**ANNOTATED MPLUS SYNTAX APPENDICES**

1. 1-CLASS LCA SYNTAX
2. 2-CLASS LCA STARTER SYNTAX
3. 3-CLASS LCA STARTER SYNTAX
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5. LRT & BCH SAVE DATA SYNTAX
6. PROPORTION CALCULATIONS SYNTAX
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**APPENDIX 1**

**1-CLASS LCA SYNTAX**

TITLE: LCA TIME 1

1 CLASS ENUMERATION

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(1); !NAME (C) & NUMBER OF CLASSES TO ENUMERATE IN MODEL; NAME CAN BE ANYTHING 8 CHARACTERS OR LESS

DEFINE: !RE-CODING ITEMS TO 3 CATEGORIES & SPECIFYING VARIABLE NAMES

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE; !SPECIFYING MIXTURE MODEL FOR MPLUS

ESTIMATOR=MLR; !DEFAULT ESTIMATOR FOR FMM IN MPLUS

PROCESSORS = 4;

STARTS = 100 50; !NUMBER OF RANDOM STARTS FOR THE NUMBER OF MODELS ESTIMATED (100) AND TAKEN TO COMPLETION (50)

MODEL:

%OVERALL%

%C#1% !DEFINING CLASS 1

[ T1\_FREQ$1]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 0 AND 1

[ T1\_FREQ$2]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 1 AND 2

[ T1\_NUM$1]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 0 AND 1

[ T1\_NUM$2]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 1 AND 2

[ T1\_HAZ$1]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 0 AND 1

[ T1\_HAZ$2]; !ESTIMATING THRESHOLD FOR DISTINGUISHING BETWEEN CATEGORIES 1 AND 2

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*); !CAN MAKE PROFILE PLOT WITH THIS DATA IN OR OUT OF MPLUS

!\* savedata:

response = lcaT1\_###\_response.txt;

file = lca\_T1\_###\_BCH.txt;

save=bch;

format = free;

missflag = 9999;

\*!

!FULL SAVEDATA COMMAND COMMENTED OUT BETWEEN !\* AND \*!

!USING BCH IN SAVE DATA COMMAND BECAUSE PROVIDES CLASS PROBABILITIES INFORMATION, MODAL PROFILE ASSIGNMENT, AND BCH WEIGHTS FOR HOWEVER WANT TO BRING IN COVARIATES.

!MISSFLAG: CODE FOR ANY MISSING DATA NEEDS TO BE A POSITIVE NUMBER, THEREFORE USING AN OUT OF BOUNDS NUMBER FOR THIS DATASET.

**APPENDIX 2**

**2-CLASS LCA STARTER SYNTAX**

TITLE: LCA TIME 1

2 CLASS ENUMERATION

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(2); !ESTIMATING 2 CLASSES FOR THE MIXTURE MODEL

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 100 50;

MODEL:

%OVERALL%

%C#1% !DEFINING CLASS 1

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#2% !DEFINING CLASS 2

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*);

!\* savedata:

response = lcaT1\_###\_response.txt;

file = lca\_T1\_###\_BCH.txt;

save=bch;

format = free;

missflag = 9999;

\*!

**APPENDIX 3**

**3-CLASS LCA STARTER SYNTAX**

TITLE: LCA TIME 1

3 CLASS ENUMERATION

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(3); !ESTIMATING 3 CLASSES FOR THE MIXTURE MODEL

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 100 50;

MODEL:

%OVERALL%

%C#1% !DEFINING CLASS 1

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#2% !DEFINING CLASS 2

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#3% !DEFINING CLASS 3

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*);

!\* savedata:

response = lcaT1\_###\_response.txt;

file = lca\_T1\_###\_BCH.txt;

save=bch;

format = free;

missflag = 9999;

\*!

**APPENDIX 4**

**4-CLASS LCA STARTER SYNTAX (THIS MODEL DID NOT CONVERGE)**

TITLE: LCA TIME 1

4 CLASS ENUMERATION

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(4); !ESTIMATING 4 CLASSES FOR THE MIXTURE MODEL

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 100 50;

MODEL:

%OVERALL%

%C#1% !DEFINING CLASS 1

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#2% !DEFINING CLASS 2

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#3% !DEFINING CLASS 3

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

%C#4% !DEFINING CLASS 4

[ T1\_FREQ$1];

[ T1\_FREQ$2];

[ T1\_NUM$1];

[ T1\_NUM$2];

[ T1\_HAZ$1];

[ T1\_HAZ$2];

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*);

!\* savedata:

response = lcaT1\_###\_response.txt;

file = lca\_T1\_###\_BCH.txt;

save=bch;

format = free;

missflag = 9999;

\*!

