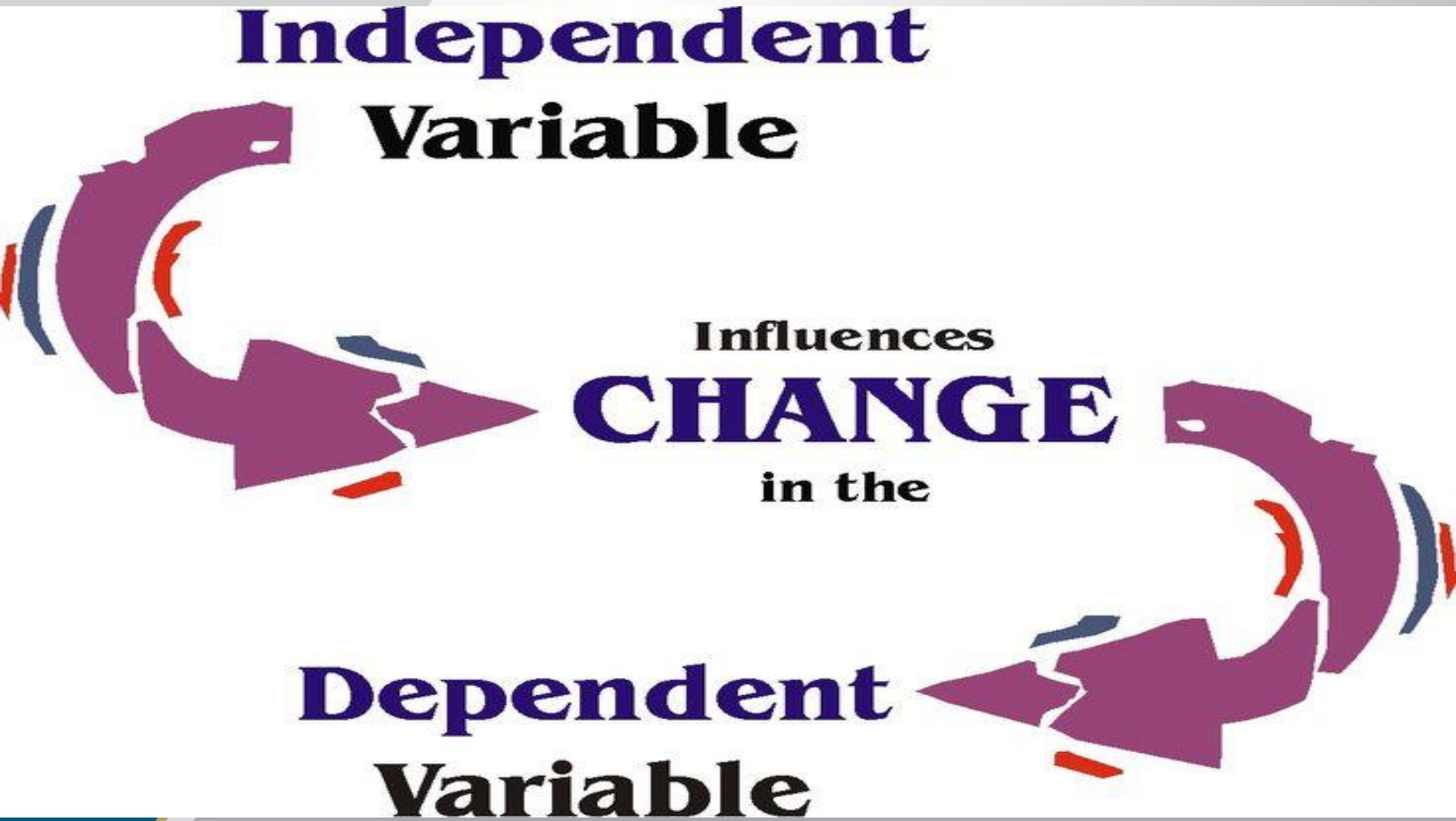
الجامعة الافتراضية السورية
SYRIAN VIRTUAL UNIVERSITY

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.


Independent
Variable
Influences
CHANGE
in the
Dependent
Variable

Types of Hypotheses

Null hypothesis

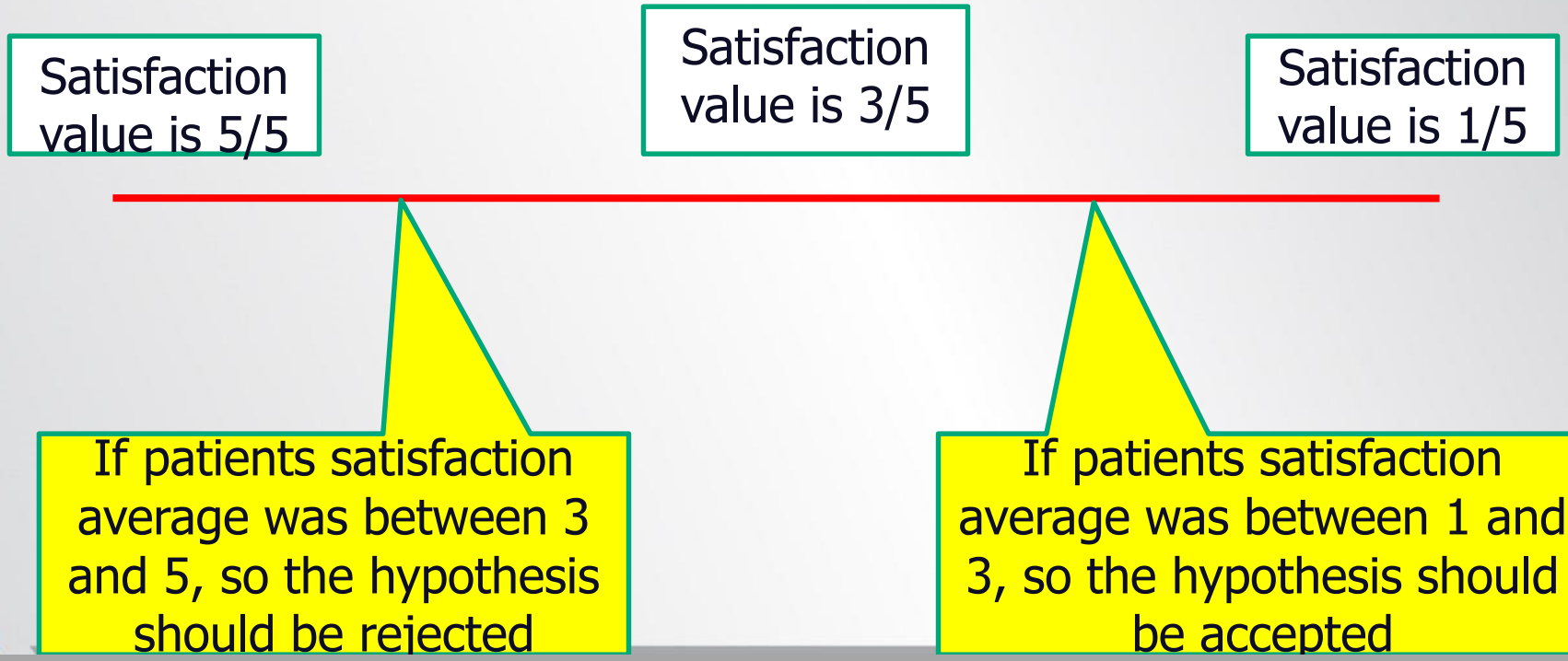
So, researcher denies relationship or influence, or differences.

