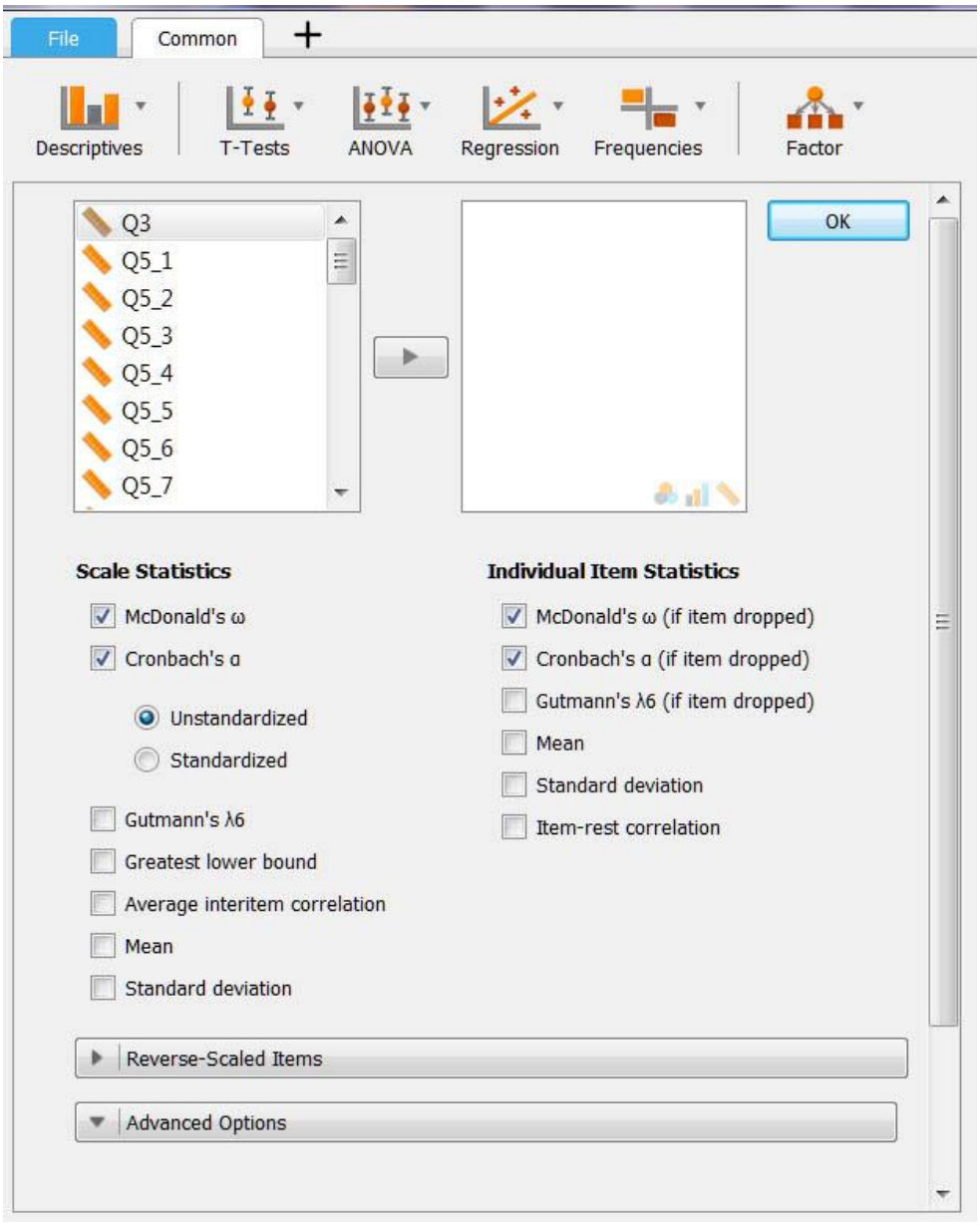
Coefficient Omega

A friend of mine, in the ECU School of Business, was asked, by a reviewer of his manuscript, to report coefficient omega rather than coefficient alpha. I had never heard of McDonald's omega as an estimate of scale reliability, but found this article about omega versus alpha: From Alpha to Omega: A Practical Solution to the Pervasive Problem of Internal Consistency Estimation. ECU folks have access to the article through our library's E-Journal Portal.

There is R code out there that will compute omega, but R is not friendly. SPSS will not compute omega. I did find a SAS macro to compute omega, but the easiest method, IMHO, is to use JASP, free statistical software from the University of Amsterdam. JASP reads many different data formats, including SPSS .sav. Here is an illustration of using JASP to compute omega.

Open the data file and then select Descriptive Statistics, Reliability Analysis. Scoot the variables to be analyzed from the left pane to the right pane. Zap, the results appear in the far-right pane, where you can export them to a HTM file.



Results

Reliability Analysis

Scale Reliability Statistics

	McDonald's ω	Cronbach's α
scale	0.979	0.976

Note. Of the observations, 85 were used, 0 were excluded listwise, and 85 were provided.

