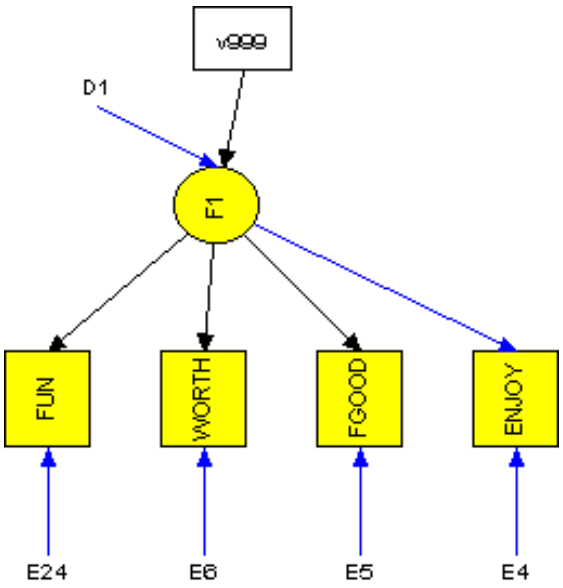
Chapter 12

Merle Canfield

MULLTI-SAMPLE MEANS




```
/TITLE
mature
/SPECIFICATIONS
 DATA='D:\EQSW\LSQMAT.ESS'; VARIABLES= 37; CASES=  414;
 METHODS=ML;anal=mom;groups=2;
 MATRIX=RAW;
/LABELS
V1=GENDERN; V2=EDUC; V3=AGE; V4=ENJOY; V5=FGOOD;
V6=WORTH; V7=FEARFUL; V8=ANGRY; V9=TENSE; V10=SHY;
V11=WORNOUT; V12=FITIN; V13=APPROVE; V14=SHOULD; V15=FINISHED;
V16=CHANGED; V17=SAD; V18=CONFUSE; V19=USELESS; V20=HURTSEL;
V21=SAY; V22=JEALOUS; V23=SLEEP; V24=FUN; V25=ALCOHOL;
V26=DRUGS; V27=LIVELY; V28=LONELY; V29=INSECURE; V30=WORRIED;
V31=SORRY; V32=OUTGOING; V33=FORCED; V34=ADVANTGE; V35=PRODUTIV;
V36=COPERTIV; V37=UNGOLD;
/EQUATIONS
V4 =  + *F1  + E4;
V5 =  + 1F1  + E5;
V6 =  + *F1  + E6;
V24 =  + *F1  + E24;
F1 =  + *V999 + D1;
```

```
/VARIANCES
V999 = 1.00;
E4 = *;
E5 = *;
E6 = *;
E24 = *;
D1 = *;
/END
/TITLE
mature
/SPECIFICATIONS
 DATA='D:\EQSW\LSQung.ESS'; VARIABLES= 37; CASES=  414;
 METHODS=ML;anal=mom;
 MATRIX=RAW;
/LABELS
V1=GENDERN; V2=EDUC; V3=AGE; V4=ENJOY; V5=FGOOD;
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V36=COPERTIV; V37=UNGOLD;
/EQUATIONS
V4 =  + *F1  + E4;
V5 =  + 1F1  + E5;
V6 =  + *F1  + E6;
V24 =  + *F1  + E24;
F1 =  + *V999 + D1;
/VARIANCES
V999 = 1.00;
E4 = *;
E5 = *;
E6 = *;
E24 = *;
D1 = *;
/con
(1,f1,v999)=(2,f1,v999);
/lmtest
/END
```

OUTPUT

```
  SAMPLE STATISTICS
```

UNIVARIATE STATISTICS

VARIABLE	ENJOY	FGOOD	WORTH	FUN	V999
MEAN	6.3116	6.0918	5.6546	4.6039	1.0000
SKEWNESS (G1)	-1.2678	-0.9811	-0.7738	-0.2006	0.0000
KURTOSIS (G2)	1.4435	0.5205	0.2339	-0.5418	0.0000

MULTIVARIATE KURTOSIS

MARDIA'S COEFFICIENT (G2,P) = 11.0862
NORMALIZED ESTIMATE = 16.2792

ELLIPTICAL THEORY KURTOSIS ESTIMATES

MARDIA-BASED KAPPA = 0.4619 MEAN SCALED UNIVARIATE KURTOSIS = 0.1380

MARDIA-BASED KAPPA IS USED IN COMPUTATION. KAPPA= 0.4619

MATRIX CONTAINS SPECIAL VARIABLE V999, THE UNIT CONSTANT
COVARIANCE MATRIX IS IN UPPER TRIANGLE; MEANS ARE IN BOTTOM ROW OF MATRIX
COVARIANCE/MEAN MATRIX TO BE ANALYZED:
4 VARIABLES (SELECTED FROM 37 VARIABLES), BASED ON 414 CASES.