Types of Hypotheses

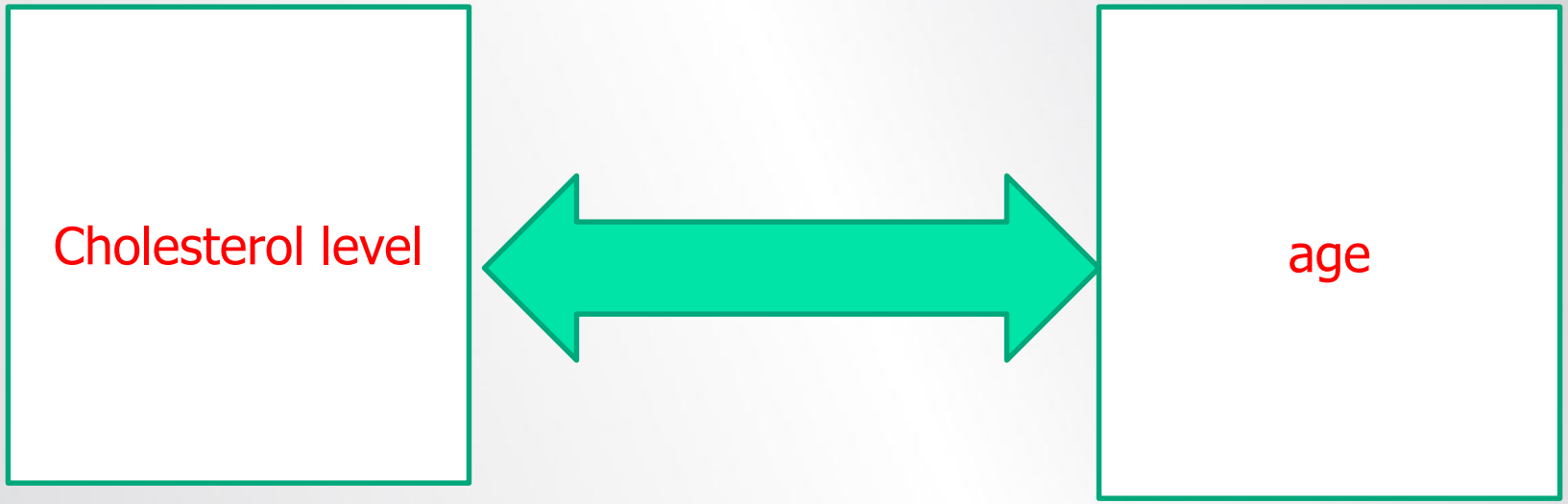
Alternative hypothesis

The researcher suggests relationship or influence, or differences.

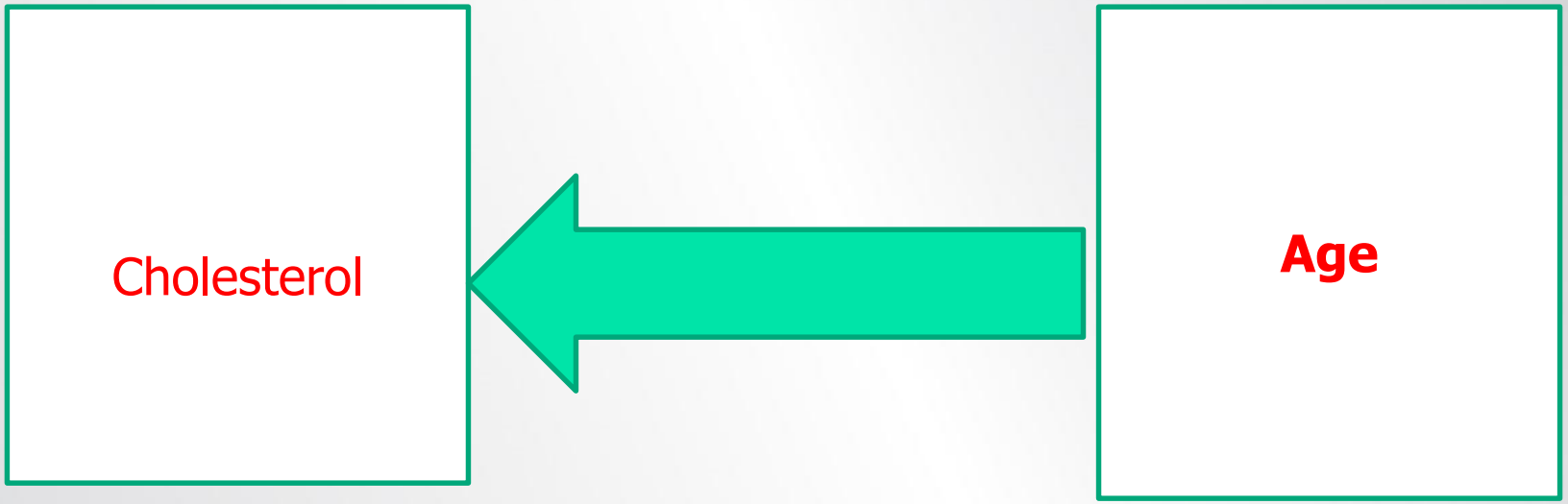
H01: Patients are dissatisfied with their doctors



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



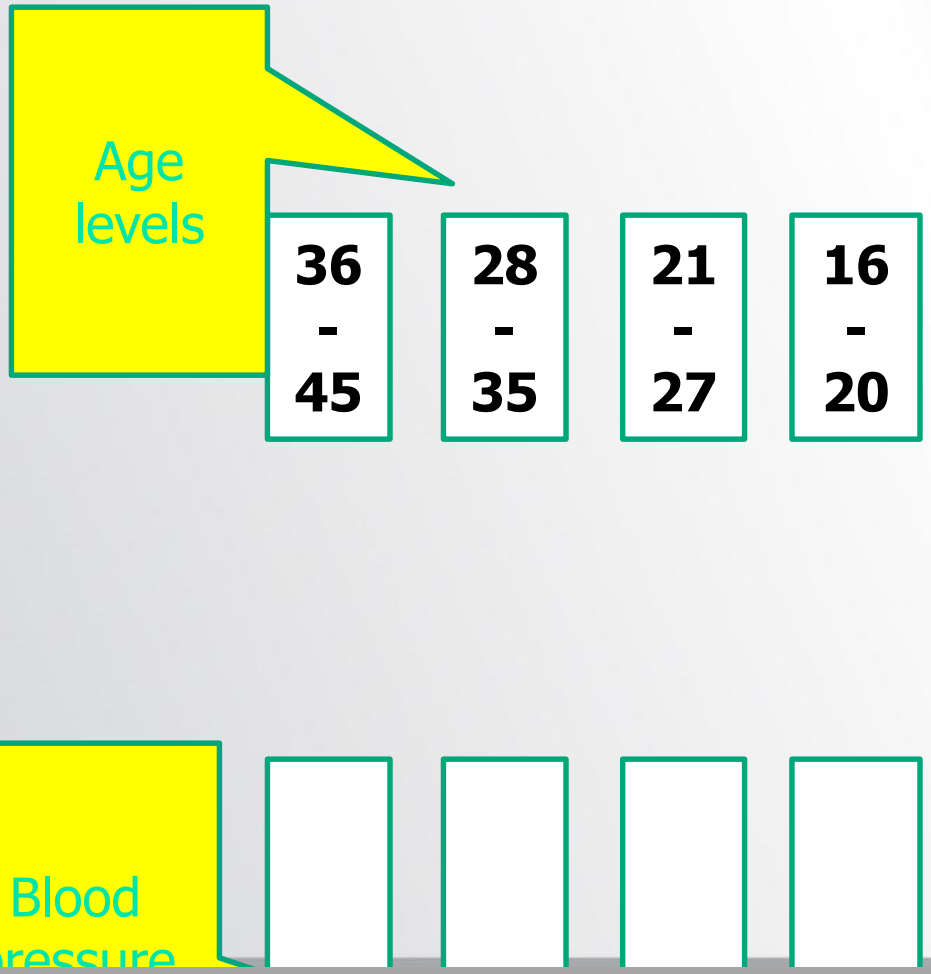
H03: Age does not affect Cholesterol level



