


Introduction to Statistics


Cal State Northridge
Ψ320
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What is Statistics?

- Statistics refers to the methods or procedures used to:
 - Organize/Summarize data
 - Analyze data
 - Draw inferences (extract meaning) from data
- Well what do we mean by the term “data”?
 - Data (plural; datum in singular) are the scores and observations we can make concerning people, animals, things or events.

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Common Uses of Statistics

- Description
- Inference
- Experimentation and statistical hypothesis testing.
- Correlation, regression and statistical hypothesis testing.

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Use 1: Description

- Organizing data
- Reducing arrays of data to a few numbers
- Graphically Displaying Data
- Statistics → Samples
- Parameters → Populations



Use 1: Description

■ Disorganized Data

Comedy	7	Suspense	8	Comedy	7	Suspense	7
Drama	8	Horror	7	Drama	5	Comedy	6
Horror	8	Comedy	5	Drama	3	Drama	3
Suspense	7	Horror	8	Comedy	6	Suspense	6
Horror	8	Comedy	6	Drama	7	Horror	9
Drama	5	Horror	9	Drama	6	Suspense	4
Drama	5	Horror	7	Suspense	3	Suspense	4
Horror	7	Suspense	5	Horror	10	Suspense	5
Horror	9	Suspense	6	Comedy	6	Drama	8
Comedy	7	Comedy	5	Comedy	4	Drama	4



Use 1: Description

■ More Organized

Comedy	Drama	Horror	Suspense
4	3	7	3
5	3	7	4
5	4	7	4
6	5	8	5
6	5	8	5
6	5	8	6
6	6	9	6
7	7	9	7
7	8	9	7
7	8	10	8



Use 1: Description

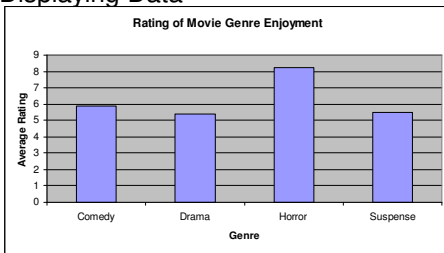
■ Reducing Data

<u>Genre</u>	<u>Average Rating</u>
Comedy	5.9
Drama	5.4
Horror	8.2
Suspense	5.5



Use 1: Description

■ Displaying Data





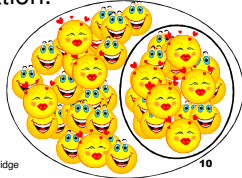
Use 2: Inference

■ Inferential statistics:

- Is a set of procedures to infer information about a population usually based upon characteristics from samples.
- Samples → Populations

Sample vs. Population

- **Population** is the *complete* set of people, animals, events or objects that share a common characteristic
- A **sample** is some subset or subsets, selected from the population.
 - **representative**
 - **simple random sample.**



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Use 3: Experimentation and hypothesis testing

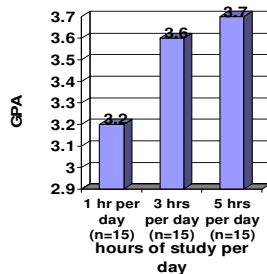
- We are not only interested in describing samples and populations, but also in testing hypotheses about causal relationships among constructs.

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Use 3: Experimentation and hypothesis testing

- Does the number of hours students study per day affect the grade they are likely to receive in statistics (Ψ320)?



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Use 4: Correlation & Regression

- Sometimes manipulation is not possible
- Is prediction possible?
- Can a relationship be established?
 - E.g., number of cigarettes smoked by per and the likelihood of getting lung cancer,
 - The level of child abuse in the home and the severity of later psychiatric problems.
 - Use of the death penalty and the level of crime.



Use 4: Correlation & Regression

- Measured constructs can be assessed for co-relation (where the “coefficient of **correlation**” varies between -1 to +1.00)

-1 ————— 0 ————— 1

- “**Regression** analysis” can be used to assess whether a measured construct predicts the values on another measured construct (or multiple) (e.g., the level of crime given the level of death penalty usage).
