Introduction to Quantitative Methods

Meaning of Variable

A characteristic, number, or quantity that increases or decreases over time, or takes different values in different situations.

Types of variables

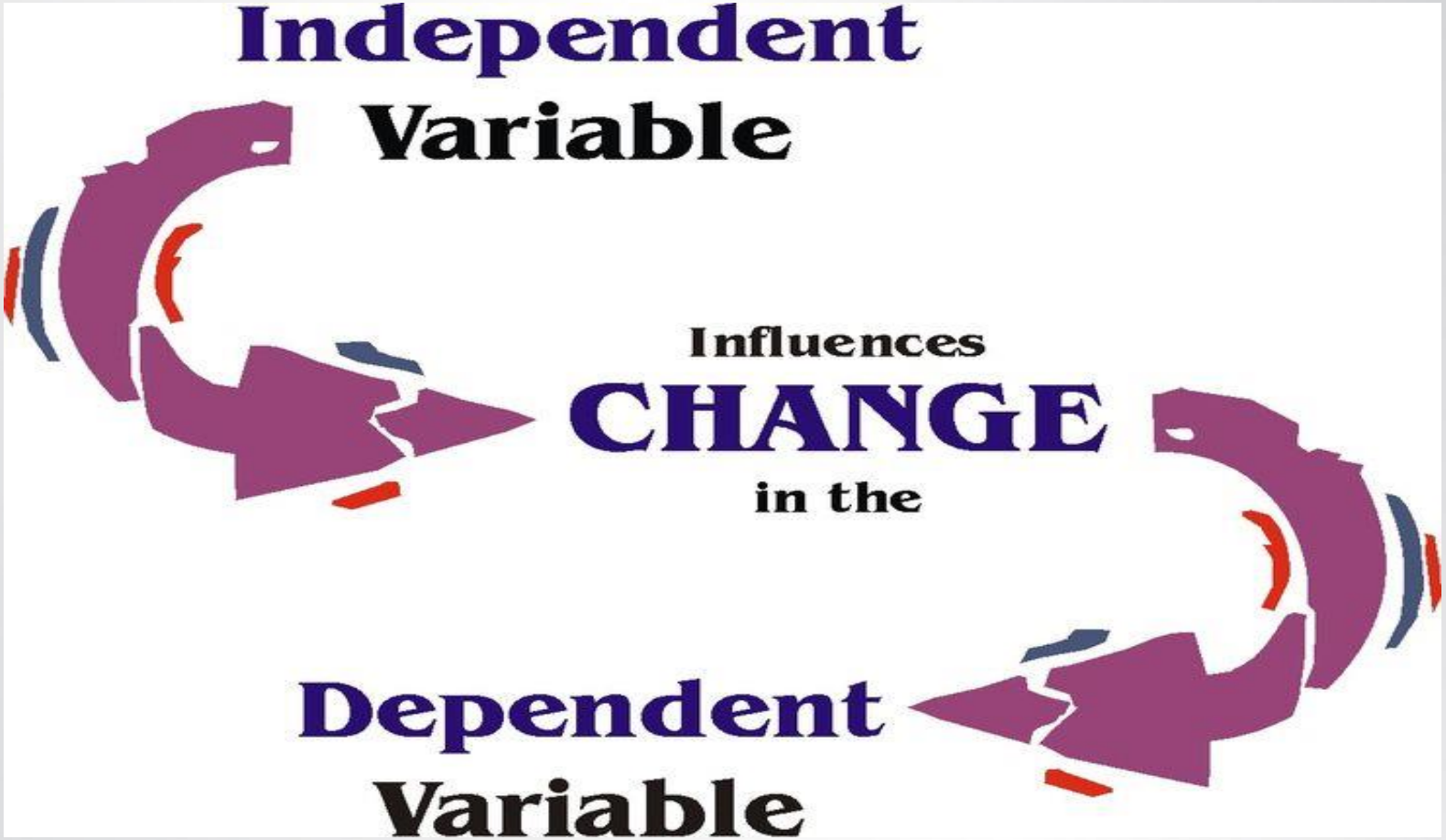
Variables can be divided for administrative purposes to:

1-**Independent variables**:

They are responsible for the creation of variables change in the phenomenon.

2-**Dependent Variables**:

that change as a result of the change in the independent variables.