**APPENDIX 5**

**LRT & BCH SAVE DATA SYNTAX**

TITLE: LCA TIME 1

3 CLASS LRT

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5 ;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(3);

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=ML;

PROCESSORS = 4;

STARTS = 0 0; !RANDOM STARTS SET TO 0, BECAUSE USING OPTSEED COMMAND BELOW TO GET BEST FITTING SOLUTION THAT WAS ALREADY DETERMINED THROUGH ENUMERATION PROCESS

OPTSEED=647708; !THE SEED FROM THE OUTPUT ASSOCIATED WITH THE BEST FITTING SOLUTION. ANY SEED ASSOCIATED WITH A MODEL THAT CONVERGED ON THE BEST FITTING *LL* CAN BE USED

!STILL PART OF THE ANALYSIS COMMANDS. THESE ARE RELATED TO THE LRT TESTS TO INCREASE THE NUMBER OF STARTS USED FOR THE K-1 MODELS. THESE CAN BE CHANGED BASED ON HOW WELL THE K-1 MODEL CONVERGES FOR THE LRT TESTS

K-1STARTS = 1000 500;

LRTSTARTS = 100 50 1000 500;

MODEL:

%OVERALL%

[ c#1\*1.69998 ] ;

[ c#2\*0.82883 ] ;

%C#1%

[ t1\_freq$1\*0.40232 ];

[ t1\_freq$2\*3.02300 ];

[ t1\_num$1\*4.71709 ];

[ t1\_num$2\*5.37712 ];

[ t1\_haz$1\*6.34737 ];

[ t1\_haz$2\*15 ];

%C#2%

[ t1\_freq$1\*-15 ];

[ t1\_freq$2\*0.59494 ];

[ t1\_num$1\*0.66546 ];

[ t1\_num$2\*2.05610 ];

[ t1\_haz$1\*-0.23210 ];

[ t1\_haz$2\*3.43156 ];

%C#3%

[ t1\_freq$1\*-1.24193 ];

[ t1\_freq$2\*-0.13269 ];

[ t1\_num$1\*-1.68098 ];

[ t1\_num$2\*-1.16641 ];

[ t1\_haz$1\*-15 ];

[ t1\_haz$2\*-2.93170 ];

OUTPUT:tech1 tech8 tech10 tech11 tech14 tech15 !REMOVED THE ! SO GET LRT TESTS NOW

patterns residual svalues sampstat !PATTERNS GIVES MISSING DATA PATTERNS

stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*);

!SAVEDATA COMMAND UNCOMMENTED NOW SO IT WILL RUN

savedata:

response = lcaT1\_DRINKING\_3CLASSES\_response.txt;!FEQUENCY INFORMATION FOR EACH RESPONSE PATTERN IN THIS FILE

file = lca\_T1\_DRINKING\_3CLASSES\_BCH.txt;

save=bch; !INDICATORS, AUXILIARY VARIABLES, ID, POSTERIOR CLASS PROBABILITIES, MODAL CLASS ASSIGNMENT, AND BCH WEIGHTS INCLUDED IN DATA FILE

format = free;

missflag = 9999;

**APPENDIX 6**

**CLASS PROPORTION SYNTAX**

TITLE: LCA TIME 1

3 CLASS PROPROTIONS

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ;

CLASSES = C(3);

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=ML; !ESTIMATOR CHANGED TO ML BECAUSE CANNOT DO BOOTSTRAPPED CONFIDENCE INTERVALS WITH MLR ESTIMATOR

PROCESSORS = 4;

STARTS = 0 0; !STARTS SET TO 0 BECAUSE USING OPTSEED AGAIN

OPTSEED=647708;

BOOTSTRAP=50000; !BOOTSTRAP SAMPLE DRAW FOR BOOTSTRAPPED CONFIDENCE INTERVALS; RECOMMENDATION IS 5,000-10,000.