		ENJOY	FGOOD	WORTH	FUN	V999
		V 4	V 5	V 6	V 24	V999
ENJOY	V 4	3.004				
FGOOD	V 5	1.562	3.013			
WORTH	V 6	1.345	1.957	3.336		
FUN	V 24	1.276	1.366	1.507	4.036	
V999	V999	6.312	6.092	5.655	4.604	1.000

SAMPLE STATISTICS

UNIVARIATE STATISTICS

VARIABLE	ENJOY	FGOOD	WORTH	FUN	V999
MEAN	5.1121	5.3318	5.1028	3.8598	1.0000
SKEWNESS (G1)	-0.5248	-0.7225	-0.6207	-0.1256	0.0000
KURTOSIS (G2)	-0.7552	0.0045	0.0647	-0.8880	0.0000

MATRIX CONTAINS SPECIAL VARIABLE V999, THE UNIT CONSTANT
COVARIANCE MATRIX IS IN UPPER TRIANGLE; MEANS ARE IN BOTTOM ROW OF MATRIX
COVARIANCE/MEAN MATRIX TO BE ANALYZED:
4 VARIABLES (SELECTED FROM 37 VARIABLES), BASED ON 214 CASES.

	ENJOY V 4	FGOOD V 5	WORTH V 6	FUN V 24	V999 V999
ENJOY V 4	4.757				
FGOOD V 5	1.258	2.852			
WORTH V 6	1.110	2.130	3.107		
FUN V 24	2.246	0.793	0.836	3.736	
V999 V999	5.112	5.332	5.103	3.860	1.000

PARAMETER ESTIMATES APPEAR IN ORDER,
NO SPECIAL PROBLEMS WERE ENCOUNTERED DURING OPTIMIZATION.

MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

ENJOY =V4 = 1.044*F1 + 1.000 E4
.014
75.587

FGOOD =V5 = 1.000 F1 + 1.000 E5

WORTH =V6 = .944*F1 + 1.000 E6

.013

71.785

FUN =V24 = .768*F1 + 1.000 E24

.016

49.569

EQS/EM 386 Licensee:

MULTIPLE POPULATION ANALYSIS, INFORMATION IN GROUP 1

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

F1 =F1 = 5.854*V999 + 1.000 D1
.068
85.900

STANDARDIZED SOLUTION:

ENJOY =V4 = .727*F1 + .687 E4
FGOOD =V5 = .774 F1 + .633 E5
WORTH =V6 = .697*F1 + .717 E6
FUN =V24 = .508*F1 + .861 E24
F1 =F1 = .000*V999 +1.000 D1

PARAMETER ESTIMATES APPEAR IN ORDER,
NO SPECIAL PROBLEMS WERE ENCOUNTERED DURING OPTIMIZATION.

ALL EQUALITY CONSTRAINTS WERE CORRECTLY IMPOSED

MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

ENJOY =V4 = .918*F1 + 1.000 E4
.024
38.365

FGOOD =V5 = 1.000 F1 + 1.000 E5

WORTH =V6 = .932*F1 + 1.000 E6

.016

59.999

FUN =V24 = .693*F1 + 1.000 E24

.022

32.150

EQS/EM 386 Licensee:
MULTIPLE POPULATION ANALYSIS, INFORMATION IN GROUP 2

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

F1 =F1 = 5.854*V999 + 1.000 D1
.068
85.900

STANDARDIZED SOLUTION:

ENJOY =V4 = .566*F1 + .824 E4
FGOOD =V5 = .836 F1 + .548 E5
WORTH =V6 = .780*F1 + .626 E6
FUN =V24 = .490*F1 + .872 E24
F1 =F1 = .000*V999 +1.000 D1

GOODNESS OF FIT SUMMARY

INDEPENDENCE MODEL CHI-SQUARE = 697.176 ON 12 DEGREES OF FREEDOM

INDEPENDENCE AIC = 673.17621 INDEPENDENCE CAIC = 607.86573
MODEL AIC = 102.34799 MODEL CAIC = 42.48005

CHI-SQUARE = 124.348 BASED ON 11 DEGREES OF FREEDOM
PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS LESS THAN 0.001

