

## Obtaining Coefficient Omega Using *Mplus*

In this document I explain how to use *Mplus* to obtain coefficient omega.

The data from this study are the same as those used in the document “Confirmatory Factor Analysis Using *Mplus*” and consist responses of 1022 people to items on the Achievement Goal Questionnaire (Elliot & McGregor, 2001) collected as part of a study by Finney, Pieper, and Barron (2004). Here I demonstrate calculation of coefficient omega using only the three items of the Performance Approach (perfapp) scale, but the commands below can easily be extended to more items.

The response scale ranged from 1 = not at all true of me to 7 = very true of me. There are no missing data, but I have included the “missing” command used to specify missing data in *Mplus* to demonstrate how this would be done. The data are in tab-delimited format and can be found in the file “goal orientation.dat”

### Coefficient Omega Syntax

The syntax is based on that for the confirmatory factor analysis and repeats the commands for that analysis. I include all commands below but only comment on those that are new to this analysis.

*Mplus* commands are in boldface. Non-boldface words indicate information that must be provided by the researcher for their specific data.

**Title:** coefficient omega for goal orientation data;

**Data:** **file is** goal2.dat;

**format is** free;

**Variable:** names are i1 i2 i3 i4 i5 i6 i7 i8 i9 i10 i11 i12;

**missing all** (8,9,10);

**usevariables =** i7 i8 i9;

**Model:** perfapp by i7\*(P1);

perfapp by i8-i9 (P2-P3);

i7 - i9 (P4-P6);

perfapp@1;

**Model constraint:**

**new**(omega);

omega = (P1 + P2 + P3)\*\*2/((P1+P2+P3)\*\*2+P4+P5+P6);

**Output:** **cinterval**;

The **usevariables** command selects out the three Performance Approach items. This command must be used if all the variables listed in the **variables** command are not used in the analysis.

The names specified in parentheses after each variable in the **model** command (P1, etc.) are used to provide labels for the parameters so that they can be used in subsequent calculations.

The **model constraint** commands are used to compute omega according to equation 3 in chapter 13 of the text. The **new** command indicates that a new parameter (omega) will be computed.

The specifications following **omega =** are the calculations for coefficient omega. The specification **\*\*** is used for exponentiation, so **\*\*2** specifies squaring.

The specification **cinterval** of the **output** command indicates that confidence intervals should be computed.

The CFA model with three indicators is just-identified and fit is therefore perfect. Because of this, I skip the fit index results. I show the parameters estimates for those who would like to check their understanding by computing the value of omega by hand.

#### MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
PERFAPP BY				
I7	0.634	0.047	13.374	0.000
I8	1.304	0.058	22.572	0.000
I9	1.205	0.059	20.429	0.000
Intercepts				
I7	5.103	0.045	114.617	0.000
I8	4.135	0.047	87.938	0.000
I9	3.890	0.050	77.535	0.000
Variances				
PERFAPP	1.000	0.000	999.000	999.000
Residual Variances				
I7	1.624	0.077	21.133	0.000
I8	0.560	0.118	4.752	0.000
I9	1.121	0.110	10.170	0.000
New/Additional Parameters				
OMEGA	0.749	0.013	56.886	0.000

The value of coefficient omega is shown as a “new parameter” above. It is calculated as:

$$\frac{(.634 + 1.304 + 1.205)^2}{((.634 + 1.304 + 1.205)^2 + (1.624 + .560 + 1.121))} = .749$$

Confidence intervals for all parameters are shown below. The 95% confidence interval for the estimate of coefficient omega is [.723, .775].

CONFIDENCE INTERVALS OF MODEL RESULTS

	Lower .5%	Lower 2.5%	Lower 5%	Estimate	Upper 5%	Upper 2.5%	Upper .5%
PERFAPP BY							
I7	0.512	0.541	0.556	0.634	0.712	0.727	0.756
I8	1.155	1.190	1.209	1.304	1.399	1.417	1.452
I9	1.053	1.089	1.108	1.205	1.302	1.320	1.357
Intercepts							
I7	4.988	5.015	5.030	5.103	5.176	5.190	5.217
I8	4.014	4.043	4.058	4.135	4.212	4.227	4.256
I9	3.761	3.792	3.808	3.890	3.973	3.989	4.020
Variances							
PERFAPP	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Residual Variances							
I7	1.426	1.473	1.497	1.624	1.750	1.774	1.821
I8	0.257	0.329	0.366	0.560	0.754	0.792	0.864
I9	0.837	0.905	0.940	1.121	1.303	1.338	1.405
New/Additional Parameters							
OMEGA	0.715	0.723	0.728	0.749	0.771	0.775	0.783