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

Female	Male
Blood pressure of female	Blood pressure of male

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



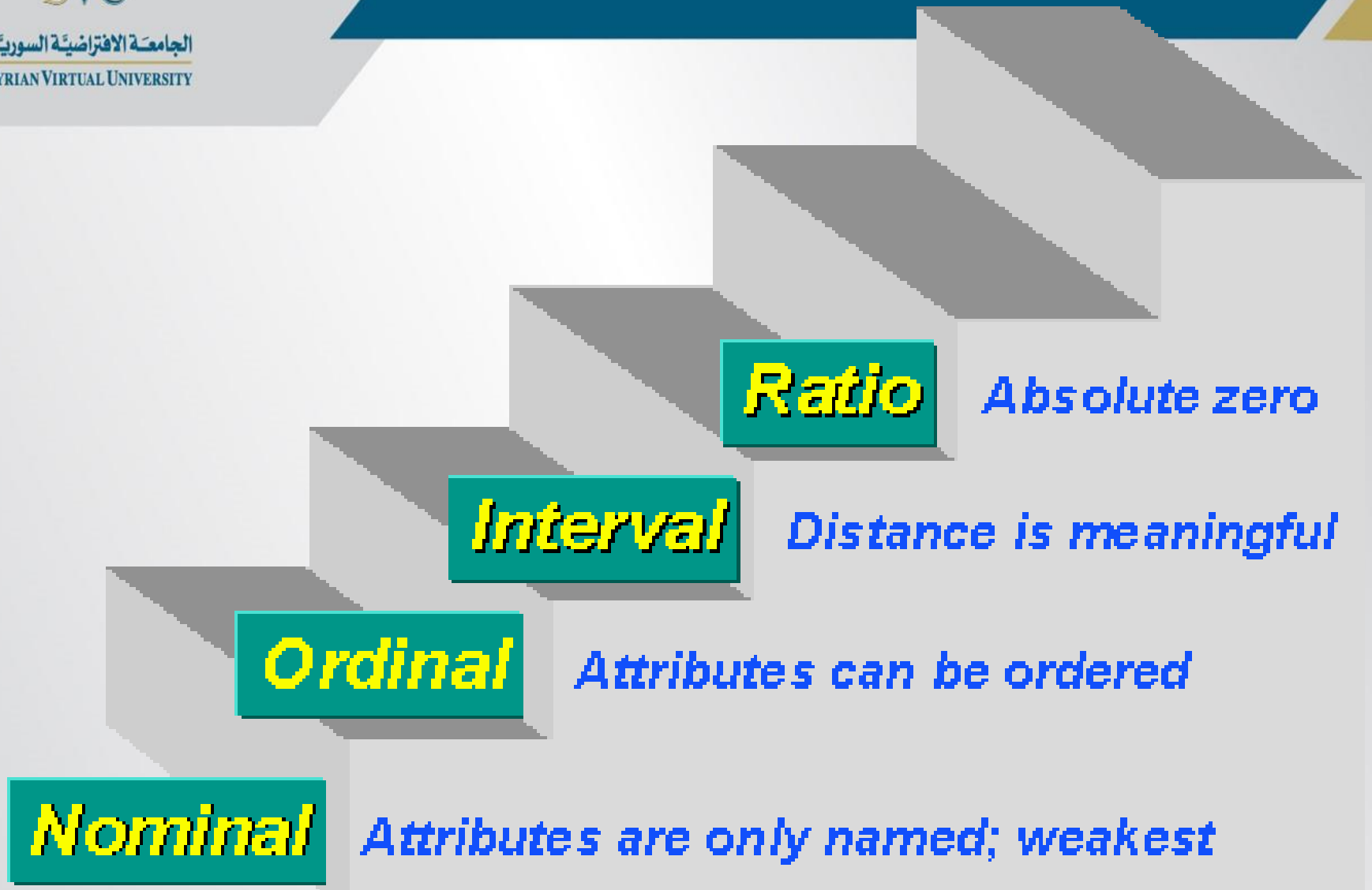
Measurement and Scaling

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

Primary Scales of Measurement

Nominal Scale

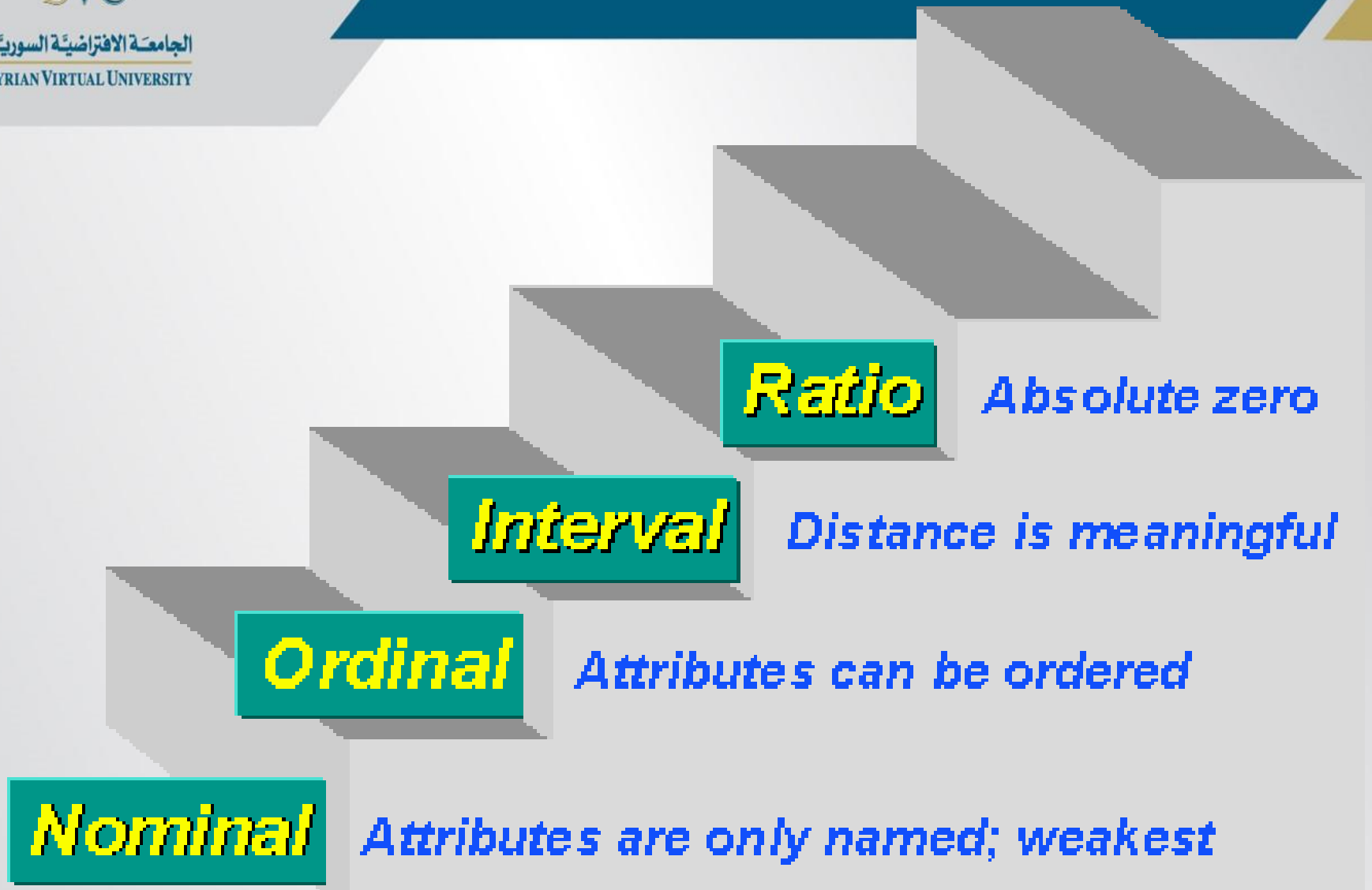
- Hospitals
- Diseases
- Departments
- Viruses
- Hurts


