

## **Research project objectives/Research hypothesis**

Many studies indicate that marijuana use has an impact on cognitive performance in humans. However, the obtained results are ambiguous, especially in the case of prolonged effects. It is believed that cognitive deficits are primarily induced by the amount of marijuana used and the age of the first contact with the substance. However, the complexity of this phenomenon does not allow us to categorically determine whether an increase in marijuana consumption coincides with an increase in the impairment of all cognitive functions, and if the dependence is linear. The main goal of the project is to analyze cognitive changes and brain activity in long-term marijuana users, depending on the pattern of consumption.

## **Research project methodology**

The project will involve 150 adults aged 25-35. The first step will be to recruit and assign participants to the appropriate group (5 groups of 30 people): accidental users, past users, occasional users, regular users, and daily users. Marijuana users (90 people) will receive smartwatches through which the amount of cannabis consumed in one month will be monitored. Hair samples will be collected from marijuana users to provide objective information about the use and basic components of marijuana (CBD and THC). The laboratory procedure will include behavioral cognitive tests and measurement of EEG activity (resting state activity). Tools have been selected based on the literature and previous research in this field.

## **Expected impact of the research project on the development of science**

The proposed project extends existing research and addresses the problem of capturing the cognitive profile along with the neural changes of marijuana users, depending on the pattern of marijuana consumption (quantity and frequency of marijuana use). Taking into account diverse user groups significantly enhances the ecological validity of the project. What is more, there is little research combining cognitive performance with brain analysis (EEG) in exploring the long-term effects of marijuana use. The introduction of planned innovative measurement methods (objective and quantitative) in the research process will allow us to obtain reliable information on the pattern of marijuana use and the content of active compounds. This is a great advantage of the project, which confronts the basic methodological objections found in previous research. Overall, this relatively new and original research approach can also help explain the varied research results in this field and draw clear conclusions about the long-lasting effects of marijuana on cognitive functioning. Practical implications are also important because, in the light of progressive legalization tendencies, it will identify the least and most vulnerable groups of marijuana users by capturing how a specific pattern of consumption translates into a neurocognitive functioning.