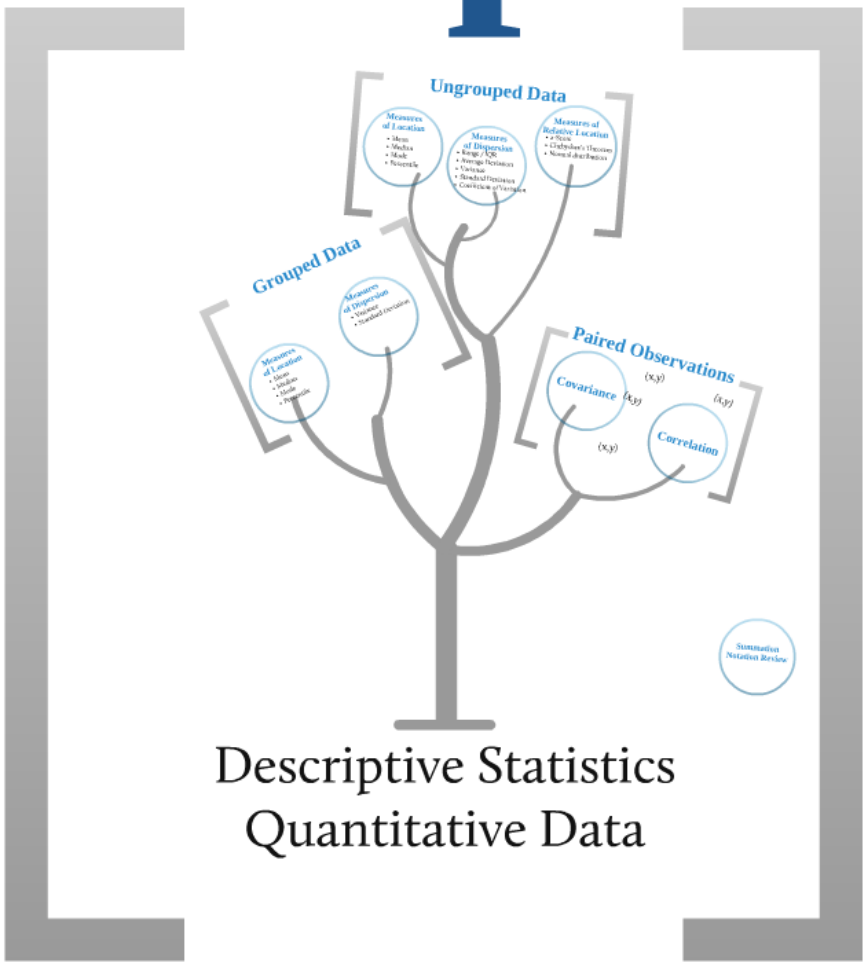
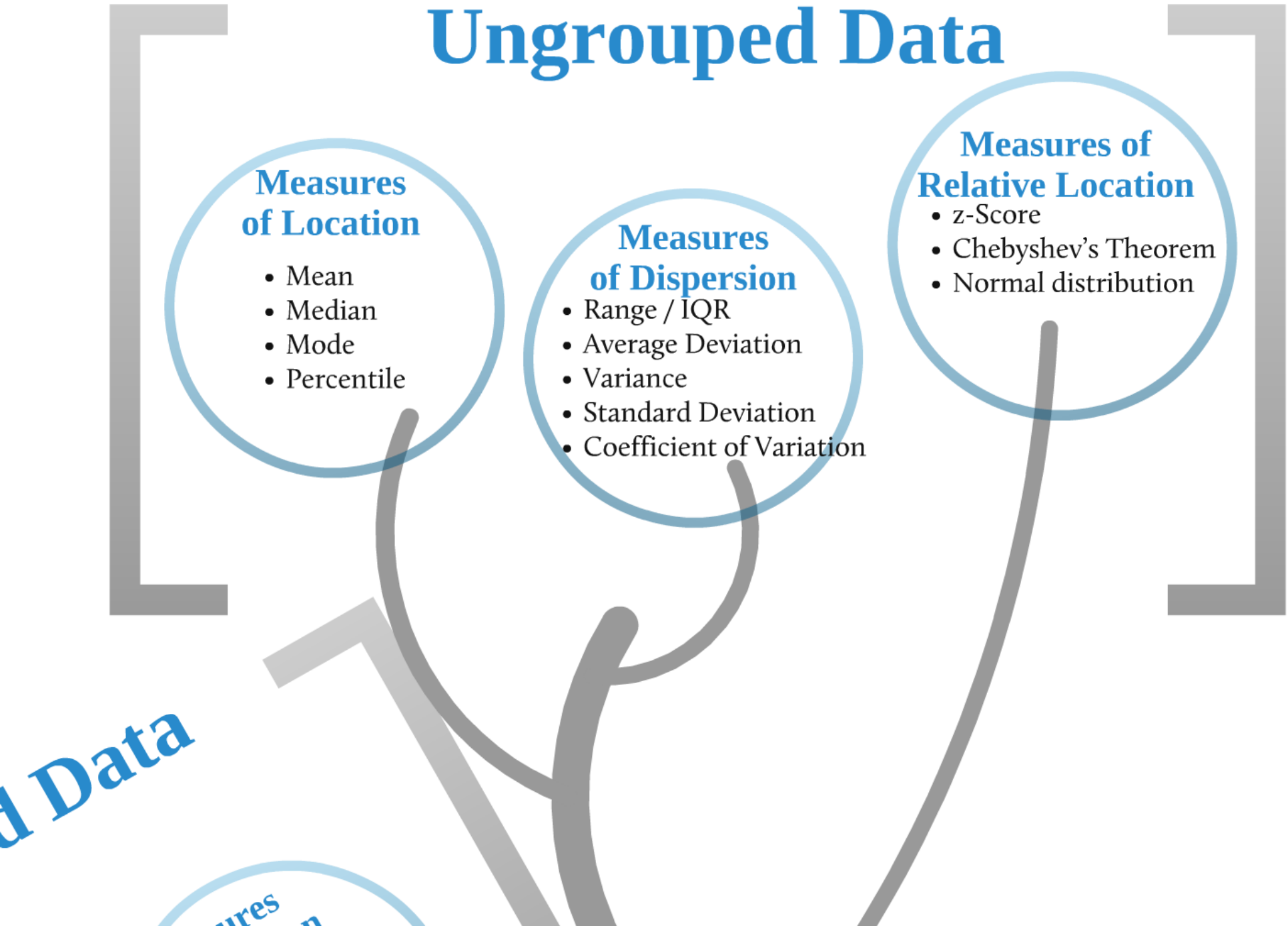
