Calculate Point-Biserial Correlation in Excel

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Point-biserial correlation is used to measure the relationship between a binary variable, x, and a continuous variable, y.

Similar to the Pearson correlation coefficient, the point-biserial correlation coefficient takes on a value between -1 and 1 where:

-1 indicates a perfectly negative correlation between two variables
0 indicates no correlation between two variables
1 indicates a perfectly positive correlation between two variables

This tutorial explains how to calculate the point-biserial correlation between two variables in Excel.

Example: Point-Biserial Correlation in Excel

Suppose we have the following binary variable, x, and a continuous variable, y:

	A	B	C	D	E	F	G
1	**x**	**y**					
2	0	12					
3	1	14					
4	1	17					
5	0	17					
6	0	11					
7	0	22					
8	1	23					
9	0	11					
10	1	19					
11	1	8					
12	0	12					
13							
14							
15							
16							
17							
18							
19							
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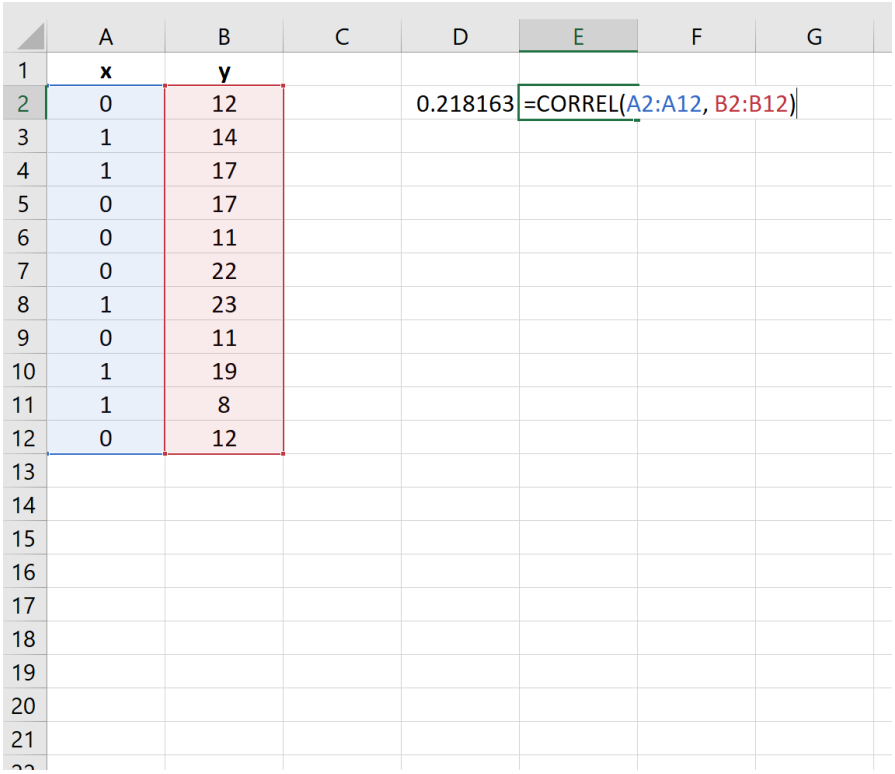
21							
22							
23							

To calculate the **point-biserial correlation** between x and y, we can simply use the **=CORREL()** function as follows:



	A	B	C	D	E	F	G
1	x	y					
2	0	12		0.218163	=CORREL(A2:A12, B2:B12)		
3	1	14					
4	1	17					
5	0	17					
6	0	11					
7	0	22					
8	1	23					
9	0	11					
10	1	19					
11	1	8					
12	0	12					
13							
14							
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The point-biserial correlation between x and y is **0.218163**.

Since this number is positive, this indicates that when the variable x takes on the value "1" that the variable y tends to take on higher values compared to when the variable x takes on the value "0."

We can easily verify this by calculating the average value of y when x is 0 and when x is 1:

	A	B	C	D	E	F	G	H
1	**x**	**y**						
2	0	12		0.218163				
3	1	14						
4	1	17		Avg. y when x = 0	14.2	=AVERAGEIF(A2:A12, 0, B2:B12)		
5	0	17		Avg. y when x = 1	16.2	=AVERAGEIF(A2:A12, 1, B2:B12)		
6	0	11						
7	0	22						
8	1	23						
9	0	11						
10	1	19						
11	1	8						
12	0	12						
13								
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When x = 0, the average value of y is **14.2**. When x = 1, the average value of y is **16.2**. This confirms the fact that the point-biserial correlation between the two variables should be positive.

We can also use the following formulas to calculate the p-value for this correlation coefficient:

	A	B	C	D	E	F	G	H
1	**x**	**y**						
2	0	12		0.218163				
3	1	14						
4	1	17		Avg. y when x = 0	14.2	=AVERAGEIF(A2:A12, 0, B2:B12)		
5	0	17		Avg. y when x = 1	16.2	=AVERAGEIF(A2:A12, 1, B2:B12)		
6	0	11						
7	0	22		sample size	11	=COUNT(B2:B12)		
8	1	23		t-test statistic	0.6706	=D2*SQRT(E7-2)/SQRT(1-D2^2)		
9	0	11		**p-value**	**0.5193**	=T.DIST.2T(E8, E7-2)		
10	1	19						
11	1	8						
12	0	12						
13								
14								
15								
16								
17								
18								

The p-value turns out to be **0.5193**. Thus, although the correlation coefficient between the two variables is slightly positive it turns out to not be a statistically significant correlation.

Additional Resources

How to Calculate Spearman Rank Correlation in Excel
How to Calculate Partial Correlation in Excel
How to Find the P-value for a Correlation Coefficient in Excel