Independent
Variable
Influences
CHANGE
in the
Dependent
Variable

Types of Hypotheses

Null hypothesis which take the following forms:

H01: Patients are dissatisfied with their doctors

H02:There is no significant relationship between Cholesterol level and age

H03: Age does not affect Cholesterol level

H04: There are no significant differences between males and females with regard to Blood pressure

H05: There are no significant differences between Ages with regard to Blood pressure

So, researcher denies relationship or influence, or differences.

Types of Hypotheses

Alternative hypothesis which take the following forms:

H1:Patients are satisfied with their doctors

H2: There is a significant relationship between Cholesterol level and age

H3: Age affects Cholesterol level

H4: There are significant differences between males and females with regard to Blood pressure

H5: There are significant differences between Ages with regard to Blood pressure

So, researcher suggests relationship or influence, or differences.

H01: Patients are dissatisfied with their doctors

Satisfaction value is 5/5

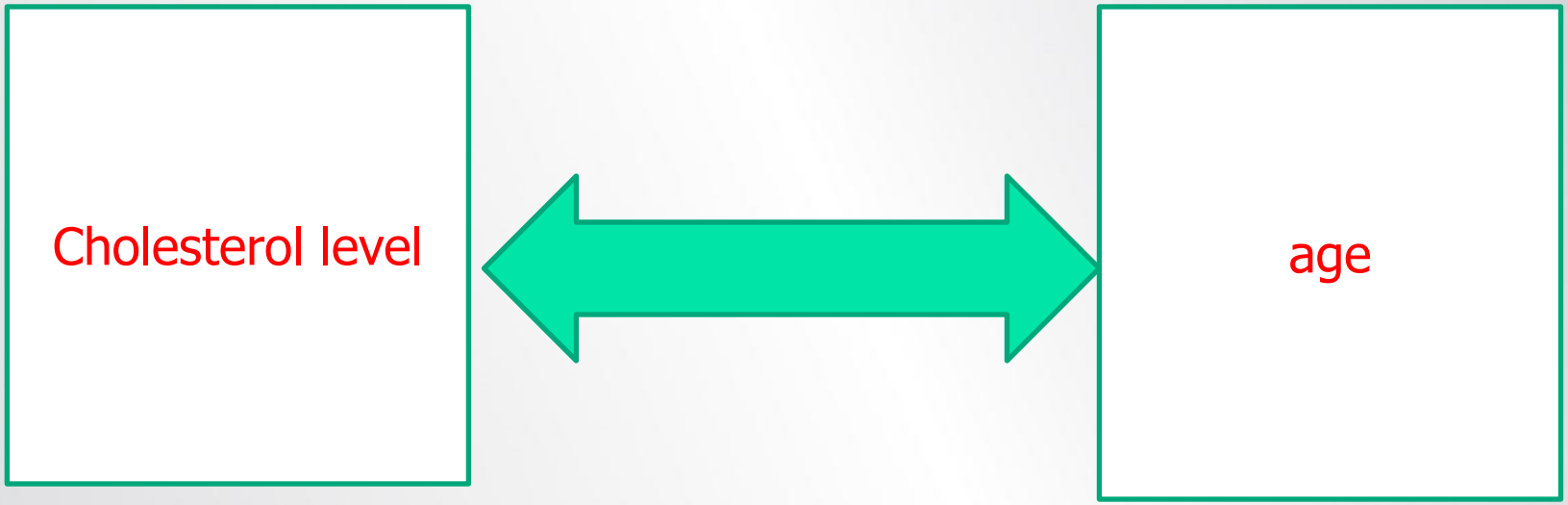
Satisfaction value is 3/5

Satisfaction value is 1/5

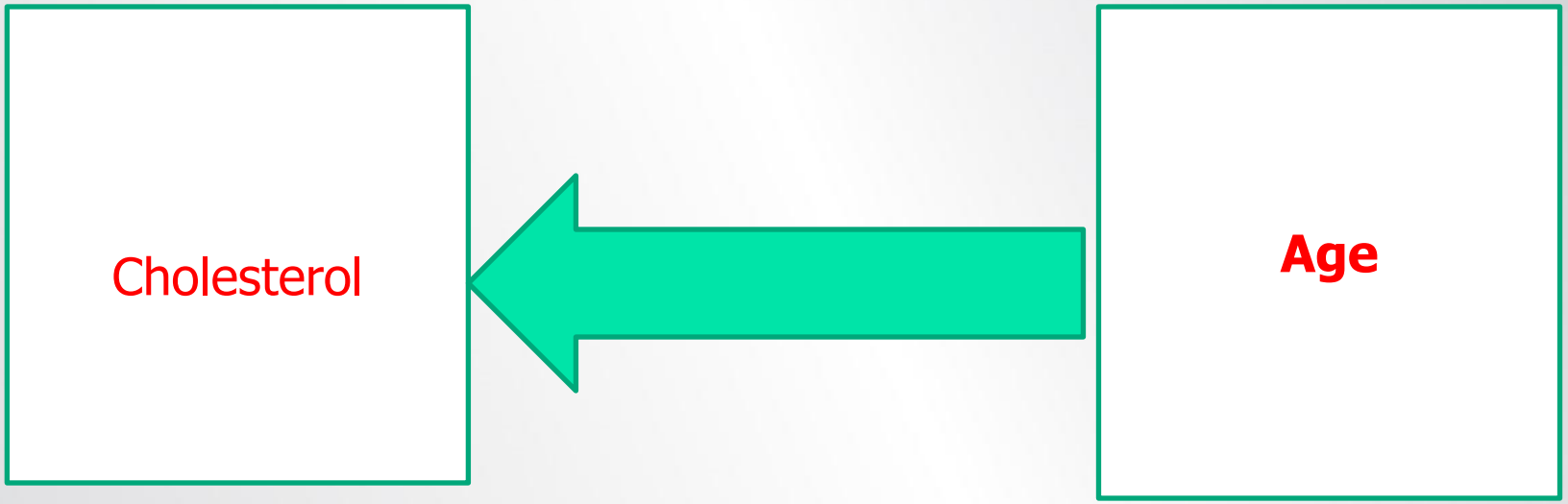
If patients satisfaction average was between 3 and 5, so the hypothesis should be accepted

If patients satisfaction average was between 1 and 3, so the hypothesis should be rejected

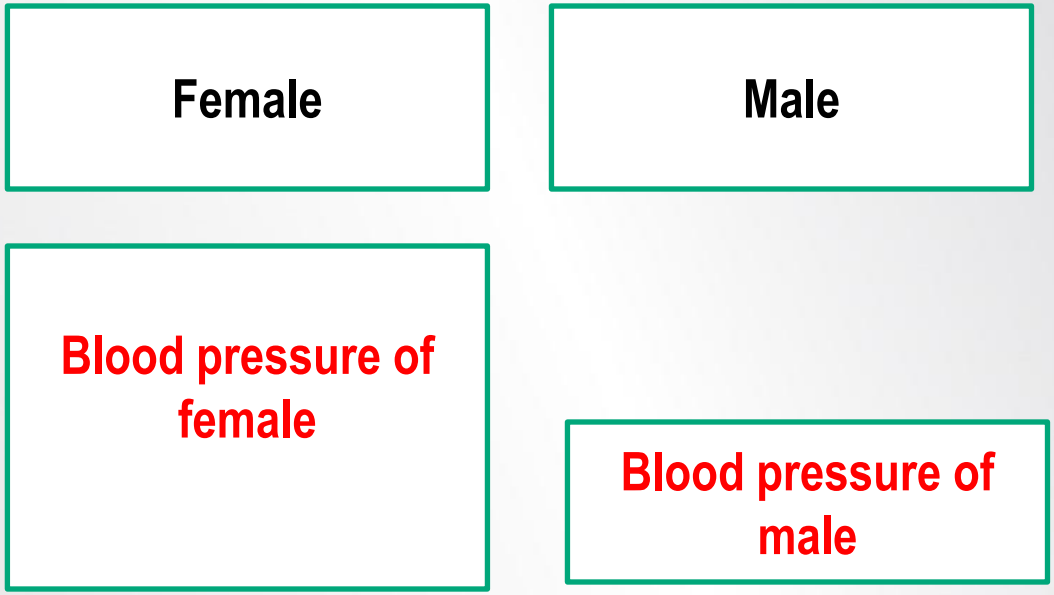
H02: There is no significant relationship between Cholesterol level and age