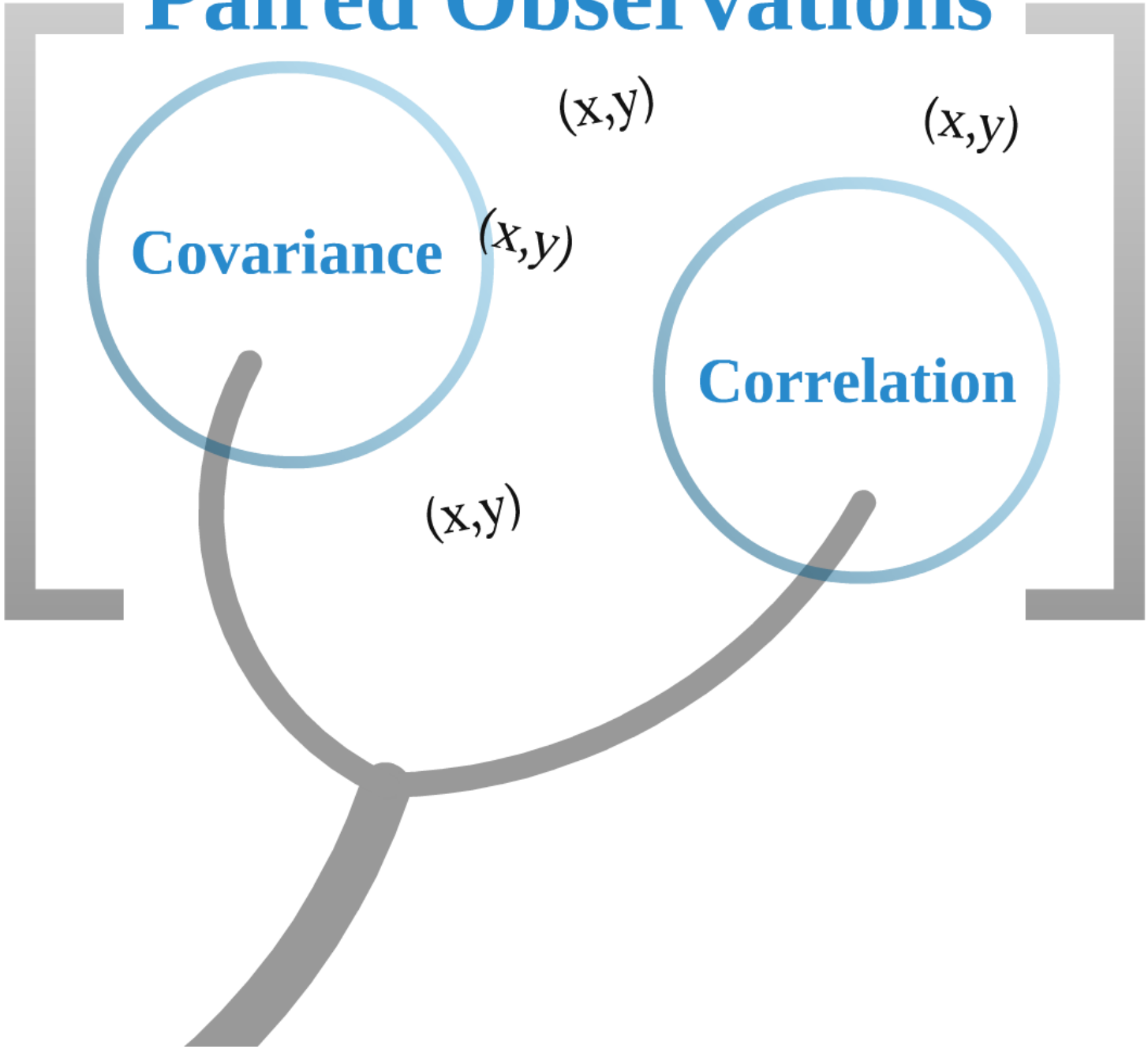
Chapter 3



