Sums of Squares

SS(C. Total) = 128647.74
SS(Test 1) = 37992.80
  Test 1 explains 29.5%
SS(Test 2|Test 1) = 9266.54
  Test 2 adds 7.2%

Sums of Squares

SS(C. Total) = 128647.74
SS(Test 1) = 37992.80
  29.5%
SS(Test 2|Test 1) = 9266.54
  7.2%

Sums of Squares

SS(C. Total) = 128647.74
SS(Test 2) = 21467.35
  Test 2 explains 16.7%
SS(Test 1|Test 2) = 25791.99
  Test 1 adds 20.0%
**Sums of Squares**

SS(C. Total) = 128647.74

SS(Test 1|Test 2) = 25791.99  
- 20.0%

SS(Test 2) = 21467.35  
- 16.7%

**Sums of Squares**

SS(C. Total) = 128647.74

SS(Test 1|Test 2) = 25791.99  
- 20.0%

SS(Test 2|Test 1) = 9266.54  
- 7.2%

SS(shared) = 12200.81  
- 9.5%

**Summary – Test 2**

- Test 2 is not linearly related to Evaluation.
  - t=2.05, P-value=0.0530
- Test 2 does not add significantly to the model that already contains Test 1.
  - t=1.51, P-value=0.1469
Summary - Test 2

- Test 2 does not add significantly to the model that contains both Test 1 and Test 3.
  - $t=1.36$, $P$-value=0.1909
- Test 2 does add significantly to the model that already contains Test 1, Test 3 and Test 4.
  - $t=3.57$, $P$-value=0.0022

Possible Models

- With 4 explanatory variables there are $2^4 - 1 = 15$ possible models.
  - 4 - 1 variable models
  - 6 - 2 variable models
  - 4 - 3 variable models
  - 1 - 4 variable model

Which is “best”? 

- A model must be useful.
- All variables must add significantly to the model.
- Among models that satisfy the above, choose the model with the highest $R^2$. 
1 - variable models

- Test 1 - useful, $R^2 = 0.295$
- Test 2 - not useful
- Test 3 - not useful
- Test 4 - useful, $R^2 = 0.343$

2 - variable models

- Test 1, Test 2 - useful, no
- Test 1, Test 3 - useful, yes, $R^2 = 0.480$
- Test 1, Test 4 - useful, yes, $R^2 = 0.551$
- Test 2, Test 3 - not useful
- Test 2, Test 4 - useful, yes, $R^2 = 0.655$
- Test 3, Test 4 - useful, no

3 - variable models

- Test 1, Test 2, Test 3 - useful, no
- Test 1, Test 2, Test 4 - useful, yes, $R^2 = 0.739$
- Test 1, Test 3, Test 4 - useful, yes, $R^2 = 0.663$
- Test 2, Test 3, Test 4 - useful, no
4 - variable models

- Test 1, Test 2, Test 3, Test 4
- Useful.
- All variables add significantly.
- $R^2 = 0.803$

Eligible Models

- Test 1 - $R^2 = 0.295$
- Test 4 - $R^2 = 0.343$
- Test 1, Test 3 - $R^2 = 0.480$
- Test 1, Test 4 - $R^2 = 0.551$
- Test 2, Test 4 - $R^2 = 0.655$
- Test 1, Test 2, Test 4 - $R^2 = 0.739$
- Test 1, Test 3, Test 4 - $R^2 = 0.663$
- Test 1, Test 2, Test 3, Test 4 - $R^2 = 0.803$

The “best” model.

The model that is useful, has all variables adding significantly and has the highest $R^2$ is the model that contains all four variables – Test 1, Test 2, Test 3, Test 4.