MPPU 1034: Application of Statistic in Educational Research

INTRODUCTION TO STATISTICS

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Variables

A **variable** is a characteristic, value, number or condition that can be changed depends on conditions.

Discrete variables

no value can exist between two neighboring categories
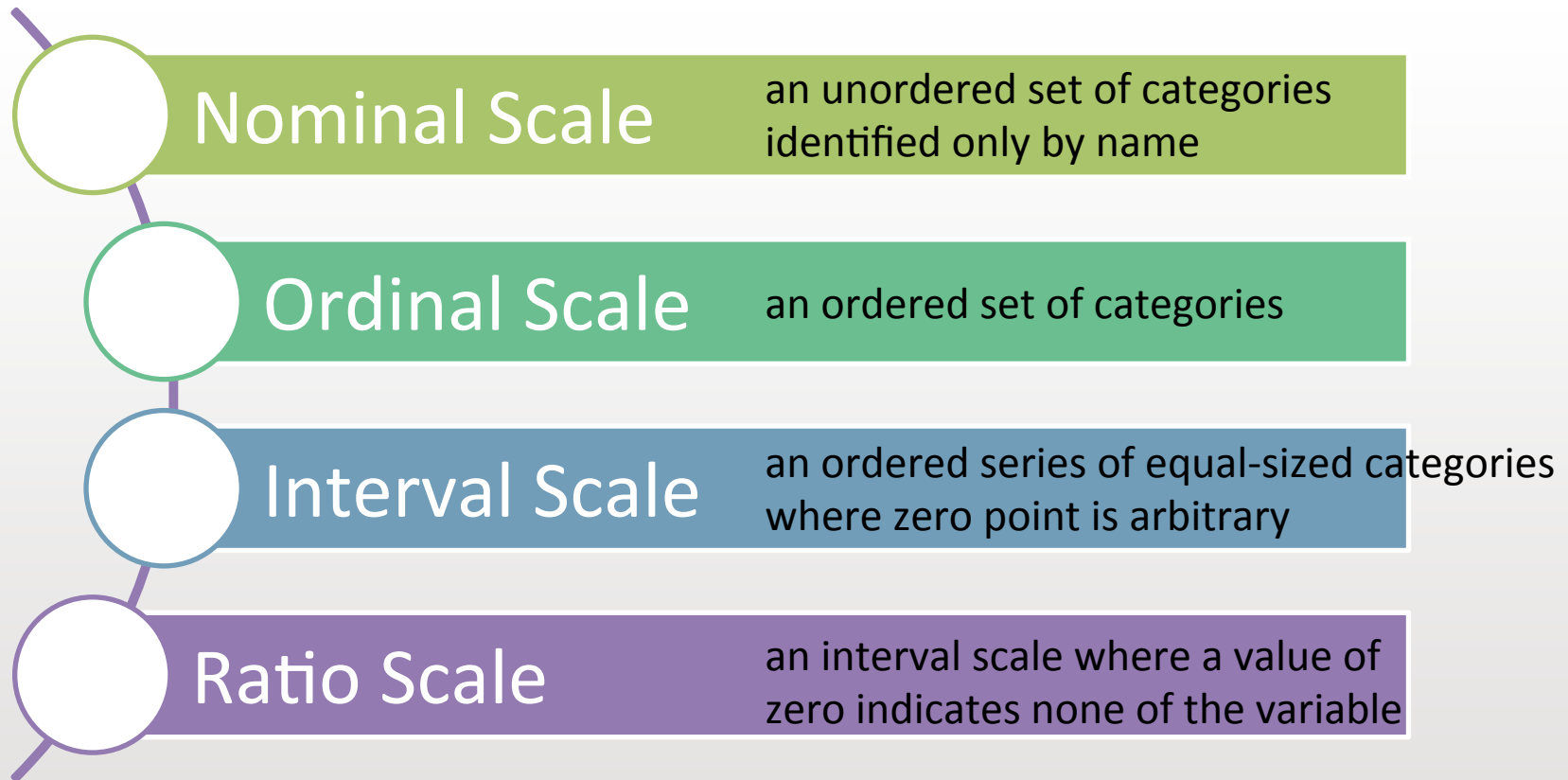
Continuous variables