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

Primary Scales of Measurement

Ordinal Scale

- Levels of injuries
- Levels of infection

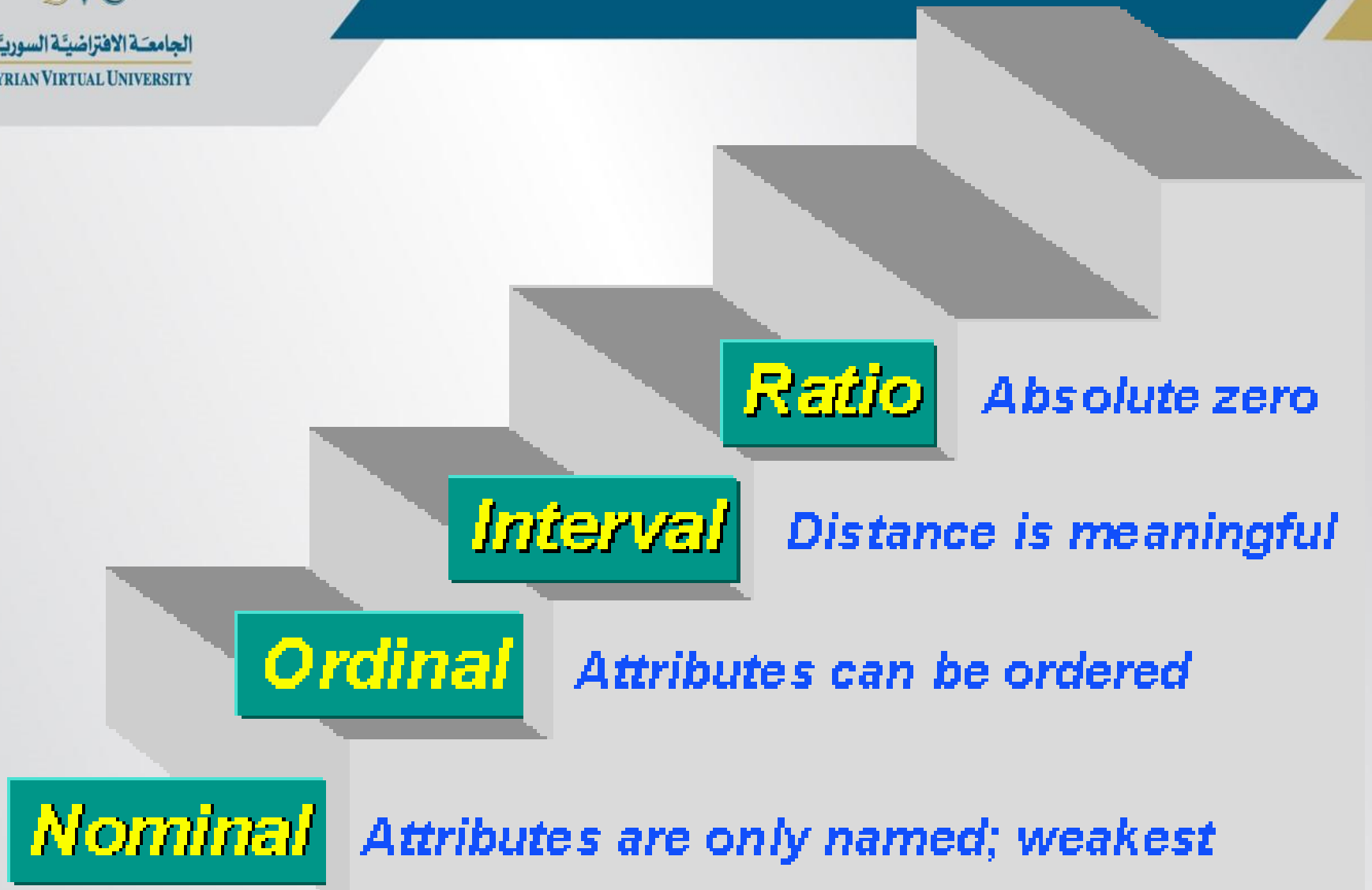

Ratio
Absolute zero
Interval
Distance is meaningful
Ordinal
Attributes can be ordered
Nominal
Attributes are only named; weakest

Primary Scales of Measurement

Interval Scale

- Patients satisfaction with doctors or institutions
- Happiness
- Depression

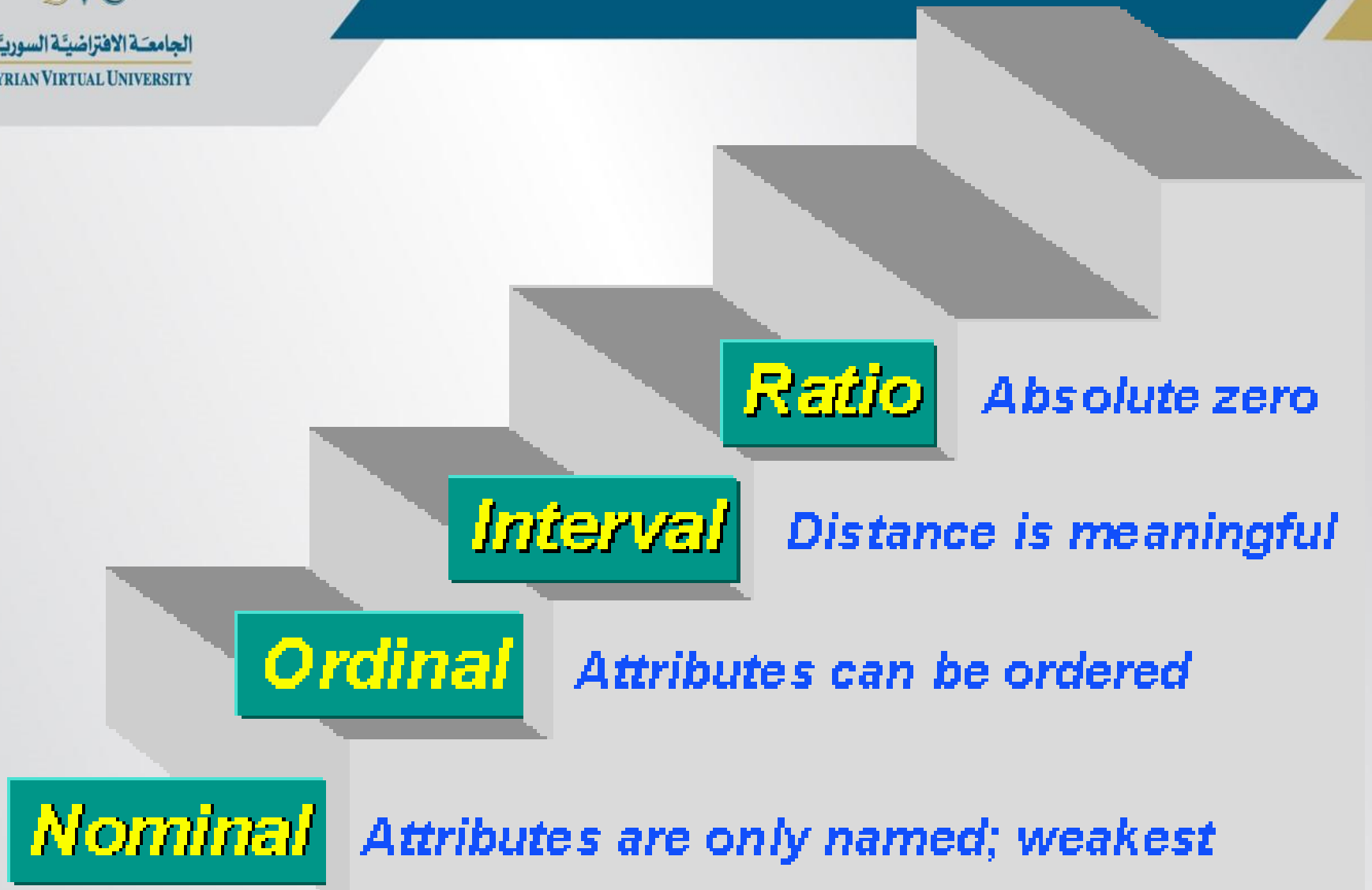
disagree	agree	neutral	disagree	Strongly disagree	
					Depressed
					Happy
					Satisfied