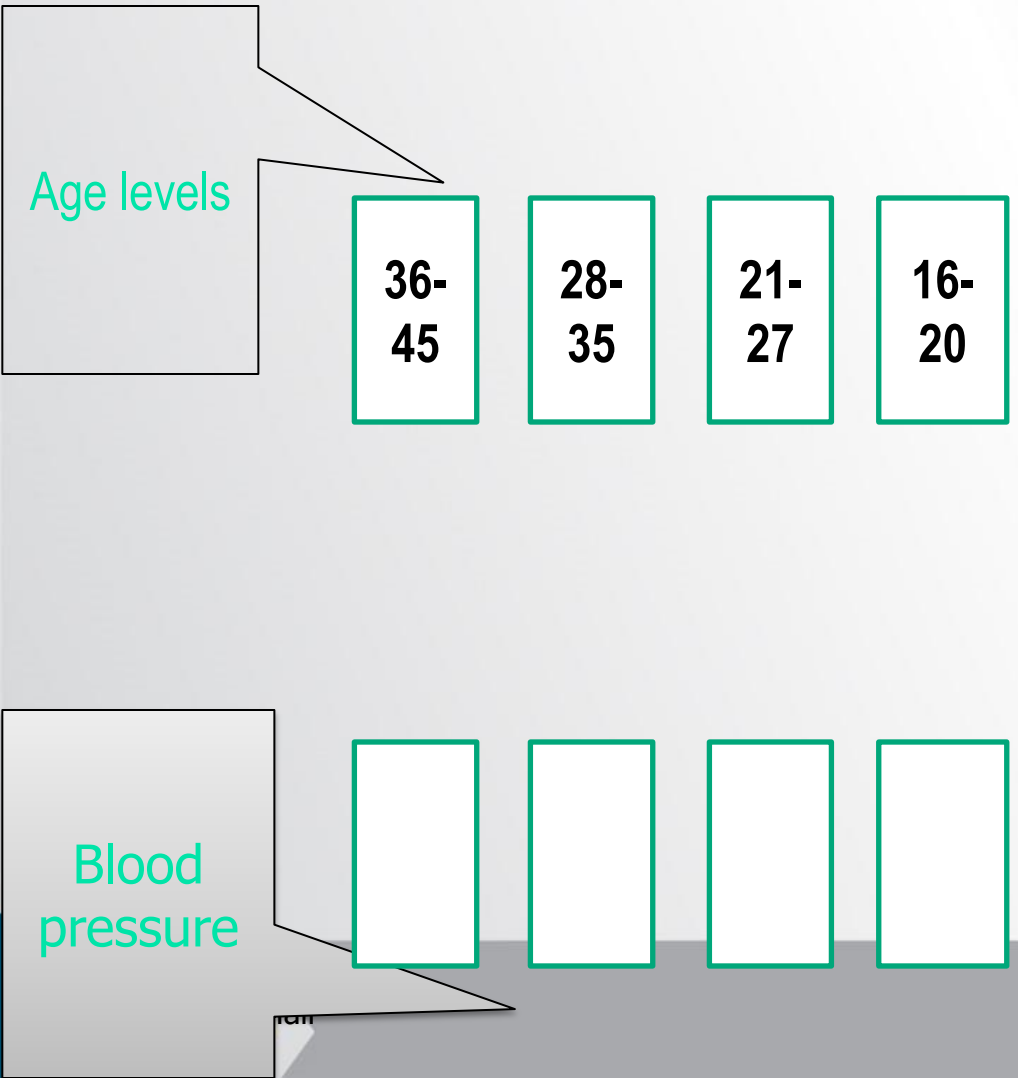
H03: Age does not affect Cholesterol level



H4: There are no significant differences between males and females with regard to Blood pressure



H4: There are no significant differences between Ages with regard to Blood pressure



Measurement and Scaling

Measurement means assigning numbers or other symbols to characteristics of objects according to certain pre-specified rules.

- One-to-one correspondence between the numbers and the characteristics being measured.
- The rules for assigning numbers should be standardized and applied uniformly.
- Rules must not change over objects or time.