BENTLER-BONETT NORMED FIT INDEX= 0.822
BENTLER-BONETT NONNORMED FIT INDEX= 0.820
COMPARATIVE FIT INDEX (CFI) = 0.835

```
 LAGRANGE MULTIPLIER TEST (FOR RELEASING CONSTRAINTS)

 CONSTRAINTS TO BE RELEASED ARE:


        CONSTRAINTS FROM GROUP  2

        CONSTR:    1   (1,F1,V999)-(2,F1,V999)=0;


         UNIVARIATE TEST STATISTICS:

  NO    CONSTRAINT    CHI-SQUARE   PROBABILITY
  --    ----------   ----------   ----------

   1    CONSTR:   1       27.706       0.000



       CUMULATIVE MULTIVARIATE STATISTICS              UNIVARIATE INCREMENT
       ----------------------------------              --------------------

 STEP  PARAMETER   CHI-SQUARE  D.F.  PROBABILITY       CHI-SQUARE  PROBABILITY
 ---- ----------  ----------  ----  -----------       ----------  -----------

   1  CONSTR:   1     27.706      1      0.000            27.706       0.000
1
  Execution begins at 05:16:58.77
  Execution ends   at 05:17:06.02
  Elapsed time =       7.25 seconds
```

The means are obtained by running the job without the contriants.

```
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V6=WORTH; V7=FEARFUL; V8=ANGRY; V9=TENSE; V10=SHY;
V11=WORNOUT; V12=FITIN; V13=APPROVE; V14=SHOULD; V15=FINISHED;
V16=CHANGED; V17=SAD; V18=CONFUSE; V19=USELESS; V20=HURTSEL;
```

```
V21=SAY; V22=JEALOUS; V23=SLEEP; V24=FUN; V25=ALCOHOL;
V26=DRUGS; V27=LIVELY; V28=LONELY; V29=INSECURE; V30=WORRIED;
V31=SORRY; V32=OUTGOING; V33=FORCED; V34=ADVANTGE; V35=PRODUTIV;
V36=COPERTIV; V37=UNGOLD;
/EQUATIONS
V4 =  + *F1  + E4;
V5 =  + 1F1  + E5;
V6 =  + *F1  + E6;
V24 =  + *F1  + E24;
F1 =  + *V999 + D1;
/VARIANCES
V999 = 1.00;
E4 = *;
E5 = *;
E6 = *;
E24 = *;
D1 = *;
/END
/TITLE
mature
/SPECIFICATIONS
 DATA='D:\EQSW\LSQung.ESS'; VARIABLES= 37; CASES=  414;
 METHODS=ML;anal=mom;
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V31=SORRY; V32=OUTGOING; V33=FORCED; V34=ADVANTGE; V35=PRODUTIV;
V36=COPERTIV; V37=UNGOLD;
/EQUATIONS
V4 =  + *F1  + E4;
V5 =  + 1F1  + E5;
V6 =  + *F1  + E6;
V24 =  + *F1  + E24;
F1 =  + *V999 + D1;
/VARIANCES
V999 = 1.00;
E4 = *;
E5 = *;
E6 = *;
```

```
E24 = *;
D1 = *;
/END
```

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

```
ENJOY   =V4  =   1.027*F1    + 1.000 E4
                  .013
                76.123

FGOOD   =V5  =   1.000 F1    + 1.000 E5


WORTH   =V6  =    .929*F1    + 1.000 E6
                  .013
                72.370

 FUN   =V24 =    .756*F1    + 1.000 E24
                  .015
                50.368
```

CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

```
  F1   =F1  =   6.104*V999  + 1.000 D1
                  .083
                73.590
```

STANDARDIZED SOLUTION:

```
ENJOY   =V4  =   .721*F1    + .693 E4
FGOOD   =V5  =   .778 F1    + .628 E5
```

WORTH =V6 = .691*F1 + .723 E6

FUN =V24 = .502*F1 + .865 E24

F1 =F1 = .000*V999 +1.000 D1

MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

ENJOY =V4 = .945*F1 + 1.000 E4

.027

35.358

FGOOD =V5 = 1.000 F1 + 1.000 E5

WORTH =V6 = .959*F1 + 1.000 E6

.018

53.750

FUN =V24 = .713*F1 + 1.000 E24

.024

29.803

CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS

F1 =F1 = 5.342*V999 + 1.000 D1

.113

47.159

STANDARDIZED SOLUTION:

ENJOY =V4 = .554*F1 + .832 E4

FGOOD =V5 = .824 F1 + .567 E5

WORTH =V6 = .770*F1 + .638 E6

FUN =V24 = .478*F1 + .878 E24

```
  F1   =F1  =   .000*V999  +1.000 D1
```

```
GOODNESS OF FIT SUMMARY

INDEPENDENCE MODEL CHI-SQUARE =        697.176 ON    12 DEGREES OF FREEDOM

INDEPENDENCE AIC =   673.17621   INDEPENDENCE CAIC =   607.86573
      MODEL AIC =    75.77056          MODEL CAIC =    21.34516

CHI-SQUARE =       95.771 BASED ON    10 DEGREES OF FREEDOM
PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS LESS THAN 0.001

BENTLER-BONETT NORMED    FIT INDEX=       0.863
BENTLER-BONETT NONNORMED FIT INDEX=       0.850
COMPARATIVE FIT INDEX (CFI)       =       0.875
```