MODELING DAILY WALKING LEVELS. A MULTILEVEL APPROACH
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The purposes of this study were: (1) to describe daily walking levels of youngsters; (2) its behavior using a multilevel approach, and (3) to verify the influence of gender, age and BMI in interindividual variation.

Sample size comprises 249 students aged 10 to 19 years old, that were monitored for their daily walking behaviors during 5-6 days (Thursday, Friday, Saturday, Sunday, Monday and Tuesday). An electronic pedometer (Yamax Digi-Walker SW 700) was attached to their waist to provide information regarding daily number of steps, distance covered (in Km), and energy expenditure (in Kcal). Since longitudinal data was gathered, and predictors at the individual level were available, we use the HLM 6.02 software for all data analysis. Within the multilevel framework, longitudinal observations (5-6 time points) are at level 1, and covariates related to subjects (age, sex and BMI) are at level 2; here observations are nested within subjects and this data structure is very well suited to be fitted with a set of hierarchical models.

Reliability estimates for the mean values of the three variables were moderate-to-high: number of steps, R=0.72, Km, R=0.80, and Kcal, R=0.76. We fitted a series of nested models and found a polynomial of the third degree as the best fit for the daily walking behavior across the 5-6 days (this was check using graphical and statistical approaches based on the Deviance statistic). Having a wave-like pattern, we identified a decline in walking and energy expenditure during the weekend. Data showed a strong intraindividual variation across days, as well as interindividual differences in subjects’ trajectories.

The mean number of steps was 10,987±358, and males walk more than females (2065 steps*d-1). No further covariates were statistically included in the model (i.e., BMI or age). In Kcal, the best model showed a mean expenditure of 324.74±11.55, boys have greater expenditures (100.63*d-1), as well as those with greater BMI (15.42 Kcal). Mean Km covered was 7.51±0.22, and males travel more 2.11 Km*d-1 than females.

In conclusion, it was found that multilevel modeling is well-suited for analyzing longitudinal changes in walking behavior; mean daily steps are around 11,000, and males walk more than girls; those who have higher BMI expend more energy. We found no age trend (negative or positive) for daily walking. Moreover, a decline in walking behaviors (i.e., physical activity) was associated with the weekend.

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