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

Primary Scales of Measurement

Ratio Scale

- Blood pressure
- Cholesterol
- Tall
- Wight
- Depth
- Volume
- Numbers of (white and red blood cells)……


Ratio
Absolute zero
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Distance is meaningful
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Primary Scales of Measurement

Fig. 8.1

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

الرموز المستخدمة في متغير Date

Format	Example
dd-mmm-yy	31-JAN-13
dd-mmm-yyyy	31-JAN-2013
mm/dd/yy	01/31/13
mm/dd/yyyy	01/31/2013
dd.mm.yy	31.01.13
dd.mm.yyyy	31.01.2013
yyddd	13031
yyyyddd	2013031
yy/mm/dd	13/01/31
yyyy/mm/dd	2013/01/31
q Q yy	1 Q 13
q Q yyyy	1 Q 2013
mmm yy	JAN 13
mmm yyyy	JAN 2013
ww WK yy	5 WK 13
ww WK yyyy	5 WK 2013
(name of the day)	THU
(name of month)	JAN
hh:mm	1:02
hh:mm:ss.s	01:02:33.7
dd hh:mm	31 01:02
dd hh:mm:ss.s	31 01:02:33.7
dd-mmm-yyyy hh:mm	31-JAN-2013 01:02
dd-mmm-yyyy hh:mm:ss.s	31-JAN-2013 01:02:33.7

المقاييس الإحصائية الوصفية
Descriptive Statistical Measures

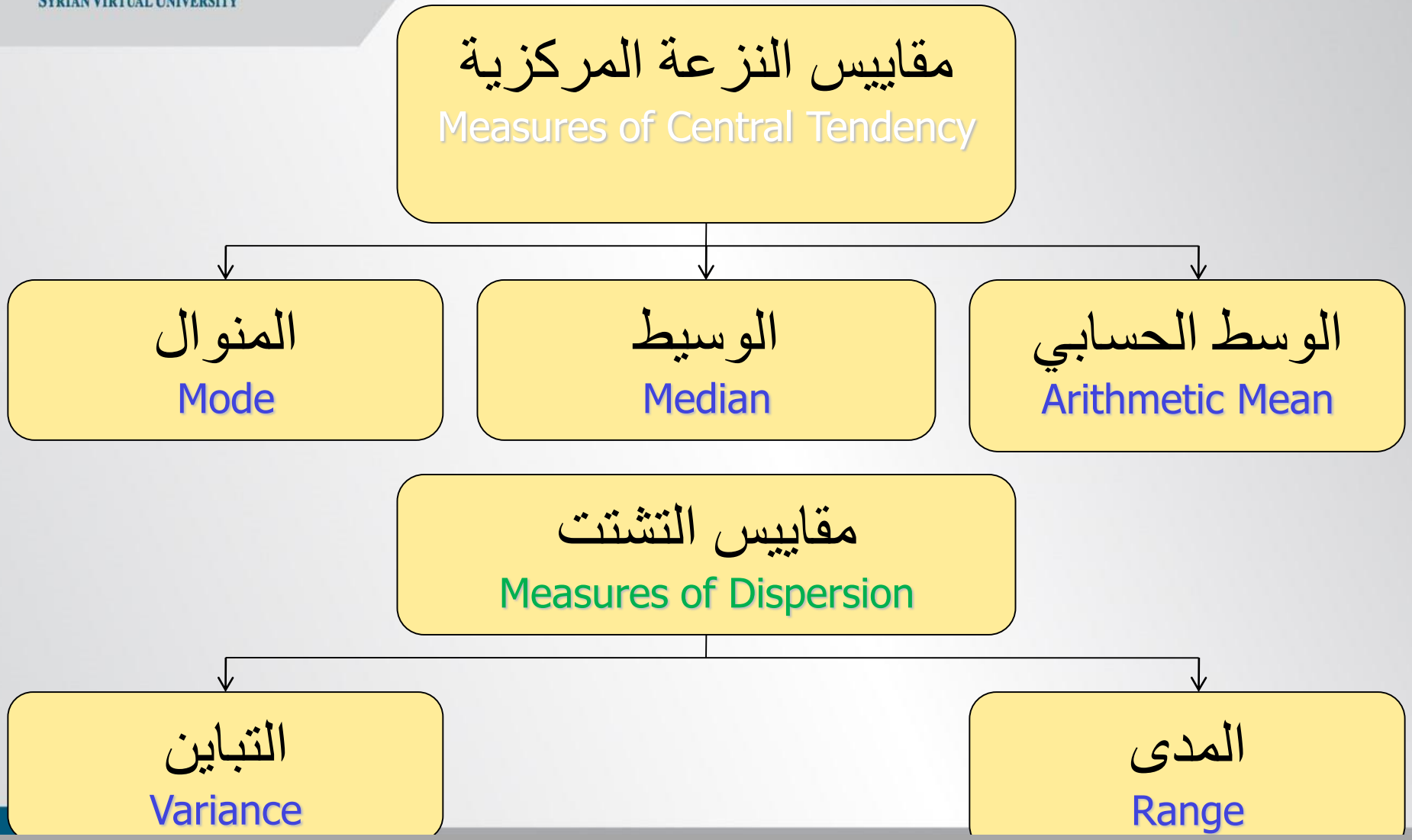
١ - مقاييس النزعة المركزية: Measures of Central Tendency

هى قيم مركزية (متوسطة) تتمركز او تتوزع حولها البيانات.

٢ - مقاييس التشتت: Measures of Dispersion

هى درجة تقارب او تباعد البيانات عن بعضها البعض.