MODEL:

%OVERALL%

[ c#1\*1.69998 ] (C1INT); !LABELED CLASS 1 INTERCEPT

[ c#2\*0.82883 ] (C2INT); !LABELED CLASS 2 INTERCEPT

!NO CLASS 3 INTERCEPT, BECAUSE CLASS 3 IS THE REFERENCE CLASS

%C#1%

[ t1\_freq$1\*0.40232 ];

[ t1\_freq$2\*3.02300 ];

[ t1\_num$1\*4.71709 ];

[ t1\_num$2\*5.37712 ];

[ t1\_haz$1\*6.34737 ];

[ t1\_haz$2\*15 ];

%C#2%

[ t1\_freq$1\*-15 ];

[ t1\_freq$2\*0.59494 ];

[ t1\_num$1\*0.66546 ];

[ t1\_num$2\*2.05610 ];

[ t1\_haz$1\*-0.23210 ];

[ t1\_haz$2\*3.43156 ];

%C#3%

[ t1\_freq$1\*-1.24193 ];

[ t1\_freq$2\*-0.13269 ];

[ t1\_num$1\*-1.68098 ];

[ t1\_num$2\*-1.16641 ];

[ t1\_haz$1\*-15 ];

[ t1\_haz$2\*-2.93170 ];

MODEL CONSTRAINT:

NEW (C1PR C2PR C3PR); !NEW PARAMETERS BEING CALCULATED BELOW

!EQUATION TO CALCULATE CLASS 1 PROPORTION (C1PR) IS TO EXPONENTIATE CLASS 1 INTERCEPT DIVIDED BY THE SUM OF THE EXPONENTIATED CLASS INTERCEPTS. CLASS 3 IS THE REFERENCE CLASS SO CAN EITHER WRITE EXP(0) OR ITS PRODUCT (1).

C1PR = (exp(c1int)/(exp(c1int)+(exp(c2int)+1));

C2PR = (exp(c2int)/(exp(c1int)+(exp(c2int)+1));

C3PR = (1/(exp(c1int)+(exp(c2int)+1));

OUTPUT:tech1 tech8 tech10 !tech11 tech14 tech15 !COMMENTED OUT LRT TESTS AGAIN B/C NOT NEED

patterns residual svalues sampstat

stdyx cinterval(BCBOOTSTRAP); !BCBOOTSTRAP IS FOR BIAS-CORRECTED ACCELERATED BOOTSTRAPPED CONFIDENCE INTERVALS; WHY HAVE BOOTSTRAP COMMAND IN ANALYSIS SECTION

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ (\*);

**APPENDIX 7**

**UNCONDITIONAL LONGITUDINAL LTA**

TITLE: LCA 3 TIMEPOINTS

UNCONDITIONAL LONGITUDINAL LTA

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ;

!ANY VARIABLES WANT IN THE SAVED DATASET FOR FUTURE MODELS NEEDS TO BE INCLUDED AS AN AUXILIARY VARIABLE HERE

AUXILIARY = Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ;

CLASSES = T1(3) T2(3) T3(3); !NAMES FOR LATENT CLASS CONSTRUCTS AT TIME 1, TIME 2, & TIME 3; NAMING CONVENTION IS UP TO RESEARCHER SO LONG AS 8 CHARACTERS OR LESS.

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

IF(T2\_AUDIT1 EQ 0) THEN T2\_FREQ = 0; !NEVER

IF(T2\_AUDIT1 EQ 1) THEN T2\_FREQ = 1;!1-4/MONTH

IF(T2\_AUDIT1 EQ 2) THEN T2\_FREQ = 1;

IF(T2\_AUDIT1 >=3) THEN T2\_FREQ = 2;!2+/WEEK

IF(T2\_AUDIT2 EQ 0) THEN T2\_NUM = 0;!0-2 DRINKS

IF(T2\_AUDIT2 EQ 1) THEN T2\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(T2\_AUDIT2 >=2) THEN T2\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(T2\_AUDIT3 EQ 0) THEN T2\_HAZ = 0;!NEVER

IF(T2\_AUDIT3 EQ 1) THEN T2\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(T2\_AUDIT3 >=2) THEN T2\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

IF(T3\_AUDIT1 EQ 0) THEN T3\_FREQ = 0; !NEVER

IF(T3\_AUDIT1 EQ 1) THEN T3\_FREQ = 1;!1-4/MONTH

IF(T3\_AUDIT1 EQ 2) THEN T3\_FREQ = 1;

