**Description of Participants**

This study includes middle school students in grades 7 to 9 (ages 11 to 15) from regular classes who provided the necessary parental consent to participate. Sports sections and UPE2A and ULYSS classes are not included in the study. Data collection takes place in public middle schools located in both urban and rural areas of France. Schools are classified according to the Social Position Index (SPI): disadvantaged schools (SPI < 89), average schools (SPI between 90 and 114), and advantaged schools (SPI > 115). Four learning fields were targeted and classified from 1 to 4.

**Protocol Description**

The aim of this quantitative analysis is to measure potential differences in physical engagement between boys and girls during a two-hour physical education (PE) class, and to evaluate the impact of three variables: gender, activities, and the socio-cultural level of the institution. Physical engagement levels are assessed using accelerometers to determine the students' level of MVPA (moderate to vigorous physical activity). The goal is to identify the variables having the most significant influence on the observed differences.

**Data Collection**

An initial questionnaire is distributed to students before the start of the study to collect personal data: age, height, weight, siblings, physical activities, and other socio-cultural information. This questionnaire serves a dual purpose: to provide the necessary information for programming the accelerometers and to identify the socio-cultural characteristics of the participants.

The quantitative part of the study takes place during a 2-hour PE class. The research team briefly presents the study without mentioning that it focuses on gender differences in physical activity to avoid potential bias.

The students wear ActiGraph accelerometers, model GT3X+ (ActiGraph™, Pensacola, FL, USA), attached to the hip with an elastic belt throughout the class. The accelerometers are set to a sampling frequency of 30 Hz and data is processed in 10-second intervals. Troiano's (2007) wear time validation algorithm is applied to ensure accuracy, and intensity thresholds are determined according to Freedson's (1998) calibration. Accelerometer data extraction is performed using Actilife software, allowing the extraction of each individual's MVPA, LPA, MPA, and VPA levels.\\

**Statistical Analysis**

Data analysis includes descriptive statistics and a two-factor ANOVA model, including independent variables such as gender (male, female) and one of the following variables: type of activity (learning field), socio-cultural category of the institution (Social Position Index category), or geographical area. In total, three two-factor ANOVA models are used. The dependent variable is the deviation of each student's MVPA from the class average. This choice is motivated by the fact that some classes have different activity times and different teachers, which does not facilitate comparison between different groups. Depending on the fulfillment of normality assumptions (QQ-plot) and homoscedasticity (residuals plot against predicted values), we may use a generalized linear model (GLM) of the gamma type (dependent variable is positive and continuous). The significance threshold for statistical tests performed is $\alpha = 5\%$. All calculations and analyses are performed with R software.

After constructing the models and verifying the assumptions, we first conduct a post-hoc analysis (multiple comparison) with Tukey's correction for a balanced design and Tukey-Kramer for a complete design used to compare the MVPA deviation from the average of boys and girls according to the modalities of the second factor of the ANOVA model. We calculate the effect size of each factor and the interaction, and we calculate the omega-squared value for each factor or interaction.