المقاييس الإحصائية الوصفية



مقاييس النزعة المركزية (الوسط الحسابي)

١ـ الوسط الحسابي
Arithmetic Mean

يعرف الوسط الحسابي لمجموعة من البيانات، بأنه حاصل جمعها مقسوماً على عددها، يرمز للوسط الحسابي بالرمز μ ليمثل متوسط المجتمع أو $\bar{x}$ ليمثل متوسط العينة.

مقاييس النزعة المركزية (الوسط الحسابي)

مزايا الوسط الحسابي

- تدخل جميع القيم في حسابه.
- سهولة حسابه والتعامل معه جبرياً.
- يعتبر الأساس في معظم عمليات الإحصاء.

مقاييس النزعة المركزية (الوسيط)

٢ـ الوسيط Median

هو القيمة العددية التي تقل عنها نصف البيانات (50%) ويزيد عنها النصف الآخر. ويرمز له بالرمز (m). ويعرف كذلك بأنه مقياس الموقع لأن قيمته تعتمد على موقعه في البيانات.

طرق حسابه

إذا كانت $x_1, x_2, \ldots, x_n$ تمثل n من بيانات العينة

لإيجاد الوسيط يجب اتباع الآتي:

١ـ ترتيب البيانات تصاعديا أو تنازليا.

٢ـ نوجد موقع الوسيط $= \frac{n+1}{2}$

مقاييس النزعة المركزية (المنوال)

٣- المنوال Mode

هو المفردة ذات القيمة الأكثر شيوعا أو تكراراً.ويرمز له بالرمز D

مقاييس التشتت (المدىRang)

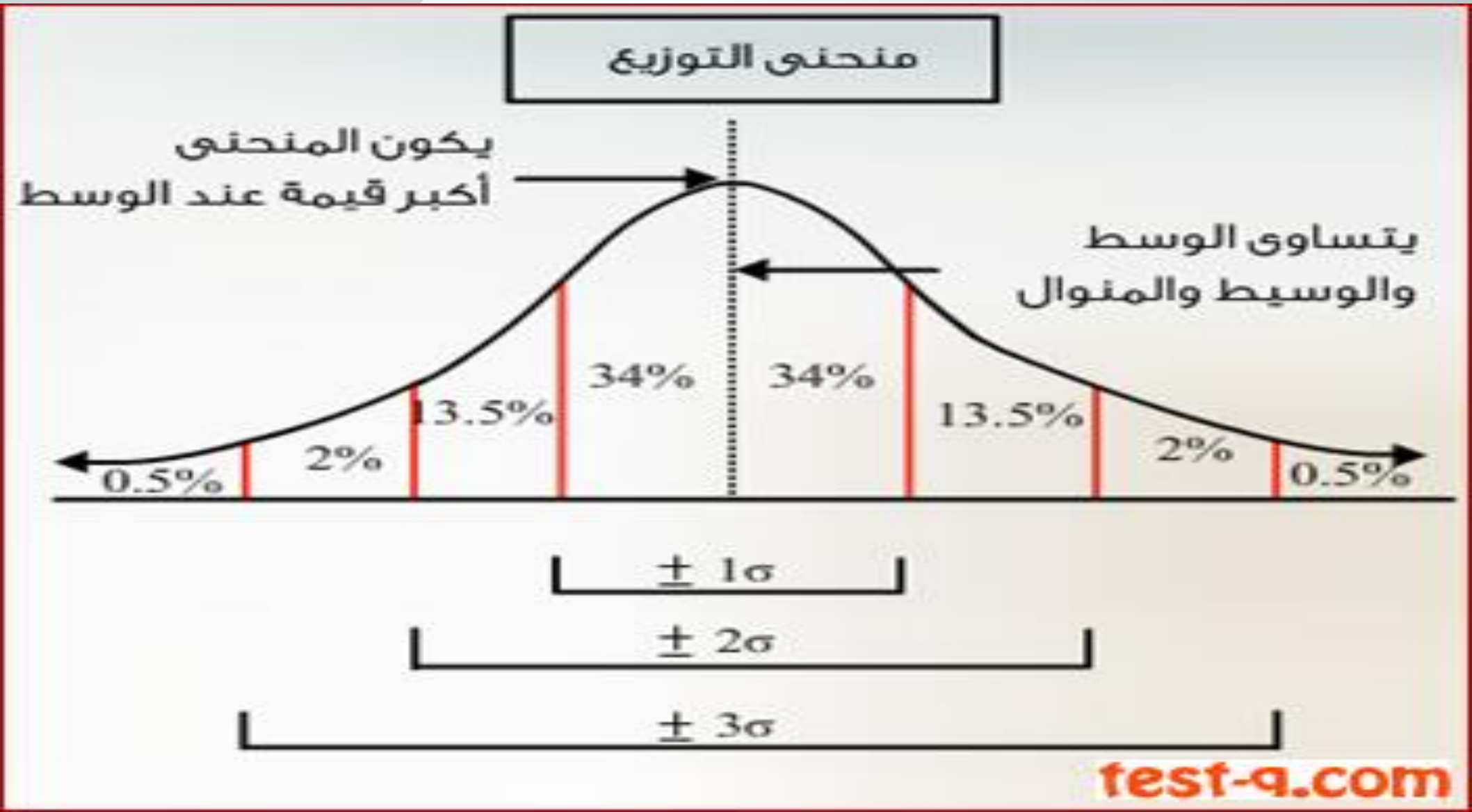
هو الفرق بين أكبر قيمة وأقل قيمة من البيانات (من نوع Scale)، ويرمز له بالرمز (R).

مقاييس التشتت (التباين والانحراف المعياري)

