PSY 121
STATISTICS IN SOCIAL SCIENCES

WHAT IS STATISTICS?
BASIC CONCEPTS OF STATISTICS IN PSYCHOLOGY

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What is STATISTICS?

- Statistics is basically the **science of collecting, organizing, analyzing, and interpreting data**. It helps us make sense of the information, numbers, and observations we encounter in life.

But statistics is not only about numbers. It involves:

- **Collecting data**: through surveys, experiments, observations, measurements.
- **Organizing data**: turning raw information into tables, graphs, categories.
- **Analyzing data**: using mathematical methods to examine the information.
- **Interpreting results**: drawing conclusions, identifying general trends, and making predictions.
- In other words, statistics is a tool for **making sense of uncertainty and expressing complex information in a simple way**.

Why Should we know statistics at a certain level?

a) The language of psychology is statistics

- Psychology is a social science, but it relies on the scientific method. We conduct experiments, collect observations, and administer surveys. All of this produces data. To make sense of that data, we need statistics. For example:
- “Are depressive symptoms more common in men or women?” → we cannot answer without statistics.
- “Is a new therapy method effective?” → we need statistical comparisons between groups.

Why Should we know statistics at a certain level?

b) It teaches us how to think critically

- Statistics is not just about calculations. It develops **critical thinking**:
- When a headline says, “80% success rate,” you’ll ask: ***How was this percentage calculated? With how many participants?***
- You’ll question: ***Can these results be generalized?***
- This mindset is part of thinking like a scientist.

Why Should we know statistics at a certain level?

c) We use statistics in everyday life

- Statistics is not only for research; it's everywhere around us:
- "**Why does Instagram keep showing me the same type of content?**" → because algorithms build **statistical models of your behavior.**

Why Should we know statistics at a certain level?

Say you come across a video on Instagram.
The video has:

- **A cat**
- **Lo-fi music in the background**
- **Aesthetic room design**
- **It’s a 30-second Reel**
- You watch it for more than 10 seconds,
  You like the post ❤
  You even scroll through the comments…
- What just happened?
  Instagram took note of all that:
- You're into cat content
- You enjoy lo-fi style audio
- Aesthetic/minimalist interiors catch your eye
- You’re engaged with short-form Reels
- So the algorithm thinks:
- “There’s an 85% chance this user will engage with similar content.”
  And boom — now you're seeing that same *type* of content over and over.

Why Should we know statistics at a certain level?

c) We use statistics in everyday life

- Statistics is not only for research; it's everywhere around us:
- "**How do I know if a diet really works**?" → averages, sample sizes, and variation matter.
- "**How are election polls conducted**?" → through statistical methods.

Why Should we know statistics at a certain level?

d) It is essential for your professional future

- Whether you become a clinical psychologist, researcher, or school psychologist, you will rely on statistics to:
- Interpret test results,
- Compare groups,
- Evaluate research studies.
- For example, if you apply a therapy method and observe improvement in your clients, you need statistical analysis to demonstrate its effectiveness scientifically.

General Concepts in Statistics

1. Population

The entire group of individuals, objects, or events we want to study.

Example: *All university students in Turkey.*

2. Sample

A smaller group selected from the population.

Researchers usually study samples because it is difficult or impossible to study the whole population.

Example: *500 university students in Turkey.*

General Concepts in Statistics

3. Variable

A characteristic or property we measure or observe.
It can take on different values.
Example: age, gender, exam score, stress level.

4. Data

The observed values of variables.
Example: 18, 20, 21 years old (data for the variable “age”).

General Concepts in Statistics

5. Descriptive Statistics

- Methods used to summarize and present data, often with tables and graphs.

Example: mean, median, standard deviation, frequency tables.

6. Inferential Statistics

- Methods used to make predictions or generalizations about the population based on sample data.

Example: *"According to this sample, about 60% of all university students may use social media more than 3 hours a day."*

General Concepts in Statistics

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General Concepts in Statistics

7. Measurement – THE MOST IMPORTANT!!

- **Measurement** is the process of **expressing a characteristic or property with numbers or symbols according to specific rules.**

In other words, measurement means:

- Taking a quality or attribute we observe or want to study,
- Representing it in a way that everyone can understand,
- Using numbers or categories to describe it.

General Concepts in Statistics

7. Measurement – THE MOST IMPORTANT!!

Examples of Measurement

- **Height** → expressed in meters or centimeters.
- **Exam score** → number of correct answers converted into a score out of 100.
- **Mood** → level of happiness rated on a scale from 1 to 5.
- **Gender** → represented with symbols or codes, e.g., male = 1, female = 2.

General Concepts in Statistics

1. Mean (Aritmetik Ortalama)

Bir veri setindeki değerlerin **toplamının, değer sayısına bölünmesiyle** elde edilir.

Formül:

$$\text{Mean} = \frac{\textit{Toplam Değerler}}{\textit{Veri Sayısı}}$$

Örneğin:

Veriler: 4, 6, 8, 10, 12

Toplam = 40

Veri sayısı = 5

Ortalama (Mean) = 40 ÷ 5 = **8**

Ortalama, genelde “genel eğilimi” gösterir.

General Concepts in Statistics

2. Median (Ortanca)

- Veriler **küçükten büyüğe sıralandığında**, ortada kalan değerdir.
- Veri sayısı tek ise → tam ortadaki sayı.
- Veri sayısı çift ise → ortadaki iki sayının ortalaması.

 Örnek:

Veriler: 3, 7, 9, 12, 15

Ortadaki değer = **9** (median).

Veriler: 2, 4, 6, 8

Ortadaki iki değer = 4 ve 6

Median = (4 + 6) ÷ 2 = **5**

- Median, uç değerlerden (örneğin çok büyük veya çok küçük sayılardan) daha az etkilenir.

General Concepts in Statistics

3. Mode (Mod)

- Bir veri setinde **en çok tekrar eden değer**.
- Birden fazla mod olabilir.
- Hiç tekrar yoksa “mod yok” denebilir.

Örneğin:

Veriler: 2, 4, 4, 5, 6, 6, 6, 7

En sık görülen = **6** (mode).

Veriler: 1, 2, 2, 3, 3

- Mode, özellikle kategorik veriler için kullanışlıdır (örneğin “en çok tercih edilen sosyal medya platformu” gibi).

IN-CLASS ACTIVITY ☺

1. Mini Class Survey

Activity: Please think about;

“How many hours did you sleep last night?”

“How many cups of coffee/tea did you drink today?”

Any questions??