports practice and aerobic fitness level on cognitive performance in general and vigilance in particular.

V. References

1. Hillman, C. H.; Erickson, K. I.; Kramer, A. F. (2008). Be smart, exercise your heart: exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9 (1), pp. 58-65.
2. Wilkinson, R. T.; Houghton, D. (1982). Field test of arousal: a portable reaction timer with data storage. *Human factors*, 24 (4), pp. 487-493.
3. Silverman, I. (2006) Sex differences in simple visual reaction time: a historical meta-analysis (sports events). *Sex Roles: a Journal of Research*, 54 (1-2), pp. 57-68.

4. Chaddock, L.; Pontifex, M. B.; Hillman, C. H.; Kramer, A. F. (2011). A review of the relation of aerobic fitness and physical activity to brain structure and function in children. *Journal of the International Neuropsychological Society*, 17 (6), pp. 975-985.

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