Primary Scales of Measurement

Nominal Scale

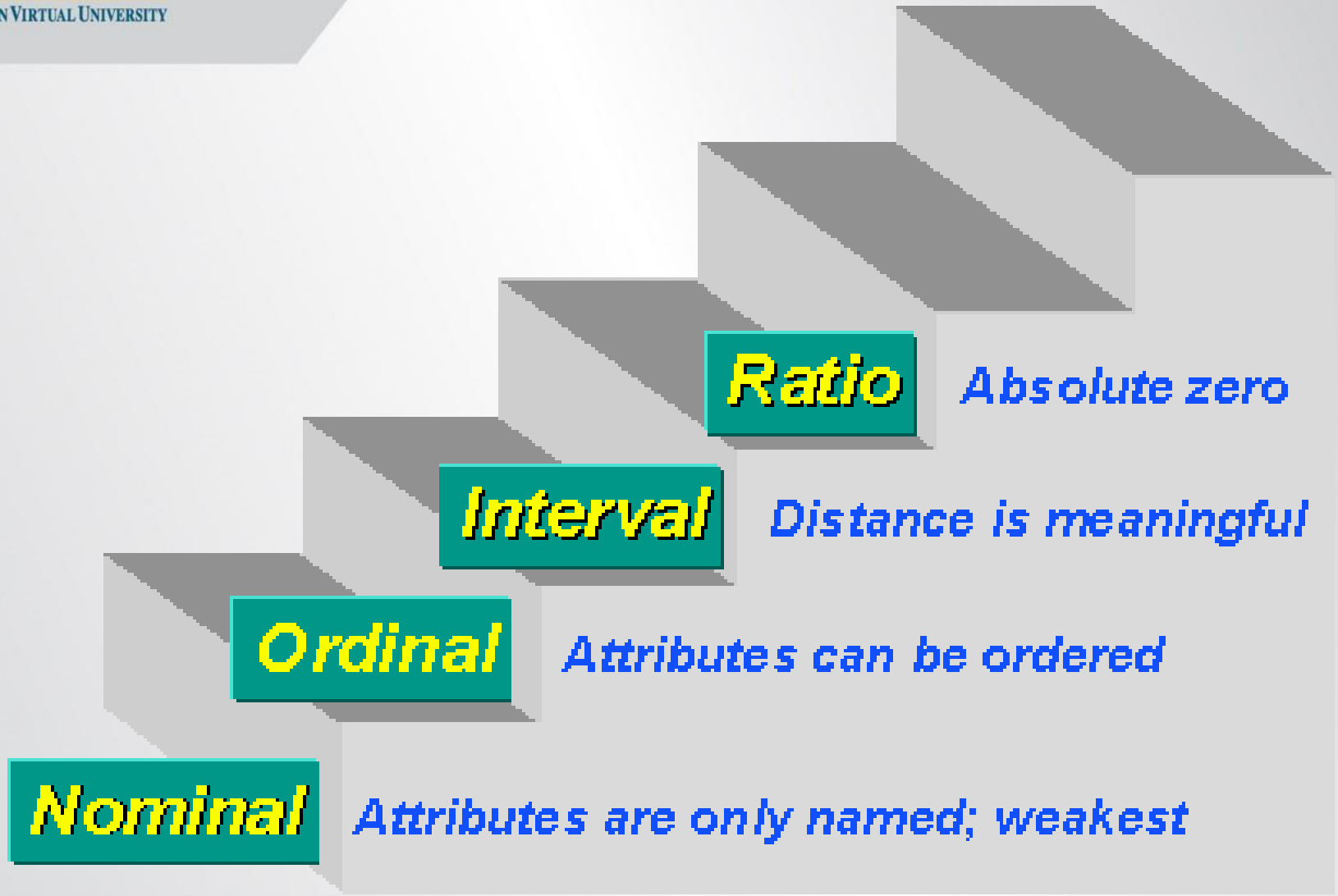
- The numbers serve only as labels or tags for identifying and classifying objects.
- The numbers do not reflect the amount of the characteristic possessed by the objects.
- Only a limited number of statistics, all of which are based on frequency counts, are permissible, e.g., percentages, and mode.

Nominal Scale

Female	Male	Gender scale

AB	O	B	A	Type of Blood

Another examples.....


