

## Spearman Rank Order Correlation

This test is used to determine if there is a correlation between sets of ranked data (ordinal data) or interval and ratio data that have been changed to ranks (ordinal data). Suppose some track athletes participated in three track and field events. In particular suppose they participated in two distance events (the mile and half mile) and one field event (shotput). Suppose a sports psychologist was interested in finding out if the finishing position of an athlete in the mile run was likely to be related to their finishing position in the half mile run and whether their placements in the running events were in any way related to their finishing position in the shotput field event. Thus, what the sports psychologist did was simply record the finishing position of each athlete in each event. Those finishing positions (ranked data) are listed for each athlete and each event in the table below.

<u>Athlete</u>	<u>Mile</u>	<u>Halfmile</u>	<u>Shotput</u>
A	4	3	7
B	9	8	6
C	3	5	8
D	6	7	1
E	7	9	2
F	1	2	9
G	8	6	4
H	5	4	5
I	2	1	3

1. Logon to system
2. **Click Start > Programs > SPSS for Windows > SPSS 10.1 for Windows.** At this point a window will appear asking you what you would like to do. Click on the circle next to Type in Data (2<sup>nd</sup> option in list) and then click **OK** at the bottom of the window.
3. A Data Editor will appear. Look in the lower left corner of the screen. You should see a **Data View** tab and to the right of it a **Variable View** tab. The **Variable View** tab will be used first for the Data **Definition** Phase of creating a data file. The **Data View** tab will be used to actually enter the raw numbers listed above. (See pages 1-3 for a more detailed explanation of creating data files.)

### DATA DEFINITION PHASE

4. Click on the **Variable View** tab in the lower left corner. A new screen will appear with the following words at the top of each column.  
**Name** Type Width Decimals **Label** **Values** Missing Columns Align Measure
5. Click on the white cell in **Row 1** under the word **Name** and type in the word **Mile**.
6. Click on the white cell in **Row 2** under the word **Name** and type in the word **Halfmile**.
7. Click on the white cell in **Row 3** under the word **Name** and type in the word **Shotput**.

### DATA ENTRY PHASE

8. Click on the **Data View** tab in the lower left corner. The **data view** screen will now appear with Column 1 named **Mile**, column 2 named **Halfmile** and column 3 named **Shotput**
9. Enter the data for Athletes A through I as follows. Click on the top left cell under the first column, **Mile**, and enter:  
4 tab 3 tab 7 enter. Then mouse to the second row to enter the data for athlete B.  
9 tab 8 tab 6 enter. Then mouse to the third row to enter the data for Athlete C. Follow the same procedure for the remaining athletes.

- 3 tab 5 tab 8
- 6 tab 7 tab 1
- 7 tab 9 tab 2
- 1 tab 2 tab 9
- 8 tab 6 tab 4
- 5 tab 4 tab 5
- 2 tab 1 tab 3

The data may also be entered down one column at a time, entering all the data for the mile first, and then moving on to column 2 and entering the halfmile data, then moving on to column 3 and entering the data for the shotput.

## Data Analysis

1. Click on **Analyze** at top of screen then
  - a. Click on **Correlate** then
  - b. Click on **Bi-variate**
2. Highlight the word **mile** by clicking on it and then
  - a. Click on **arrow >** to transfer this name to the **Variables** box
3. Highlight the word **halfmile** by clicking on it and then
  - a. Click on **arrow >** to transfer this name to the **Variables** box
4. Highlight the word **shotput** by clicking on it and then
  - a. Click on **arrow >** to transfer this name to the **Variables** box.
5. Make sure there is a check mark in the small white box next to the word **Spearman** under Correlation Coefficients. If not, click on the small white box and a check mark should appear.
6. Click on **OK**.
7. Your results will appear in a Window. Scroll up using the slide bar on the right to the top of the output. The results of this analysis are presented below.

**Correlations**

			MILE	HALFMILE	SHOTPUT
Spearman's rho	MILE	Correlation Coefficient	1.000	.850**	-.450
		Sig. (2-tailed)	.	.004	.224
		N	9	9	9
	HALFMILE	Correlation Coefficient	.850**	1.000	-.433
		Sig. (2-tailed)	.004	.	.244
		N	9	9	9
	SHOTPUT	Correlation Coefficient	-.450	-.433	1.000
		Sig. (2-tailed)	.224	.244	.
		N	9	9	9

\*\* : Correlation is significant at the .01 level (2-tailed).

8. Here are the null and alternative hypotheses for the above problem:
 

Hnull: a) There is no relationship between finishing position in the mile and half mile.  
 b) There is no relationship between finishing position in the mile and shotput.  
 c) There is no relationship between finishing position in the half mile and shotput.

Halt: a) There is a relationship between finishing position in the mile and half mile.  
 b) There is a relationship between finishing position in the mile and shotput.  
 c) There is a relationship between finishing position in the half mile and shotput.

9. **Interpretation and APA writing template for Results Above:**

A series of Spearman rank-order correlations were conducted in order to determine if there were any relationships between the finishing position of an athlete in the three events of the mile, the half mile, and the shotput. A two-tailed test of significance indicated there was a significant positive relationship between the finishing position of athletes in the mile and half mile run  $r_s(9) = .85, p < .05$ . The better the athlete's performance in the mile run, the better their performance in the half mile run. However, a similar two-tailed test of significance indicated that the athlete's finishing position in the mile run was unrelated to his finishing position in the shotput event  $r_s(9) = -.45, p > .05$ , and that his finishing position in the half mile was unrelated to his finishing position in the shotput event  $r_s(9) = -.4333, p > .05$ .