

14.E: Correlations (Exercises)

1. What does a correlation assess?

Answer:

Correlations assess the linear relation between two continuous variables

2. What are the three characteristics of a correlation coefficient?

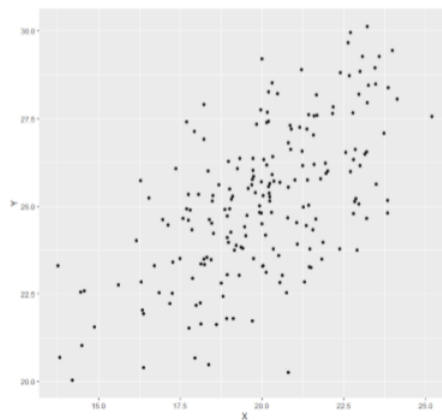
3. What is the difference between covariance and correlation?

Answer:

Covariance is an unstandardized measure of how related two continuous variables are. Correlations are standardized versions of covariance that fall between negative 1 and positive 1.

4. Why is it important to visualize correlational data in a scatterplot before performing analyses?

5. What sort of relation is displayed in the scatterplot below?



Answer:

Strong, positive, linear relation

6. What is the direction and magnitude of the following correlation coefficients

- 0.81
- 0.40
- 0.15
- 0.08
- 0.29

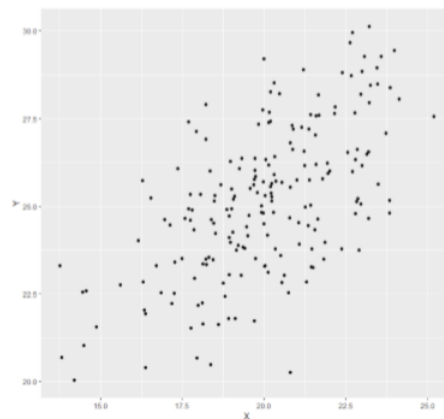
7. Create a scatterplot from the following data:

Hours Studying	Overall Class Performance
0.62	2.02
1.50	4.62
0.34	2.60
0.97	1.59
3.54	4.67
0.69	2.52
1.53	2.28

Hours Studying	Overall Class Performance
0.32	1.68
1.94	2.50
1.25	4.04
1.42	2.63
3.07	3.53
3.99	3.90
1.73	2.75
1.9	2.95

Answer:

Your scatterplot should look similar to this:



8. In the following correlation matrix, what is the relation (number, direction, and magnitude) between...

- Pay and Satisfaction
- Stress and Health

Workplace	Pay	Satisfaction	Stress	Health
Pay	1.00			
Satisfaction	0.68	1.00		
Stress	0.02	-0.23	1.00	
Health	0.05	0.15	-0.48	1.00

9. Using the data from problem 7, test for a statistically significant relation between the variables.

Answer:

Step 1: $H_0 : \rho = 0$, “There is no relation between time spent studying and overall performance in class”, $H_A : \rho > 0$, “There is a positive relation between time spent studying and overall performance in class.”

Step 2: $df = 15 - 2 = 13$, $\alpha = 0.05$, 1-tailed test, $r^* = 0.441$.

Step 3: Using the Sum of Products table, you should find:
 $\bar{X} = 1.61$, $SS_X = 17.44$, $\bar{Y} = 2.95$, $SS_Y = 13.60$, $SP = 10.06$, $r = 0.65$

Step 4: Obtained statistic is greater than critical value, reject H_0 . There is a statistically significant, strong, positive relation between time spent studying and performance in class, $r(13) = 0.65, p < .05$.

10. A researcher collects data from 100 people to assess whether there is any relation between level of education and levels of civic engagement. The researcher finds the following descriptive values:

$\bar{X} = 4.02, s_x = 1.15, \bar{Y} = 15.92, s_y = 5.01, SS_X = 130.93, SS_Y = 2484.91, SP = 159.39$ Test for a significant relation using the four step hypothesis testing procedure.

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