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 non-technical 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 download here:

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