Welcome to

The Session Will Begin Shortly

START

Statistics in R with Tidyverse

Session 5: Multiple Linear Regression Analysis (Part 1)

instats

Multiple Linear Regression Overview

- Predicting one variable based on multiple predictors
- Involves two or more explanatory variables to explain the outcome
- Applications in the social sciences, economics, and engineering

instats

Benefits of Multiple Regression

- Explaining Complex Relationships
  - Multiple factors can influence a single outcome
  - Allows for a more complete understanding
- Improved Prediction Accuracy
  - Including additional variables can enhance model accuracy
  - Provides insights into how each variable contributes individually

Key Components

- Explanatory Variables
    - Independent variables used to predict the outcome
    - Can include both numerical and categorical variables
- Outcome Variable
    - Dependent variable
    - The goal/target to be investigated that is numerical

Dummy Variables

- Representing categorical data in regression
- Creating Dummy Variables
    - Binary dummy coding
    - Multiple dummies for multi-level categories
- Interpretation of Dummy Variables
    - Baseline category
    - Interpretation of coefficients relative to baseline

instats

Interactions Between Variables

- Main Effects
  - Impact of a predictor on the outcome when other predictors are held constant
- Interaction Effects
  - Occurs when the effect of one variable depends on the level of another
  - Key in exploring complex, real-world scenarios

Model Interpretation

- Intercept
    - Predicted value of the outcome when all predictors are zero
    - Can be interpreted or ignored based on context
- Coefficients
    - Measure the strength and direction of the relationship between each predictor and the outcome
    - Partial slopes

instats

Model Fit

- Fitted Values
    - Predicted values for the outcome based on the regression model
- Residuals
    - Differences between observed and predicted values
    - Used to evaluate the accuracy and fit of the model

Demo & Exercises

Q & A

STOP