

Comparing Variables Of Ordinal Or Dichotomous Scales: Spearman Rank- Order, Point-Biserial, And Biserial Correlations

1. The business department at a small college wanted to compare the relative class rank of its MBA graduates with their fifth-year salaries. The data collected by the department are presented in Table 1. Compare the graduates' class rank with their fifth-year salaries.

TABLE 1

Relative class rank	Fifth-year salary (\$)
1	83,450
2	67,900
3	89,000
4	80,500
5	91,000
6	55,440
7	101,300
8	50,560
9	76,050

Use a two-tailed Spearman rank-order correlation with $\alpha = 0.05$ to determine if a relationship exists between the two variables. Report your findings.

2. A researcher was contracted by the military to assess soldiers' perception of a new training program's effectiveness. Fifteen soldiers participated in the program. The researcher used a survey to measure the soldiers' perceptions of the program's effectiveness. The survey used a Likert-type scale that ranged from 5 = *strongly agree* to 1 = *strongly disagree*. Using the data presented in Table 2, compare the soldiers' average survey scores with the total number of years the soldiers had been serving.

Use a two-tailed Spearman rank-order correlation with $\alpha = 0.05$ to determine if a relationship exists between the two variables. Report your findings.

TABLE 2

Average survey score	Years of service
4.0	18
4.0	15
2.4	2
4.2	13
3.4	4
4.0	10
5.0	24
1.8	4
3.2	9
2.5	5
2.5	3
3.0	8
3.6	16
4.6	14
4.8	12

3. A middle school history teacher wished to determine if there is a connection between gender and history knowledge among 8th-grade gifted students. The teacher administered a 50 item test at the beginning of the school year to 16 gifted 8th-grade students. The scores from the test are presented in Table 3.

Use a two-tailed point-biserial correlation with $\alpha = 0.05$ to determine if a relationship exists between the two variables. Report your findings.

TABLE 3

Participant	Gender	Posttest score
1	M	44
2	M	30
3	M	50
4	M	33
5	M	37
6	M	35
7	M	36
8	F	29
9	F	39
10	F	33
11	F	50
12	F	45
13	F	37
14	F	30
15	F	34
16	F	50

4. A researcher wished to determine if there is a connection between poverty and self-esteem. Income level was used to classify 18 participants as either below poverty or above poverty. Participants completed a 20 item survey to measure self-esteem. The scores from the survey are reported in Table 4.

Use a two-tailed biserial correlation with $\alpha = 0.05$ to determine if a relationship exists between the two variables. Report your findings.

TABLE 4

Participant	Poverty level	Survey score
1	Above	15
2	Above	19
3	Above	15
4	Above	20
5	Above	7
6	Above	12
7	Above	3
8	Above	15
9	Below	9
10	Below	5
11	Below	13
12	Below	13
13	Below	11
14	Below	10
15	Below	8
16	Below	9
17	Below	10
18	Below	17