

PSY121- STATISTICS IN SOCIAL SCIENCES
IN-CLASS EXERCISE

- 1) A researcher is examining the relationship between **students' test anxiety levels** and their **academic performance**. The **exam scores (out of 100)** collected from 10 students are as follows:
62, 65, 70, 72, 74, 78, 80, 85, 87, 90.
- The corresponding **anxiety scores** (higher value = higher anxiety) are:
28, 30, 35, 36, 38, 41, 43, 45, 48, 50.

Questions:

- a. Calculate the **range, mean, variance, standard deviation, and standard error** for the academic performance scores.
 - b. Find the **Z score** of the student who scored 85 and 65.
 - c. Using this Z score, please calculate the **T score**.
- 2) An organizational psychologist is conducting a study to understand the relationship between **employees' workplace stress** and **productivity** across three departments in a mid-sized company. All employees completed a **Stress Questionnaire** (scores range from 0 = very low stress to 100 = very high stress). Their **weekly productivity** (number of completed tasks) was also recorded. The data below show the stress scores and productivity levels for 10 randomly selected employees (a combined dataset from all departments):

Employee	Stress Score	Productivity
1	42	78
2	50	74
3	55	70
4	60	65
5	65	62
6	68	58
7	70	56
8	72	54
9	75	50
10	80	45

Questions:

- a. Calculate the **range, mean, variance, standard deviation, and standard error** for both **Stress Scores** and **Productivity**.
- b. Compute the **Z score** for an employee who has a **stress score of 72** and a **productivity score of 54**.
- c. Convert both Z scores into **T scores**.

- 3) An educational psychologist wants to investigate how **study time** affects **students' exam performance**. Data were collected from **10 students** preparing for the same exam. For each student, the researcher recorded their **weekly study hours** and their **exam scores** (out of 100).

Dataset

Student	Study Hours	Exam Score
1	4	55
2	5	60
3	6	64
4	7	68
5	8	72
6	9	76
7	10	78
8	11	81
9	12	84
10	14	88

Questions:

- a. Calculate the **range, mean, variance, standard deviation, and standard error** for both **Study Hours** and **Exam Scores**.
 - b. A student studied **10 hours per week** and scored **78** on the exam.
 - Compute this student's **Z score** for both variables.
 - Convert each Z score into a **T score**.
- 4) A researcher wants to examine the factors that influence university students' academic success. They collect the following data from 15 students. Identify which of the variables above are **continuous** and which are **discrete**.
- a. **Age** (in years)
 - b. **Gender** (male/female)
 - c. **Number of close friends**
 - d. **Daily study time** (in hours)
 - e. **Department** (psychology, sociology, law, etc.)
 - f. **GPA** (on a 4.00 scale)
 - g. **Number of failed courses**
 - h. **Satisfaction with university life** (1 = very low, 5 = very high)
- 5) For each hypothesis below, determine **which statement represents the null hypothesis (H_0)** and **which represents the alternative hypothesis (H_1)**.
- a. There is no difference in test performance between students with high and low exam anxiety.
 - b. Gender influences empathy scores.
 - c. Students with high exam anxiety score lower on tests than those with low anxiety.
 - d. Sleep duration has no effect on reaction time.
 - e. Gender does not influence empathy scores.

- f. Reaction time changes depending on sleep duration.
- g. The training program does not change job satisfaction levels.

- 6) A researcher wants to study **job satisfaction among teachers** in a large city. The city has **primary, middle, and high schools**. Because job conditions might differ across school levels, the researcher decides to divide the teachers into these **three groups (strata)** and then randomly select participants **proportionally from each group**. Which sampling method is used in this study? Explain why it is appropriate.
- 7) A government agency wants to investigate **students' physical activity levels** in the country. Instead of randomly selecting students from all schools, the agency randomly selects **10 schools** from different regions and collects data **from all students in those schools**. Which sampling method is used? Why might the researcher prefer this method over others?
- 8) A psychologist wants to examine the **relationship between daily stress and sleep quality** among university students. They obtain a list of all 2,000 students enrolled at the university and use a **computer program** to randomly select **200 students** to participate. Which sampling method is used in this study? Explain why it is appropriate.