Differences between Correlations

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1 Comparing Correlations within a Published Paper

You are reading a published paper and see the correlation table below. You do not have access to the data - just the correlation matrix. The sample size for the correlation matrix is $N = 30$.

Table 1

Means, standard deviations, and correlations with confidence intervals

Variable	M	SD	1	2	3	4	5	6
1. rating	64.63	12.17						
2. complaints	66.60	13.31	.83** [.66, .91]					
3. privileges	53.13	12.24	.43* [.08, .68]	.56** [.25, .76]				
4. learning	56.37	11.74	.62** [.34, .80]	.60** [.30, .79]	.49** [.16, .72]			
5. raises	64.63	10.40	.59** [.29, .78]	.67** [.41, .83]	.45* [.10, .69]	.64** [.36, .81]		
6. critical	74.77	9.89	.16 [-.22, .49]	.19 [-.19, .51]	.15 [-.22, .48]	.12 [-.25, .46]	.38* [.02, .65]	
7. advance	42.93	10.29	.16 [-.22, .49]	.22 [-.15, .54]	.34 [-.02, .63]	.53** [.21, .75]	.57** [.27, .77]	.28 [-.09, .58]

Note. * indicates $p < .05$; ** indicates $p < .01$. M and SD are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014).

Figure 1:

1.1 Question 1

Based on the above correlation matrix - determine if the rating-complaint correlation is stronger than the rating-critical correlation. You will have to use the cocor package and the cocor.dep.groups.overlap command. Use ?cocor.dep.groups.overlap to learn about this command.

1.2 Question 2

Based on the above correlation matrix - determine if the rating-complaint correlation is stronger than the raises-critical correlation. You will have to use the cocor package and the cocor.dep.groups.nonoverlap

command. Use ?cocor.dep.groups.nonoverlap to learn about this command.

2 Replication Issues

2.1 Question 3

You decide to run a replication of this study. In your replication you want to evaluate the rating-privileges correlation. You plan on using a sample size of $N = 100$. What is the prediction interval when you use N = 100 for your replication sample size? (Use the predictionInterval package)

2.2 Question 4

What replication sample size do you need to ensure the prediction interval width (i.e., upper bound minus lower bound) is not greater than .50? (Trick question - why is obtaining a prediction interval that narrow problematic in this scenario?) (Do you even need to run an analysis in R to determine this would be problematic?)

2.3 Question 5

You discover a new paper that also examines the rating-privileges correlation. It used a sample size of 1000 and obtained a correlation of .10. Is this correlation different from from the rating-privileges correlation in Table 1 above? Use the cocor package command: cocor.indep.groups

2.4 Question 6

What can you conclude about the strength of the rating-privileges correlation based on Table 1 and the result obtainied in Question 5?