Descriptive Statistics
Quantitative Data


Ungrouped Data
Measures of Location
Mean
Median
Mode
Percentile
Measures of Dispersion
Range / IQR
Average Deviation
Variance
Standard Deviation
Coefficient of Variation
Measures of Relative Location
z-Score
Chebyshev's Theorem
Normal distribution

Paired Observations



Grouped Data

Measures of Location

- Mean
- Median
- Mode
- Percentile

Measures of Dispersion

- Variance
- Standard Deviation

Summation Notatation

$$\sum_{i=1}^{n}$$

The purpose of the summation notation is to show the summation of a series of values, variables, or functions in a simplified or generalized manner.

Values are given in a subscripted manner:

- If we call the category X then we would refer to the age of the first individual as X1, the second as X2, and so on.

Ungrouped Data

i	X_i	X_i	X_i^2	$(X_i-\overline{X})$	$(X_i-\overline{X})^2$
1	X_1	15	225	2.875	8.265625
2	X_2	10	100	-2.125	4.515625
3	X_3	5	25	-7.125	50.765625
4	X_4	9	81	-3.125	9.765625
5	X_5	14	196	1.875	3.515625
6	X_6	20	400	7.875	62.015625
7	X_7	6	36	-6.125	37.515625
8	X_8	18	324	5.875	34.515625

$$n = 8$$

$$\sum x_i =$$

$$\sum x_i^2 =$$

$$\sum x_i^2 \neq \left(\sum x_i\right)^2$$

Why?

$$\bar{x} = \frac{\sum x_i}{n}$$

$$s^2 = \frac{n\sum x_i^2 - (\sum x_i)^2}{n(n-1)}$$

$$\sum(x_i - \bar{x})^2$$

7	X_7	6	36	-6.125	37.5
8	X_8	18	324	5.875	34.5

$$n = 8$$

$$\sum x_i =$$

$$\sum x_i^2 =$$

$$\sum x_i^2 \neq$$

W

$$\bar{x} = \frac{\sum x_i}{n}$$

$$s^2 = \frac{n\sum x_i^2 - (\sum x_i)^2}{n(n-1)}$$

$$s^2 = \frac{\sum (x_i - \bar{x})^2}{n-1}$$

Though this method looks easy it is very difficult. (DO NOT use it)

Grouped Data

f_i	M_i	f_iM_i	$f_iM_i^2$
5	10	50	500
9	20	180	3600
20	30	600	18000
8	40	320	12800
6	50	300	15000
2	60	120	7200

$$n = \sum f_i$$

$$\sum f_i M_i =$$

$$\sum f_i M_i^2 =$$

$$s^2 = \frac{n\sum f_i M_i^2 - (\sum f_i M_i)^2}{n(n-1)}$$

Parameter - a descriptive measure of a population

Statistic - a descriptive measure of a sample

Description	Sample	Population
size	n	N
mean	$\overline{x}$	μ
variance	s^2	σ^2
standard deviation	s	σ
proportion	$\overline{\rho}$	ρ
slope	b_1	β_1
covariance	s_{xy}	σ_{xy}
Correlation Coefficient	r_{xy}	ρ_{xy}

Did you know

e	s^2	σ^2
d deviation	s	σ
on	$\bar{\rho}$	ρ
	b_1	β_1
nce	s_{xy}	σ_{xy}
tion Coefficient	r_{xy}	ρ_{xy}

Did you know...?

Brain Drain? Graduate outcomes for the University of Nebraska at Kearney Nebraska Workforce Development (2006)

- 69% of the 2003-2004 UNK graduates were employed in NE
- 64% of the undergraduate and 84% of the graduates work in NE
- Highest annual earnings is in Operations Management - $35,437 (compared to all UNK)
- UNK Management graduates have the highest percent of graduates working in Nebraska.