

## Physical performance in high school students: effect of chronotype

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Morningness-Eveningness (M-E) is an individual characteristic, defined as chronotype. People are typically categorized in 3 different chronotypes: Morning, Evening and Neither types (M, E and N-types), which differ in the circadian rhythm of many physiological variables. M-types use to wake up and go to bed early and to have their best performances in the first part of the day, otherwise E-types go to bed and wake up late and they have the peak performances in the evening. The chronotype is influenced by both individual and environmental factors and gradually changes during human development. Many studies have demonstrated a trend beginning with a tendency toward morningness in children that gradually evolves into a shift toward eveningness. Approximately at the age of 20 years, this shift reaches its maximum and starts to decline, leading to a growing tendency toward morningness from midadulthood on. This more pronounced eveningness has been found to negatively affect adolescents' sleep and daytime functioning; even physical performance of adolescents can vary throughout the day because sleep pressure increases, the input from the circadian timing system is optimal or non-optimal to perform the task or both of them. In this study participated 216 students, 124 males and 92 females, attending the first two high school classes (mean age 14-15 years). For the assessment of chronotype, all students compiled the Morningness-Eveningness Questionnaire (MEQ), validated by Horne and Ostberg in 1976. For all subjects we collected anthropometric data (weight, height, BMI). All the subjects were categorized as M (n=22), N (n=165), and E-types (n=29). To assess the relationship between chronotype and physical performance, from the sample we recruited 51 subjects, 22 M-type (14 males and 8 females) and 29 E-types (18 males and 11 females), who carried out three Eurofit tests (SHR, Shuttle Run; SBJ, Standing Broad Jump; Cooper endurance test). Preliminary results, although showing some differences in physical performance between E and M chronotype, have not detected statistically significant differences between the two groups.

### References

- [1] Hagenauer et al. (2012) The neuroendocrine control of the circadian system: Adolescent chronotype. *Front Neuroendocrinol* 33: 211-229.
- [2] Schlarb et al. (2014) Chronotype-related differences in childhood and adolescent aggression and antisocial behavior - A review of the literature. *Chronobiol Int* 31 (1):1-16.

### Keywords

Adolescent; chronotype; performance.