IF(T3\_AUDIT1 >=3) THEN T3\_FREQ = 2;!2+/WEEK

IF(T3\_AUDIT2 EQ 0) THEN T3\_NUM = 0;!0-2 DRINKS

IF(T3\_AUDIT2 EQ 1) THEN T3\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(T3\_AUDIT2 >=2) THEN T3\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(T3\_AUDIT3 EQ 0) THEN T3\_HAZ = 0;!NEVER

IF(T3\_AUDIT3 EQ 1) THEN T3\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(T3\_AUDIT3 >=2) THEN T3\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 0; !DO NOT NEED RANDOM STARTS TO FIND DIFFERENT POTENTIAL SOLUTIONS

MODEL:

%OVERALL%

MODEL T1: !TIME 1 CROSS-SECTIONAL MODEL WITH ITS START VALUES

%T1#1%

[ t1\_freq$1\*0.40232 ];

[ t1\_freq$2\*3.02300 ];

[ t1\_num$1\*4.71709 ];

[ t1\_num$2\*5.37712 ];

[ t1\_haz$1\*6.34737 ];

[ t1\_haz$2\*15 ];

%T1#2%

[ t1\_freq$1\*-15 ];

[ t1\_freq$2\*0.59494 ];

[ t1\_num$1\*0.66546 ];

[ t1\_num$2\*2.05610 ];

[ t1\_haz$1\*-0.23210 ];

[ t1\_haz$2\*3.43156 ];

%T1#3%

[ t1\_freq$1\*-1.24193 ];

[ t1\_freq$2\*-0.13269 ];

[ t1\_num$1\*-1.68098 ];

[ t1\_num$2\*-1.16641 ];

[ t1\_haz$1\*-15 ];

[ t1\_haz$2\*-2.93170 ];

MODEL T2: !TIME 2 CROSS-SECTIONAL MODEL WITH ITS START VALUES

%T2#1%

[ t2\_freq$1\*-1.00203 ];

[ t2\_freq$2\*-0.23343 ];

[ t2\_num$1\*-1.11018 ];

[ t2\_num$2\*-0.56427 ];

[ t2\_haz$1\*-2.05905 ];

[ t2\_haz$2\*-1.87027 ];

%T2#2%

[ t2\_freq$1\*-2.85764 ];

[ t2\_freq$2\*1.37409 ];

[ t2\_num$1\*-0.25386 ];

[ t2\_num$2\*2.00902 ];

[ t2\_haz$1\*-1.48252 ];

[ t2\_haz$2\*2.63169 ];

%T2#3%

[ t2\_freq$1\*0.69391 ];

[ t2\_freq$2\*2.91353 ];

[ t2\_num$1\*2.40960 ];

[ t2\_num$2\*2.42739 ];

[ t2\_haz$1\*4.61329 ];

[ t2\_haz$2\*15 ];

MODEL T3: !TIME 3 CROSS-SECTIONAL MODEL WITH ITS START VALUES

%T3#1%

[ t3\_freq$1\*-2.76438 ];

[ t3\_freq$2\*0.80358 ];

[ t3\_num$1\*-5.96376 ];

[ t3\_num$2\*15 ];

[ t3\_haz$1\*-5.95583 ];

[ t3\_haz$2\*15 ];

%T3#2%

[ t3\_freq$1\*-3.13760 ];

[ t3\_freq$2\*-1.40381 ];

[ t3\_num$1\*-5.80225 ];

[ t3\_num$2\*-5.13741 ];

[ t3\_haz$1\*-15 ];

[ t3\_haz$2\*-6.95648 ];

%T3#3%

[ t3\_freq$1\*0.03164 ];

[ t3\_freq$2\*2.22665 ];

[ t3\_num$1\*];

[ t3\_num$2\* ];

[ t3\_haz$1\* ];

[ t3\_haz$2\* ];

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ (\*);

savedata:

response = LTA\_response.txt; !SAVING RESPONSE PATTERNS FOR UNCONDITIONAL LTA (PATTERNS OVER TIME)

file = LTA\_BCH.txt; !SAVING DATASET IN CASE NEED TO BRING IN COVARIATES (IF NO MEASUREMENT INVARIANCE, EVEN PARTIAL WAS ATTAINED)

save=bchWEIGHTS;

format = free;

missflag = 9999;