Ratio
Absolute zero
Interval
Distance is meaningful
Ordinal
Attributes can be ordered
Nominal
Attributes are only named; weakest

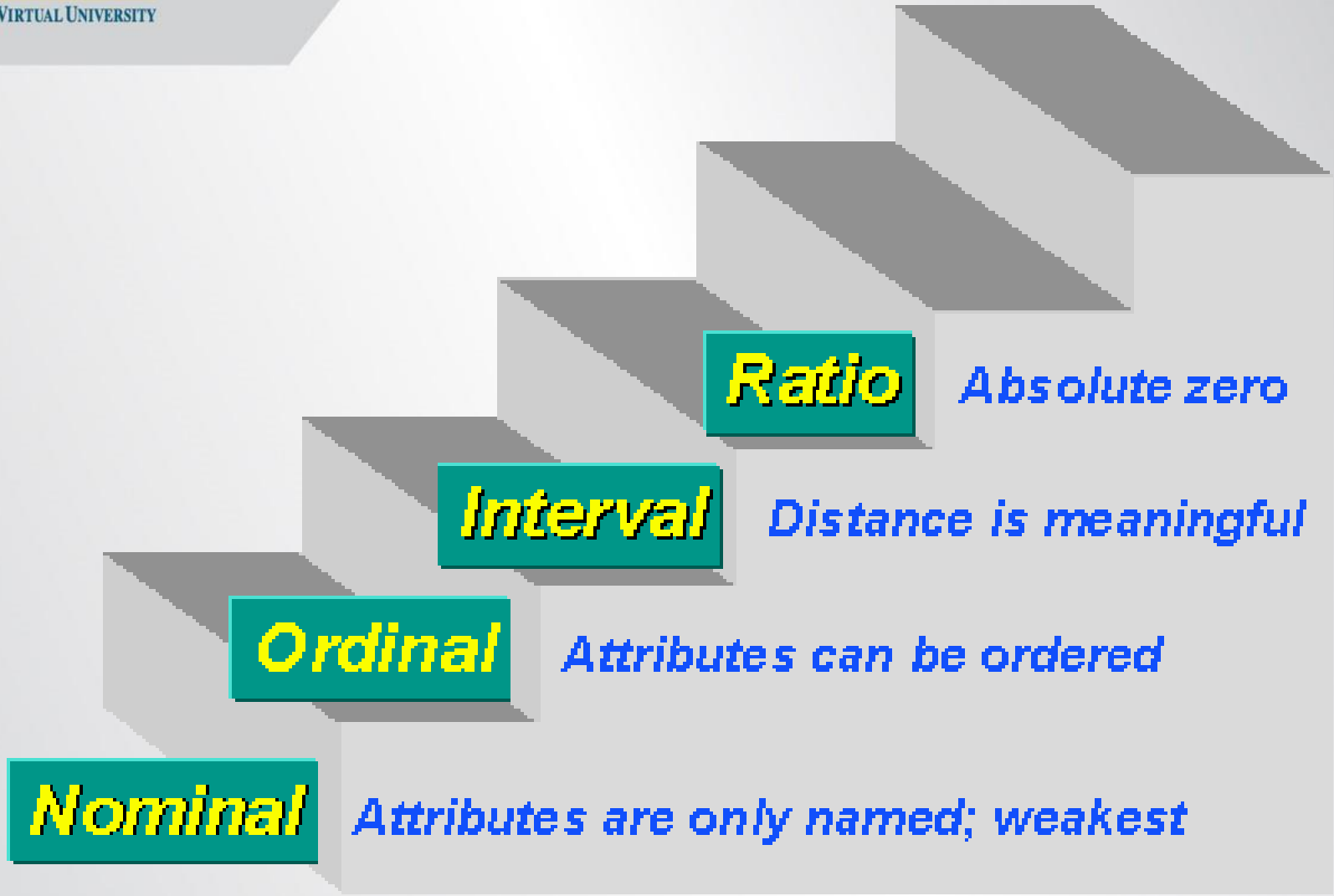
Primary Scales of Measurement

Ordinal Scale

- A ranking scale in which numbers are assigned to objects to indicate the relative extent to which the objects possess some characteristic.
- Can determine whether an object has more or less of a characteristic than some other object, but not how much more or less.
- Any series of numbers can be assigned that preserves the ordered relationships between the objects.
- In addition to the counting operation allowable for nominal scale data, ordinal scales permit the use of statistics based on centiles, e.g., percentile, quartile, median.