there are infinite number of possible values that fall between any two observed value
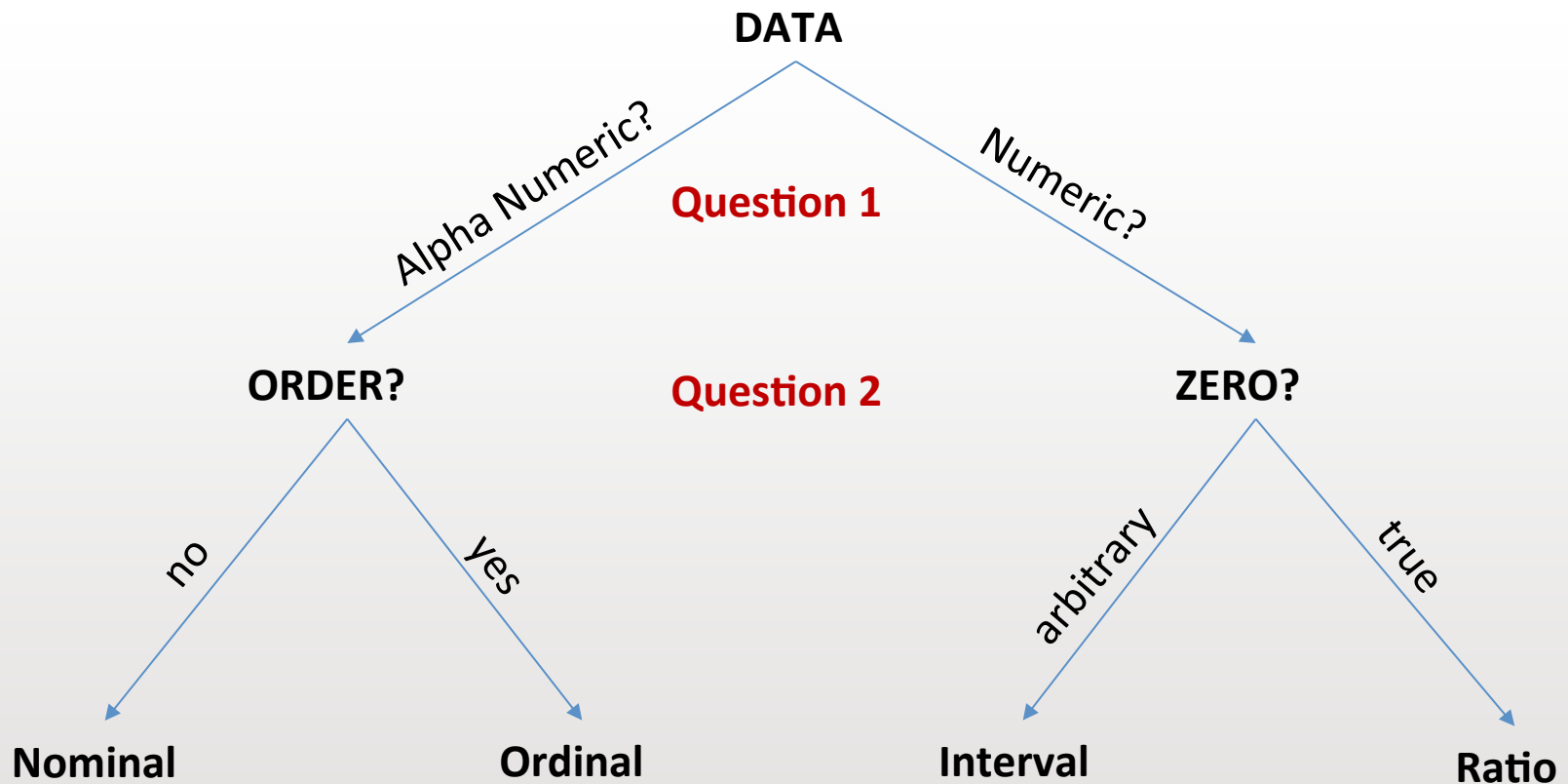
Population & Sample

- The entire group of individuals is called the population.
- A sample is a part of population to represent the population (usually too large) in a research study.

4 Types of Measurement Scales

Nominal Scale — an unordered set of categories identified only by name

Ordinal Scale — an ordered set of categories

Interval Scale — an ordered series of equal-sized categories where zero point is arbitrary

Ratio Scale — an interval scale where a value of zero indicates none of the variable

Measurement Scales

DATA

Alpha Numeric? — **Question 1** — Numeric?

ORDER? — **Question 2** — ZERO?