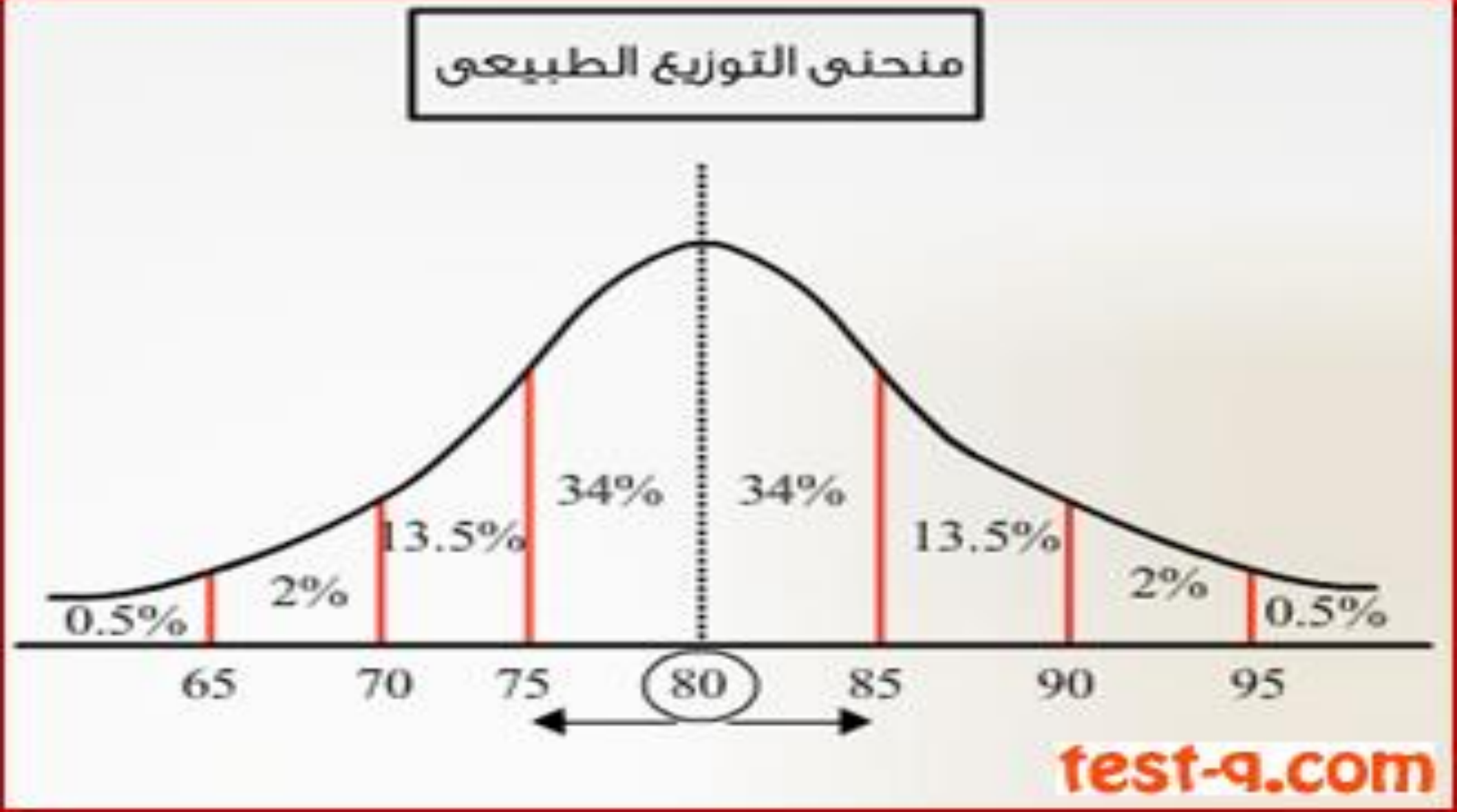
التباين للعينة هو عبارة عن مجموع مربعات انحرافات القيم عن وسطها الحسابي مقسوماً على (عدد هذه القيم مطروح منه واحد).

الانحراف المعياري هو الجذر التربيعي الموجب للتباين.

Normal Distribution - Explained Simply (part 1)

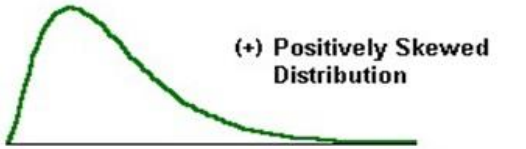


An example

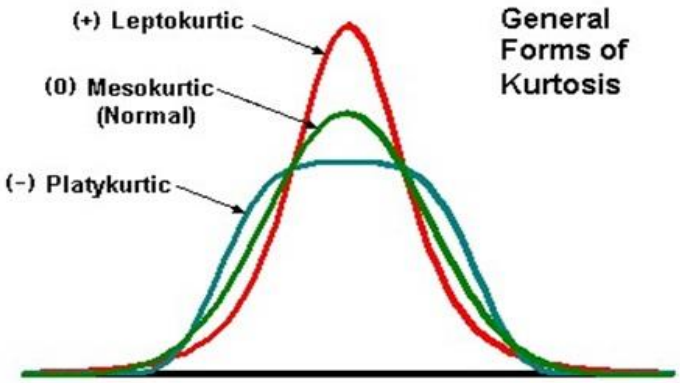


Skewness/Kurtosis

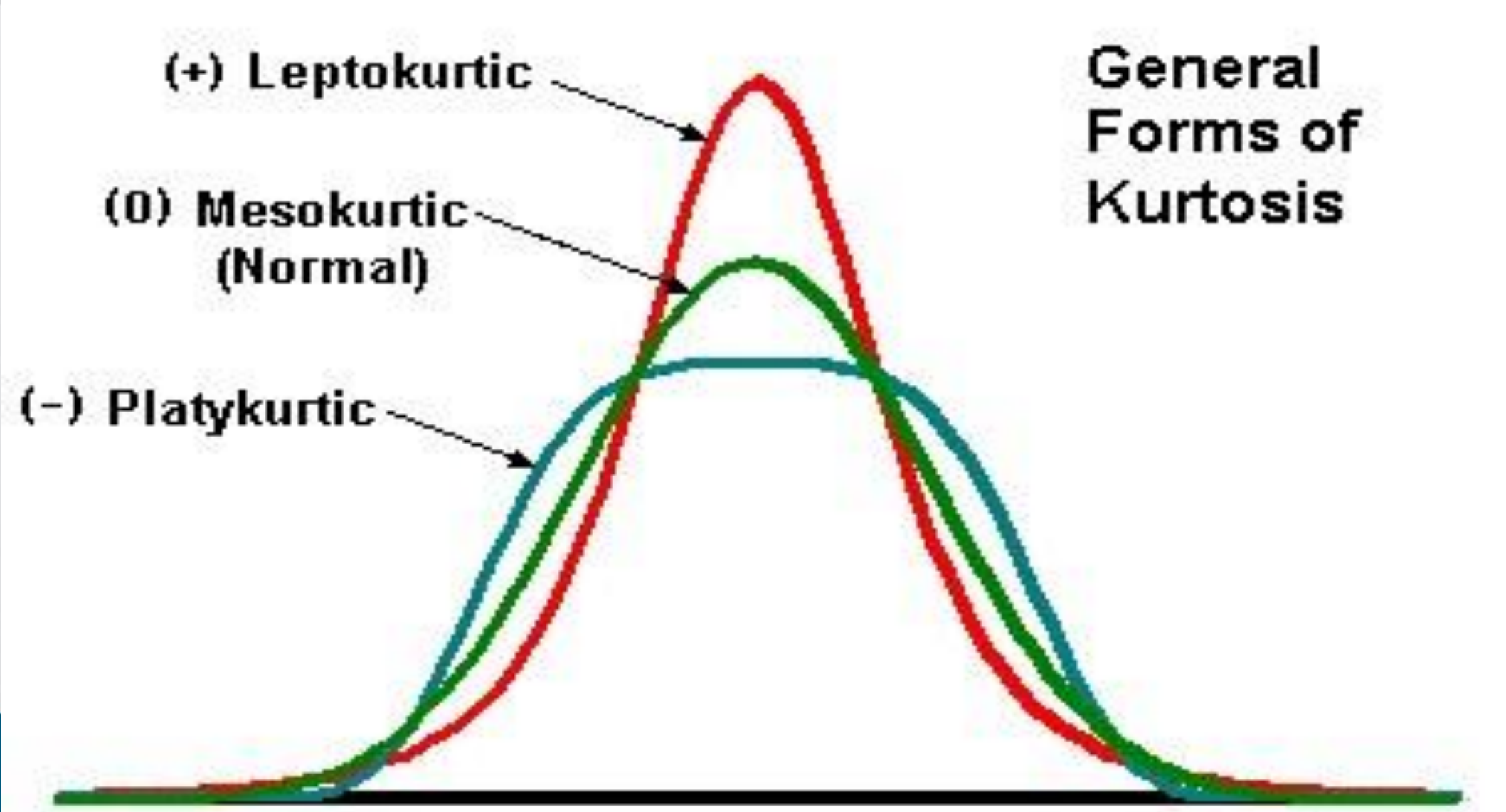
Skewness is the degree of departure from symmetry of a distribution. A positively skewed distribution has a "tail" which is pulled in the positive direction. A negatively skewed distribution has a "tail" which is pulled in the negative direction.