Item Statistics

Item Reliability Statistics

	If item dropped	
	McDonald's ω	Cronbach's α
Q3	0.979	0.976
Q5_1	0.978	0.975
Q5_2	0.978	0.975
Q5_3	0.978	0.975
Q5_4	0.978	0.975
Q5_5	0.978	0.975
Q5_6	0.978	0.975
Q5_7	0.978	0.975
Q6	0.979	0.976
Q8_1	0.978	0.975
Q8_2	0.978	0.975
Q8_3	0.978	0.975
Q8_4	0.978	0.975
Q9	0.978	0.975
Q11_1	0.978	0.975
Q11_2	0.978	0.975
Q11_3	0.978	0.975
Q11_4	0.978	0.975
Q12_1	0.978	0.975
Q12_2	0.978	0.975
Q12_3	0.978	0.975
Q12_4	0.978	0.975
Q12_5	0.978	0.975
Q12_6	0.978	0.975
Q12_7	0.978	0.975
Q12_8	0.978	0.975
Q12_9	0.978	0.975
Q12_10	0.978	0.975
Q13_1	0.978	0.975
Q13_2	0.978	0.975
Q13_3	0.978	0.975
Q13_4	0.978	0.975
Q13_5	0.978	0.975
Q14_1	0.979	0.977
Q14_2	0.979	0.976
Q14_3	0.979	0.976
Q14_4	0.978	0.976
Q14_5	0.978	0.976

JASP makes use of the “Measure” attribute of variables in imported SPSS .sav files. If a variable has this attribute se to “nominal,” you need to change it to “scale” to be able to do the reliability analysis.

The R package “psych” can also be used to compute omega. See

- Calculate McDonald's omega estimates of general and total factor saturation
- Using R and the psych package to find ω
- Package ‘coefficientalpha’

Here are the items on one of the subscales.

	COMMUNICATIONS WITH PEERS DURING TAKE HOME EXAMS	***Com-Peer-H***
Q6	I communicated with group members as part of our collaboration while working on the TAKE HOME exams	
Q8_1	Our team members have enough ways to communicate with each other	
Q8_2	The communication between us significantly contributed to the quality of our submission	
Q8_3	The frequency of communication between us reflects our need for completing the take home exams	
Q8_4	It is easy to collaborate given the available resources (internet, study rooms, etc.)	

Here is the R code and output.

```
> Com_Peer_H <- read.csv("C:/Users/Vati/Desktop/Swart_Omega/Com_Peer_H.csv")
>   View(Com_Peer_H)
> library(psych)

Call: omega(m = Com_Peer_H, nfactors = 1, fm = "pa", n.iter = 1, p = 0.05,
    title = "Omega", plot = FALSE, n.obs = 85)
Alpha:                 0.91
G.6:                   0.9
Omega Hierarchical:    0.91
Omega H asymptotic:    1
Omega Total            0.91

Schmid Leiman Factor loadings greater than  0.2
        g  F1*   h2   u2 p2
Q6   0.59      0.34 0.66  1
Q8_1 0.87      0.75 0.25  1
Q8_2 0.91      0.83 0.17  1
Q8_3 0.83      0.69 0.31  1
Q8_4 0.90      0.81 0.19  1

With eigenvalues of:
  g F1*
3.4 0.0

general/max  Inf   max/min =   NaN
mean percent general =  1    with sd =  0 and cv of  0
Explained Common Variance of the general factor =  1

The degrees of freedom are 5  and the fit is  0.02
The number of observations was  85  with Chi Square =  1.67  with prob <  0.89
The root mean square of the residuals is  0.02
The df corrected root mean square of the residuals is  0.02
RMSEA index =  0  and the 90 % confidence intervals are  NA 0.068
BIC =  -20.54

Compare this with the adequacy of just a general factor and no group factors
The degrees of freedom for just the general factor are 5  and the fit is  0.02
The number of observations was  85  with Chi Square =  1.67  with prob <  0.89
```

```
The root mean square of the residuals is  0.02
The df corrected root mean square of the residuals is  0.02

RMSEA index =  0  and the 90 % confidence intervals are  NA 0.068
BIC =  -20.54

Measures of factor score adequacy
                                                 g F1*
Correlation of scores with factors            0.97   0
Multiple R square of scores with factors      0.94   0
Minimum correlation of factor score estimates 0.88  -1

 Total, General and Subset omega for each subset
                                                  g  F1*
Omega total for total scores and subscales    0.91 0.91
Omega general for total scores and subscales  0.91 0.91
Omega group for total scores and subscales    0.00 0.00
Warning messages:
1: In schmid(m, nfactors, fm, digits, rotate = rotate, n.obs = n.obs,  :
  Omega_h and Omega_asymptotic are not meaningful with one factor
2: In cov2cor(t(w) %*% r %*% w) :
  diag(.) had 0 or NA entries; non-finite result is doubtful
```

As you can see, this produces a helluva lot more output than just the value of omega.

[Return to Wuensch's R Lessons]

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