51-60	41-50	31-40	20-30	Age

Postgraduate	College	Secondary	Elementary	Education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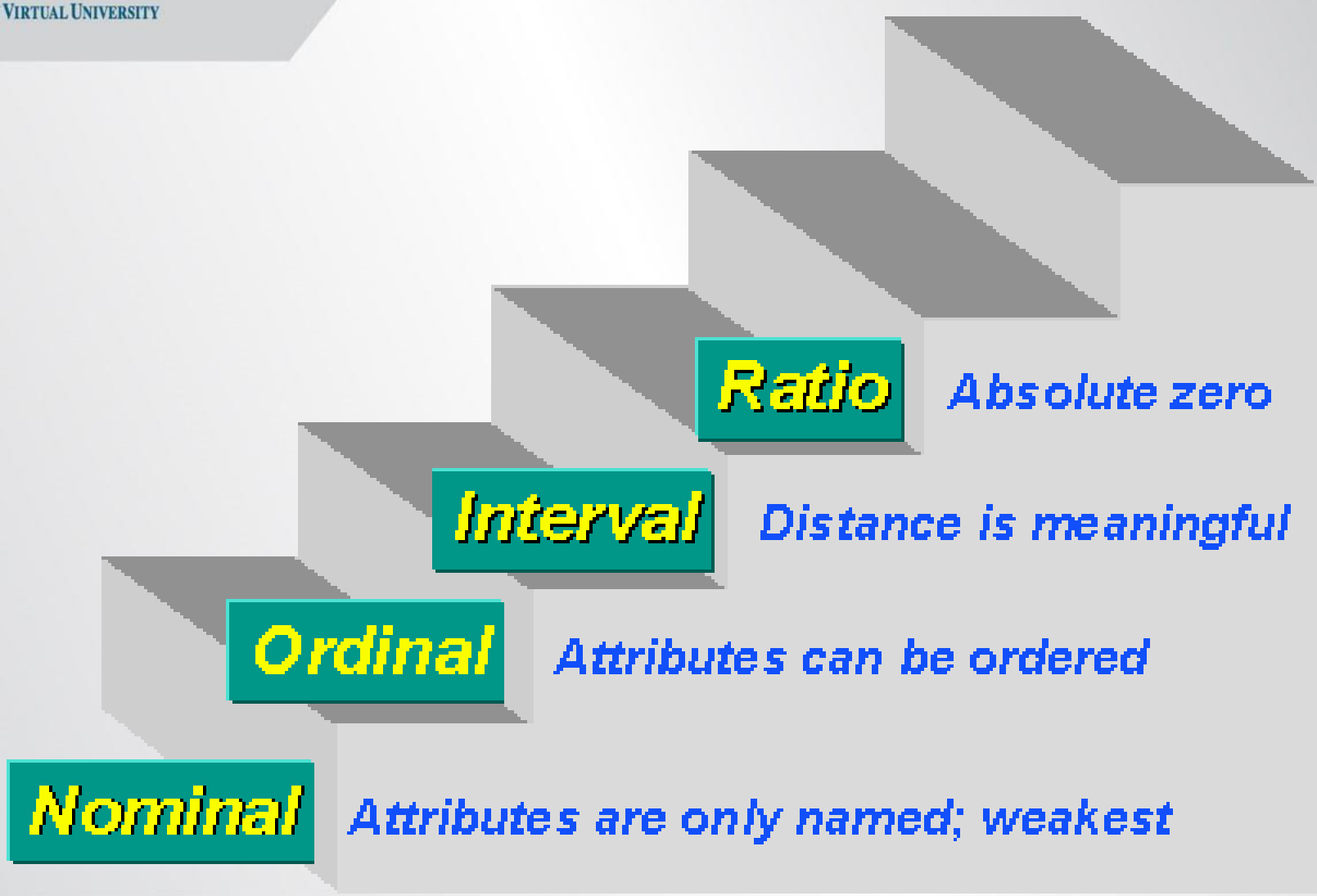
Primary Scales of Measurement

Interval Scale

- Numerically equal distances on the scale represent equal values in the characteristic being measured.
- It permits comparison of the differences between objects.
- The location of the zero point is not fixed. Both the zero point and the units of measurement are arbitrary.
- It is not meaningful to take ratios of scale values.
- Statistical techniques that may be used include all of those that can be applied to nominal and ordinal data, and in addition the arithmetic mean, standard deviation, and other statistics commonly used in marketing research.