Kurtosis is the degree of peakedness of a distribution. A normal distribution is a mesokurtic distribution. A pure leptokurtic distribution has a higher peak than the normal distribution and has heavier tails. A pure platykurtic distribution has a lower peak than a normal distribution and lighter tails.

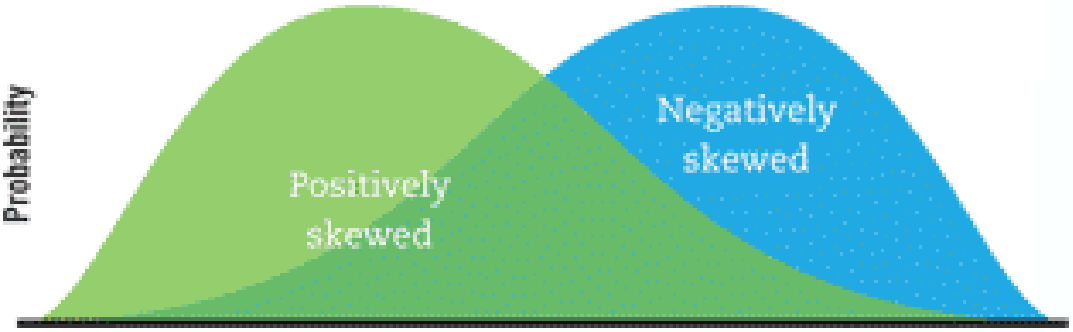


Normal Distribution



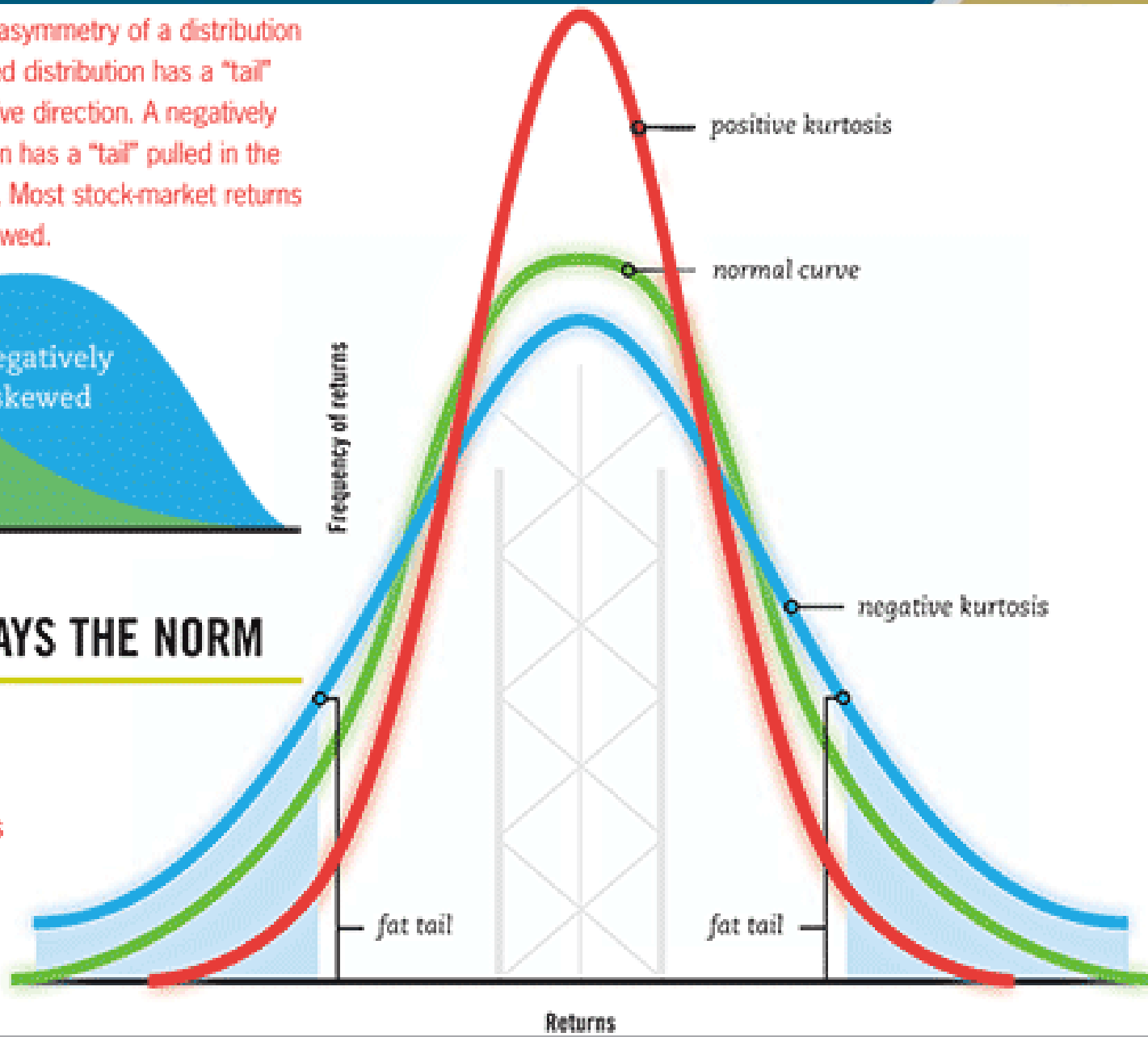
Normal Distribution

Skewness is the asymmetry of a distribution A positively skewed distribution has a "tail" pulled in the positive direction. A negatively skewed distribution has a "tail" pulled in the negative direction. Most stock-market returns are negatively skewed.



NORMAL NOT ALWAYS THE NORM

Kurtosis refers to how peaked the curve is: steeper means positive kurtosis and flatter means negative kurtosis. Fat tails occur when there are more outsize returns on the downside or upside, or both, than the normal curve suggests.

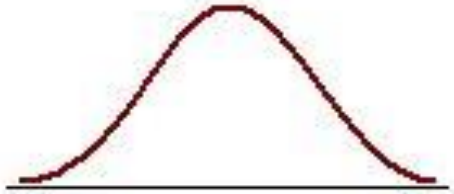


Normal Distribution

Skewness

The coefficient of Skewness is a measure for the degree of symmetry in the variable distribution.

Negatively skewed distribution
or Skewed to the left
Skewness <0



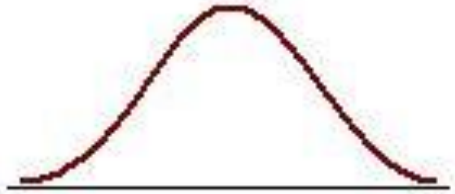
Normal distribution
Symmetrical
Skewness = 0

Positively skewed distribution
or Skewed to the right
Skewness > 0

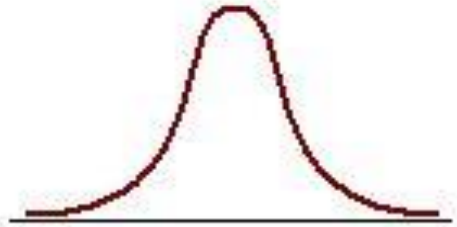
Kurtosis

The coefficient of Kurtosis is a measure for the degree of peakedness/flatness in the variable distribution.

Platykurtic distribution
Low degree of peakedness
Kurtosis <0



Normal distribution
Mesokurtic distribution
Kurtosis = 0



Leptokurtic distribution
High degree of peakedness
Kurtosis > 0