

## Plan Overview

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*A Data Management Plan created using DMPTool-Stage*

**Title:** Prediction of aversive behavior and affinity for physical exercise through Machine Learning based on biopsychosocial factors: impact of Physical Education professional counseling to promote adherence to exercise programs.

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**Funding opportunity number:** 48437

**Template:** Template USP - Mínimo

### **Project abstract:**

In order to understand the biopsychosocial aspects of exercise, the present umbrella project will conduct two studies, being the aim of first study are: 1) to elaborate and test an instrument through Machine Learning able to predict aversive behavior or greater affinity for exercise in adults; 2) evaluate the effectiveness of training orientation and training based on predictions of aversion and affinity for physical exercise on adherence. In the second study the objectives are: 1) to verify through Machine Learning if aversive behavior or higher affinity for exercise in women can be influenced by menstrual cycle (MC); 2) identify main MC markers that influence aversion and affinity for exercise. With an  $n = 430$ , the first study will consist of the following steps: 1) identify and group through machine learning 215 subjects by different behavioral patterns in relation to exercise using biopsychosocial variables; 2) predict, based on these groupings through machine learning, aversive behavioral patterns or affinity for exercise in 215 new subjects, evaluating the effects of these predictions on exercise adherence in gyms for a period of 12 months. The 2nd study, with a  $n = 32$  and through a crossover design with 7 laboratory visits, will evaluate the effects of the different phases of MC in continuous aerobic exercises (with heavy and severe intensities) and high-intensity intermittent exercise (HIIE) and how much the phenomenon is associated with mood disorders through machine learning. For it will be measured psychological, cardiopulmonary, hormonal and neurophysiological responses before, during and after exercise bouts in different laboratory visits.

**Last modified:** 01-23-2020

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# **Prediction of aversive behavior and affinity for physical exercise through Machine Learning based on biopsychosocial factors: impact of Physical Education professional counseling to promote adherence to exercise programs. - Descrição dos Dados e Metadados produzidos pelo projeto**

Study 1 will have 2 stages. In first stage, the following data will be collected from a sample of healthy adults:

- Biological data - Heart rate at rest, heart rate variability, body mass index, waist-hip ratio and body fat percentage;
- Psychological data - Score of questionnaires of mood state profile, preference and tolerance for the intensity of the exercise, pleasure for the exercise, and the trans-theoretical model of behavioral change in relation to the exercise;
- Social profile data - Socioeconomic data related to income and education, and questionnaire score on the use of social networks aimed at practitioners of physical activities in gyms

The second stage of study 1 will be conducted in different gyms, and a new sample will be allocated to healthy adults, and in addition to collecting all the same variables from the first stage, these new subjects will have their routines (retention, frequency or absences and adherence by intensities and prescribed exercise time) of exercises at the gym followed for 12 months (or until the participant leaves the routine).

Study 2 will verify, through Machine Learning, whether the aversive behavior or greater affinity for exercise in women can be influenced by the menstrual cycle. For this, a subsample of women (classified as physically active and sedentary) will be invited to collaborate in laboratory visits to collect biological variables (body composition, biochemical analyzes, cardiorespiratory and neurophysiological responses) and psychological variables (mood questionnaires, pleasure, associated symptoms to the menstrual cycle and scales of perception of recovery, subjective perception of effort, affective valence, motivation and arousal).

In study 1, psychological and social data will be collected through questionnaires. Biological data will be measured through body scale, stadiometer, measuring tape, adipometer, cardiac monitor and some also by self-report. The other data will be collected in the second stage (retention, frequency or absences and adherence by intensities and prescribed exercise time) of study 1 through the gyms records.

In study 2, psychological data will be collected through questionnaires and scales. Data on the phases of the menstrual cycle and the different exercise models will be measured by means of body temperature records by thermometer, hormonal analyzes by blood samples. Neurophysiological variables will be collected using Functional near-infrared spectroscopy. Body composition data will be collected using a scale, stadiometer, measuring tape, adipometer. Cardiopulmonary data will be collected by a respiratory gas analyzer and a cardiac monitor.

All data in both studies will be collected following protocols validated in articles published in journals indexed in databases such as PubMed, Web of Science and SciELO. If the validated procedure is not compatible with the study or not exist, the measurement will be performed based on the recommendations of the respective instrument manufacturer (if equipment) and related literature.

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