Strongly agree	Agree	Neutral	Disagree	Strongly disagree	I am satisfied with my doctor
5	4	3	2	1	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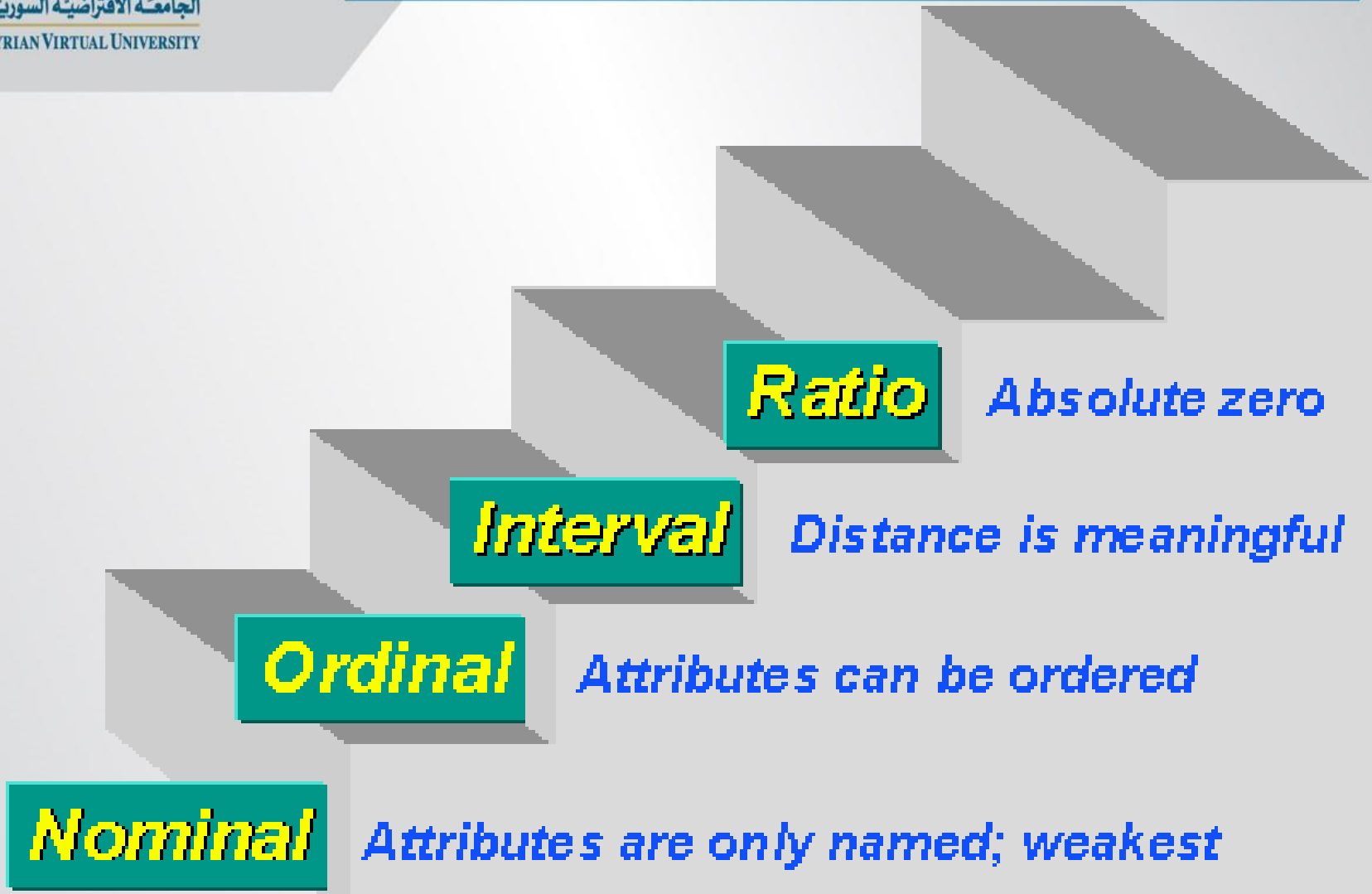
Primary Scales of Measurement

Ratio Scale

- Possesses all the properties of the nominal, ordinal, and interval scales.
- It has an absolute zero point.
- It is meaningful to compute ratios of scale values.
- All statistical techniques can be applied to ratio data.

Emergency cases	Days
200	1
230	2
300	3
400	4
500	5
200	6
100	7
800	8
300	9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Primary Scales of Measurement

Fig. 8.1

Scale		Finish
Nominal	Numbers Assigned to Runners	7, 8, 3
Ordinal	Rank Order of Winners	Third place, Second place, First place
Interval	Performance Rating on a 0 to 10 Scale	8.2, 9.1, 9.6
Ratio	Time to Finish, in Seconds	15.2, 14.1, 13.4