Inferencial statistics

Section No. (3)

Chapter (3): Correlation Coefficient

Presented by

Ghidaa abobakr Hamouda

Assistant Lecturer in Department of
Insurance, Statistics and Mathematics

Choose the correct answer

> **To study the relationship between the price of a product and its demand the following data is obtained which follows the normal distribution. Using a 95% confidence level, can we conclude that the correlation coefficient is significantly different from zero**

Price of product	14	16	12	15	11	13	10
Demand (in units)	175	90	250	120	400	215	430

1) The appropriate correlation coefficient between two variables

a) Cramer	b) spearman	c) chi-square	d) Pearson

2) The correlation coefficient between two variables =

a) 0.08	b) 0.87	c) 0.97	d) - 0.97

3) The direction and strength of the relation between two variables

a) positive weak	b) positive strong	c) negative weak	d) negative strong

4) Scatter plot between two variables

a) straight line that slopes upward from left to right	b) straight line that slopes downward from left to right	c) curve

5) State the null and alternate hypothesis

H0 : ρ =0 H1: ρ≠0	H0: ρ ≠ 0 H1: ρ =0	H0: ρ ≤ 0 H1: ρ > 0	H0: ρ ≥ 0 H1: ρ < 0

6) The level of significance

a) 0.095	b) 0.5	c) 0.95	d) 0.05

7) Choose the appropriate test to test Is the correlation coefficient is significantly different from zero

a) t-distribution	b) chi-square	c) F-distribution	d) Z-distribution

8) The hypothesis is…

a) One- Tailed	b) Two-Tailed	c)Zero	d) mean

9) The value of the test statistics

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{-0.972*\sqrt{5}}{\sqrt{1-0.9409}} = -8.94$$

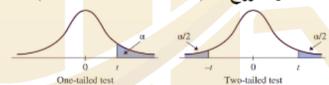| a) 0.095	b) 0.5	c) 0.95	d) -8.94

10) The critical value is

(*t*-distribution table) جدول توزيع *t*

Degree of Freedom (df)	Confidence Intervals					
	0.20	0.10	0.05	0.02	0.01	0.001
	Level of significance for One-Tailed Test (Alpha)					
	0.10	0.05	0.02	0.01	0.001	0.0005
	Level of significance for Two-Tailed Test (Alpha)					
	0.20	0.10	0.05	0.02	0.01	0.001
1	3.0777	6.3138	12.7062	31.8205	63.6567	636.6192
2	1.8856	2.9200	4.3027	6.9646	9.9248	31.5991
3	1.6377	2.3534	3.1824	4.5407	5.8409	12.9240
4	1.5332	2.1318	2.7764	3.7469	4.6041	8.6103
5	1.4759	2.0150	2.5706	3.3649	4.0321	6.8688
6	1.4398	1.9432	2.4469	3.1427	3.7074	5.9588

$$t_{(\alpha, n-2)} = t_{(0.05, 5)} = 2.57$$

a) 0.095	b) 0.5	c) 0.95	d) 2.57

11) The decision rule is

a) correlation is significant	b) don't reject H0	c) correlation is insignificant	d) reject H1

> **Suppose we are interested in the relationship between the heights and weights of a group of students. The following data were obtained which follow the normal distribution. can we conclude that the correlation coefficient is significantly different from zero?**

>

Correlations

		height	weight
height	Pearson Correlation	1	.887**
	Sig. (2-tailed)		.003
	N	8	8
weight	Pearson Correlation	.887**	1
	Sig. (2-tailed)	.003	
	N	8	8

**. Correlation is significant at the 0.01 level (2-tailed).

12) The appropriate correlation coefficient between two variables

a) Cramer	b) spearman	c) chi-square	d) Pearson

13) The correlation coefficient between two variables =

a) 0.08	b) - 0.97	c) 0.97	d) 0.887

14) The direction and strength of the relation between two variables

a) positive weak	b) positive strong	c) negative weak	d) negative strong

15) Scatter plot between two variables

a) straight line that slopes upward from left to right	b) straight line that slopes downward from left to right	c) curve

16) State the null and alternate hypothesis

$H0 : \rho = 0$ $H1: \rho \neq 0$	$H0: \rho \neq 0$ $H1: \rho = 0$	$H0: \rho \leq 0$ $H1: \rho > 0$	$H0: \rho \geq 0$ $H1: \rho < 0$

17) The level of significance

a) 0.095	b) 0.5	c) 0.95	d) 0.01

18) Choose the appropriate test to test Is the correlation coefficient is significantly different from zero

a) t-distribution	b) chi-square	c) F-distribution	d) Z-distribution

19) The hypothesis is…

a) One- Tailed	b) Two-Tailed	c)Zero	d) mean

20) The value of the test statistics

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} = \frac{0.887*\sqrt{6}}{\sqrt{1-0.784}} = 4.67$$

a) 0.095	b) 0.5	c) 0.95	d) 4.67

21) The p-value is

a) 0.095	b) 0.5	c) 0.95	d) 0.003

22) The decision rule is

p-value < 0.01

a) correlation is significant	b) don't reject H0	c) correlation is insignificant	d) reject H1

USC
FACULTY OF COMMERCE
كلية التجارة
جامعة مدينة السادات

UNIVERSITY OF SADAT CITY
USC
جامعة مدينة السادات

> **The city council of Sadat city wants to study the relation between the work of hours, number of crime, and increasing number of police in street. can we conclude that the correlation coefficient is significantly different from zero?**

Correlations

		workhour	police	crime
workhour	Pearson Correlation	1	.878**	-.711*
	Sig. (2-tailed)		.004	.048
	N	8	8	8
police	Pearson Correlation	.878**	1	-.874**
	Sig. (2-tailed)	.004		.004
	N	8	8	8
crime	Pearson Correlation	-.711*	-.874**	1
	Sig. (2-tailed)	.048	.004	
	N	8	8	8

**. Correlation is significant at the 0.01 level (2-tailed).

23) The correlation coefficient between work hour, number of police =

a) 0.08	b) 0.87	c) 0.97	d) 0.878

24) The correlation coefficient between number of crimes, work hour =

a) 0.08	b) 0.87	c) 0.97	d) -0.711

25) The direction and strength of the relation between number of police, number of crimes

a) positive weak	b) positive strong	c) negative weak	d) negative strong

26) Scatter plot between work hour, number of police

a) straight line that slopes upward from left to right	b) straight line that slopes downward from left to right	c) curve

27) State the null and alternate hypothesis

$H0 : \rho_i = 0$ $H1: \rho_i \neq 0$	$H0: \rho_i \neq 0$ $H1: \rho_i = 0$	$H0: \rho_i \leq 0$ $H1: \rho_i > 0$	$H0: \rho_i \geq 0$ $H1: \rho_i < 0$

28) The decision rule between number of crimes, work hour

p-value (0.048) > 0.01

a) correlation is significant	b) don't reject H0	c) correlation is insignificant	d) reject H1

29) The decision rule between number of crimes, number of police

a) correlation is significant	b) don't reject H0	c) correlation is insignificant	d) reject H1