# Lab 3 Regression Analysis

### 1 Objective

Here are the learning objectives for this assignment:

- 1. Understand the concepts of simple and multiple regression analysis in the context of Kinesiology.
- 2. Develop proficiency in using jamovi to conduct and interpret simple and multiple regression analyses.
- 3. Learn to interpret regression coefficients, R-squared values, and other related statistics from regression output.
- 4. Understand the importance of assessing model assumptions and the impact of multicollinearity in multiple regression analysis.
- 5. Apply critical thinking skills to evaluate the relationships between multiple factors affecting athletic performance.
- 6. Develop the ability to interpret and communicate the results of regression analyses to both technical and nontechnical audiences.
- 7. Enhance problem-solving skills by addressing real-world Kinesiology-related questions using statistical analyses.

#### 2 Introduction

Welcome to this week's lab on regression analysis using jamovi! In this lab, we will be applying the concepts of simple and multiple regression analysis to a dataset related to Kinesiology. The dataset contains information on various factors affecting athletic performance.

### 3 Dataset

The dataset is provided in a CSV format, which you can down-load here: data-lab3.csv

The dataset contains the following variables:

- 1. ID Unique identifier for each participant
- 2. Age Age of the participant (in years)
- 3. Height Height of the participant (in centimeters)
- 4. Weight Weight of the participant (in kilograms)
- 5. BMI Body Mass Index of the participant
- 6. VO2max Maximum oxygen consumption (in ml/kg/min)
- 7. 40YD Time to complete a 40-yard dash (in seconds)
- 8. VerticalJump Maximum vertical jump height (in inches)

#### **4** Instructions

Part 1: Data Analysis using jamovi

- 1. Download and install jamovi (https://www.jamovi.org) if you haven't already.
- 2. Open jamovi and import the data-lab3.csv file.
- 3. Perform a simple regression analysis to predict VO2max based on Age.
- 4. Perform a multiple regression analysis to predict VO2max based on Age, Height, Weight, and BMI.
- 5. Interpret the results of both simple and multiple regression analyses.

#### Part 2: Open-ended Questions

After completing the data analysis in jamovi, please access Canvas to answer the 10 questions related to the analysis. I urge you to answer the questions first, then copy and paste them in Canvas.

#### **Open-ended Questions**

1. What is the primary purpose of conducting a regression analysis?

- 2. In simple regression analysis, what is the role of the independent variable and the dependent variable?
- 3. How can you determine the strength and direction of the relationship between the independent and dependent variables in a simple regression analysis?
- 4. What is the difference between simple and multiple regression analysis?
- 5. How do you interpret the R-squared value in a regression analysis?
- 6. In the simple regression analysis predicting VO2max based on Age, what is the direction of the relationship between Age and VO2max?
- 7. In the multiple regression analysis predicting VO2max, which variable(s) had a significant effect on VO2max?
- 8. In the multiple regression analysis predicting VO2max, which variable(s) had the strongest effect on VO2max?
- 9. How can multicollinearity affect the results of a multiple regression analysis?
- 10. What can be done to address multicollinearity in a multiple regression analysis?

Remember to submit your jamovi output and your responses to the multiple-choice questions on Canvas by the due date. Good luck!

## 5 Grading rubric

Total points available: 90

Component	Points
10 open-ended questions	90
jamovi output in PDF format	10