

## Machine Learning Analysis of Eating Disorders Risk, Physical Activity and Psychological Factors in Adolescents: A Community Sample Study

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**Abstract :** Introduction: Eating Disorders (ED), such as anorexia, bulimia, and binge eating, are psychiatric illnesses that mostly affect young people. The main symptoms concern eating (restriction, excessive food intake) and weight control behaviors (laxatives, vomiting). Psychological comorbidities (depression, executive function disorders, etc.) and problematic behaviors toward physical activity (PA) are commonly associated with ED. Acquaintances on ED risk factors are still lacking, and more community sample studies are needed to improve prevention and early detection. To our knowledge, studies are needed to specifically investigate the link between ED risk level, PA, and psychological risk factors in a community sample of adolescents. The aim of this study is to assess the relation between ED risk level, exercise (type, frequency, and motivations for engaging in exercise), and psychological factors based on the Jacobi risk factors model. We suppose that a high risk of ED will be associated with the practice of high caloric cost PA, motivations oriented to weight and shape control, and psychological disturbances. Method: An online survey destined for students has been sent to several middle schools and colleges in northwest France. This survey combined several questionnaires, the Eating Attitude Test-26 assessing ED risk; the Exercise Motivation Inventory-2 assessing motivations toward PA; the Hospital Anxiety and Depression Scale assessing anxiety and depression, the Contour Drawing Rating Scale; and the Body Esteem Scale assessing body dissatisfaction, Rosenberg Self-esteem Scale assessing self-esteem, the Exercise Dependence Scale-Revised assessing PA dependence, the Multidimensional Assessment of Interoceptive Awareness assessing interoceptive awareness and the Frost Multidimensional Perfectionism Scale assessing perfectionism. Machine learning analysis will be performed in order to constitute groups with a tree-based model clustering method, extract risk profile(s) with a bootstrap method comparison, and predict ED risk with a prediction method based on a decision tree-based model. Expected results: 1044 complete records have already been collected, and the survey will be closed at the end of May 2022. Records will be analyzed with a clustering method and a bootstrap method in order to reveal risk profile(s). Furthermore, a predictive tree decision method will be done to extract an accurate predictive model of ED risk. This analysis will confirm typical main risk factors and will give more data on presumed strong risk factors such as exercise motivations and interoceptive deficit. Furthermore, it will enlighten particular risk profiles with a strong level of proof and greatly contribute to improving the early detection of ED and contribute to a better understanding of ED risk factors.

**Keywords :** eating disorders, risk factors, physical activity, machine learning

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