

Tutorial 1

Types of Variables, Simple Linear Regression, and PPDAC

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- The Statistical Method (PPDAC)
- Types of Variables
- Simple Linear Regression
- Wrap-up

- **P**roblem: What's the outcome of our study?
- **P**lan: How to collect data?
- **D**ata: Gather it
- **A**nalysis: Apply tools (e.g. regression)
- **C**onclusion: Interpret in context

Types of Variables

Two broad types:

- Qualitative
- Quantitative

Subtypes:

- Qualitative → Categorical, Binary, Unstructured
- Quantitative → Continuous, Count, Discrete Numerical

Example: Types of Variables in a Student Survey

Variable	Type	Subtype
Grade	Qualitative	Categorical
Passed Course (Y/N)	Qualitative	Binary
Favorite Hobby	Qualitative	Unstructured
Height (cm)	Quantitative	Continuous
Number of Siblings	Quantitative	Count
Courses Enrolled	Quantitative	Discrete Numerical

Quick Check

- Dice roll outcome: discrete or continuous?
- Temperature: continuous or discrete?
- Year in school: categorical or numerical?

Regression Motivation

Question: Does hours studied predict exam grade?

Model:

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

Small Dataset

Hours Studied (X_i)	Grade % (Y_i)
2	65
4	70
6	80
8	85

PPDAC Example: Sleep and Exam Performance

Problem: Do students who sleep more before an exam score higher?

Plan: Survey students, record hours of sleep (x_i) and exam grade (Y_i)

Data (sample of 6 students):

Student	Hours Sleep (x_i)	Exam Grade (%) (Y_i)
A	4	60
B	5	65
C	6	72
D	7	78
E	8	85
F	9	88

Questions?