**Show R^2 for an OLS regression model with 2 predictors (1 and 2) where Y is the outcome** 1

R^2 = (RY1^2 + RY2^2 - 2*R12*RY1*RY2) /(1-R12^2) RY1 = R(Y, X1); R12 = R(X1, X2) 2

C11 =(A$11^2+A$14^2-2*B11*A$11*A$14)/(1-B11^2) 3

Source: http://core.ecu.edu/psyc/wuenschk/MV/multReg/Partial.pdf 4

**Show R(Y,X1|X2) partial correlation** 5

D11 =(A$11-A$14*B11)/SQRT((1-B11^2)*(1-A$14^2)) 6

Source: Geometric Interpretation of Partial Correlation using Spherical Triangles 7

Guy Thomas and John O'Quigley. American Statistician, February 1993, Vol 47, No 1. P 30. 8

| A | B | C | D | E | F | G | H | I | J | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Ry1 | **R12** | **R^2** | **R(Y,X1\|X2)** | | Ry1 | **R12** | **R^2** | **R(Y,X1\|X2)** | | 10 |
| 0.5 | -0.99 | **50.00** | 8.14 | | 0.5 | **-0.40** | **1.21** | 1.19 | | 11 |
| | -0.8 | **2.50** | 1.73 | | | **-0.3** | **1.04** | 1.04 | | 12 |
| Ry2 | -0.6 | **1.25** | 1.15 | | Ry2 | **-0.2** | **0.92** | 0.91 | | 13 |
| 0.5 | -0.5 | **1.00** | 1.00 | | 0.7 | **0** | **0.74** | 0.70 | | 14 |
| | -0.4 | **0.83** | 0.88 | | | **0.2** | **0.63** | 0.51 | | 15 |
| | 0 | **0.50** | 0.58 | | | **0.4** | **0.55** | 0.34 | | 16 |
| | 0.4 | **0.36** | 0.38 | | | **0.6** | **0.50** | 0.14 | | 17 |
| | 0.5 | **0.33** | 0.33 | | | **0.7** | **0.49** | 0.02 | Nullified | 18 |
| | 0.6 | **0.31** | 0.29 | | | **0.8** | **0.50** | -0.14 | Sign reverse | 19 |
| | 0.8 | **0.28** | 0.19 | | | **0.9** | **0.58** | -0.42 | Simpson's | 20 |
| | 0.9 | **0.26** | 0.13 | | | **0.95** | **0.77** | -0.74 | Paradox | 21 |
| | 0.99 | **0.25** | 0.04 | | | **0.99** | **2.36** | -1.92 | | 22 |

| A | B | C | D | E | F | G | H | I | J | 23 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | Ry1 | | Ry2 | | | | | | | 24 |
| | **R^2** | -0.9 | -0.5 | 0 | 0.3 | 0.5 | 0.7071 | 0.8 | 0.9 | 25 |
| R12 | -0.7 | 0.84 | 0.29 | 0.49 | 1.08 | 1.67 | 2.44 | 2.84 | 3.31 | 26 |
| | -0.5 | 0.81 | 0.33 | 0.33 | 0.65 | 1.00 | 1.47 | 1.72 | 2.01 | 27 |
| | -0.3 | 0.87 | 0.38 | 0.27 | 0.47 | 0.71 | 1.06 | 1.24 | 1.46 | 28 |
| | 0 | *1.06* | 0.50 | **0.25** | 0.34 | 0.50 | 0.75 | 0.89 | 1.06 | 29 |
| | 0.3 | *1.46* | 0.71 | 0.27 | 0.27 | 0.38 | 0.59 | 0.71 | 0.87 | 30 |
| | 0.5 | *2.01* | 1.00 | 0.33 | 0.25 | 0.33 | 0.53 | 0.65 | 0.81 | 31 |
| | 0.7 | *3.31* | 1.67 | 0.49 | 0.25 | 0.29 | 0.50 | 0.65 | 0.84 | 32 |
| | 0.9 | *9.84* | 5.00 | 1.32 | 0.37 | 0.26 | 0.60 | 0.89 | 1.32 | 33 |

C33 =($A$24^2+C$25^2-2*$B33*$A$24*C$25)/(1-$B33^2) 34

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.50 | Ry1 | | Ry2 | | | | | | | 35 |
| | **R(y,1\|2)** | -0.9 | -0.6 | 0 | 0.3 | 0.55 | 0.7071 | 0.8 | 0.9 | 36 |
| R12 | -0.9 | **-1.63** | -0.11 | 1.15 | 1.85 | *2.73* | *3.69* | *4.66* | *6.89* | 37 |
| | -0.6 | -0.11 | 0.22 | 0.63 | 0.89 | 1.24 | *1.63* | *2.04* | *2.98* | 38 |
| | -0.3 | 0.55 | 0.42 | 0.52 | 0.65 | 0.83 | *1.06* | *1.29* | *1.85* | 39 |
| | 0 | *1.15* | 0.63 | **0.50** | 0.52 | 0.60 | 0.71 | 0.83 | *1.15* | 40 |
| | 0.3 | *1.85* | 0.89 | 0.52 | 0.45 | 0.42 | 0.43 | 0.45 | 0.55 | 41 |
| | 0.6 | *2.98* | *1.34* | 0.63 | 0.42 | 0.25 | 0.13 | 0.04 | **-0.11** | 42 |
| | 0.7071 | *3.69* | *1.63* | 0.71 | 0.43 | 0.19 | **0.00** | **-0.15** | **-0.44** | 43 |
| | 0.9 | *6.89* | *2.98* | *1.15* | 0.55 | 0.01 | **-0.44** | **-0.84** | **-1.63** | 44 |
| | 0.95 | *9.96* | *4.28* | *1.60* | 0.72 | **-0.09** | **-0.78** | **-1.39** | **-2.61** | 45 |

C45 =($A$35-C$36*$B45)/SQRT((1-$B45^2)*(1-C$36^2))

Conclusions involving R-square:

1 R-sq never decreases when adding a predictor

2 R-sq remains unchanged if confounder correlation with predictor and with outcome is zero.

Conclusions involving the partial correlation (PC) coefficient:

1 To reverse sign, the product of confounder correlations must exceed the pre=existing correl

2 To nullify PC, the product of confounder correlations must equal the pre=existing correlatio

Adjusted R-sq

https://www.quora.com/What-is-the-difference-between-R-squared-and-Adjusted-R-squar

Biz Analytics: Excel & Tableau

https://www.springboard.com/workshops/data-analytics-school?utm_source=quora&utm_

Rsq in comparing two series of longitudinal data

http://www.investopedia.com/terms/r/r-squared.asp

R2q > 85% is high

Rsq < 70% is low

ation.
n.

ed

_medium=cpc&utm_campaign=dab_leadgen_20161026&utm_term=us_ca&utm_content=ad_1