no → Nominal

yes → Ordinal

arbitrary → Interval

true → Ratio

Data Relationship

Ratio

Interval

Ordinal

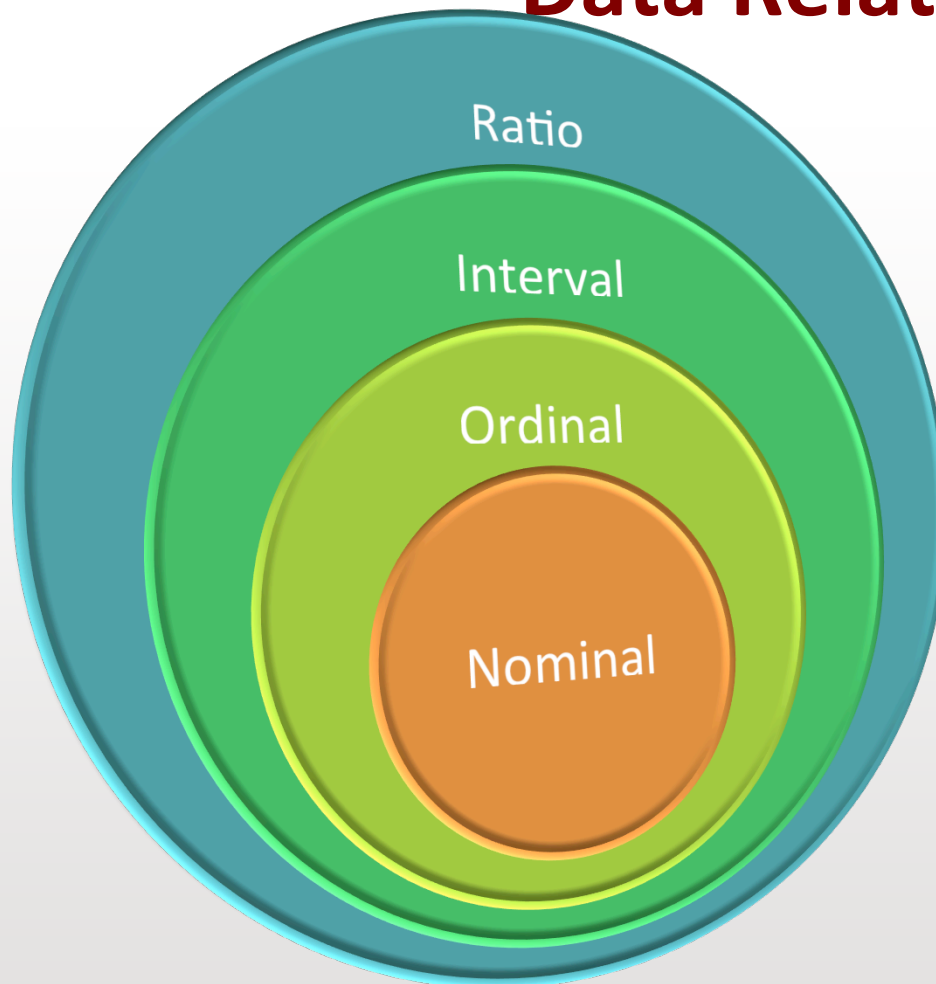Nominal

1. Ratio data can be reduced to Interval or Ordinal or Nominal data.
2. Interval data can be reduced to Ordinal or Nominal data.
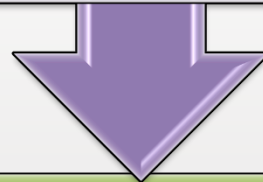3. Ordinal data can be reduced to Nominal data.

Do you know how? Please discuss with your friends or teachers. ☺

Experiment

Independent Variable

Manipulated variable

Dependent Variable

Observed variable

2 Types of Statistics

Descriptive Statistics

Organize and summarize data into table or graph

Inferential Statistics

Make general conclusions about population

Table 1:
Descriptive Statistics of the Pre Test and Post Test

	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
PreTest	35	72.74	13.11	33.33	91.67	66.67	75.00	83.33
PostTest	35	94.76	8.29	75.00	100.00	91.67	100.00	100.00

Table 1 shows the descriptive statistics for the Pre Test and Post Test. There were 35 students (N) in each condition. The Pre Test gave a mean score of 72.74 with a standard deviation of 13.11. The Post Test gave a mean score of 94.76 with a standard deviation of 8.29. The mean for the Post Test is higher than that of the Pre Test. It means, on average, that the scores in the Post Test are higher than the scores in the Pre Test. These results suggest that there is improvement in students' Post Test scores after the treatment.

Real Limits

- Real limits are boundaries between equal size intervals

- Example:

  Intervals 11-20, 21-30, 31-40

  Lower limit = 20.5

  Upper limit = 30.5

Notation

- The individual measurements or scores is represents by the letter X or Y.

- The number of scores in a data set is represents by N for a population or n for a sample.

- The sum of a set of values is represents by the Greek letter sigma, Σ.

Notation

	Parameter	Statistics
Number of cases	N	n
Mean	μ	x
Variance	σ^2	s^2
Standard division	σ	s
Correlation coefficient	ρ	r

X	X^2	Y	Y^2	XY
72	5184	165	27225	11880
68		151		
67		160		
67		160		
68		146		
70		160		
66		133		
$\sum X$	$\sum X^2$	$\sum Y$	$\sum Y^2$	$\sum XY$

Also, find $2\sum y^2$ and $(\sum x)^2$