**APPENDIX 8**

**LONGITUDINAL MEASUREMENT INVARIANCE LTA SYNTAX**

TITLE: LCA 3 TIMEPOINTS

UNCONDITIONAL LONGITUDINAL LTA – MEASUREMENT INVARIANCE ACROSS TIME

DATA:

FILE IS "LTA\_EXAMPLE.DAT";

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

UNIQUECODE Male

AUDIT1 AUDIT2 AUDIT3

PHQ1 PHQ2

T2\_AUDIT1 T2\_AUDIT2 T2\_AUDIT3

T2\_PHQ1 T2\_PHQ2

T3\_AUDIT1 T3\_AUDIT2 T3\_AUDIT3

T3\_PHQ1 T3\_PHQ2

T4\_PTSD\_1 T4\_PTSD\_2 T4\_PTSD\_3 T4\_PTSD\_4 T4\_PTSD\_5

;

USEVARIABLES ARE T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ;

!ANY VARIABLES WANT IN THE SAVED DATASET FOR FUTURE MODELS NEEDS TO BE INCLUDED AS AN AUXILIARY VARIABLE HERE

AUXILIARY = Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5;

MISSING IS ALL (9999);

categorical = T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ;

CLASSES = T1(3) T2(3) T3(3); !NAMES FOR LATENT CLASS CONSTRUCTS AT TIME 1, TIME 2, & TIME 3; NAMING CONVENTION IS UP TO RESEARCHER SO LONG AS 8 CHARACTERS OR LESS.

DEFINE:

IF(AUDIT1 EQ 0) THEN T1\_FREQ = 0; !NEVER

IF(AUDIT1 EQ 1) THEN T1\_FREQ = 1;!1-4/MONTH

IF(AUDIT1 EQ 2) THEN T1\_FREQ = 1;

IF(AUDIT1 >=3) THEN T1\_FREQ = 2;!2+/WEEK

IF(AUDIT2 EQ 0) THEN T1\_NUM = 0;!0-2 DRINKS

IF(AUDIT2 EQ 1) THEN T1\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(AUDIT2 >=2) THEN T1\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(AUDIT3 EQ 0) THEN T1\_HAZ = 0;!NEVER

IF(AUDIT3 EQ 1) THEN T1\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(AUDIT3 >=2) THEN T1\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

IF(T2\_AUDIT1 EQ 0) THEN T2\_FREQ = 0; !NEVER

IF(T2\_AUDIT1 EQ 1) THEN T2\_FREQ = 1;!1-4/MONTH

IF(T2\_AUDIT1 EQ 2) THEN T2\_FREQ = 1;

IF(T2\_AUDIT1 >=3) THEN T2\_FREQ = 2;!2+/WEEK

IF(T2\_AUDIT2 EQ 0) THEN T2\_NUM = 0;!0-2 DRINKS

IF(T2\_AUDIT2 EQ 1) THEN T2\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(T2\_AUDIT2 >=2) THEN T2\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(T2\_AUDIT3 EQ 0) THEN T2\_HAZ = 0;!NEVER

IF(T2\_AUDIT3 EQ 1) THEN T2\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(T2\_AUDIT3 >=2) THEN T2\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

IF(T3\_AUDIT1 EQ 0) THEN T3\_FREQ = 0; !NEVER

IF(T3\_AUDIT1 EQ 1) THEN T3\_FREQ = 1;!1-4/MONTH

IF(T3\_AUDIT1 EQ 2) THEN T3\_FREQ = 1;

IF(T3\_AUDIT1 >=3) THEN T3\_FREQ = 2;!2+/WEEK

IF(T3\_AUDIT2 EQ 0) THEN T3\_NUM = 0;!0-2 DRINKS

IF(T3\_AUDIT2 EQ 1) THEN T3\_NUM = 1; !3-4 DRINKS (HAZARD WOMEN @4)

IF(T3\_AUDIT2 >=2) THEN T3\_NUM = 2; !5+ DRINKS (HAZARD FOR ALL)

IF(T3\_AUDIT3 EQ 0) THEN T3\_HAZ = 0;!NEVER

IF(T3\_AUDIT3 EQ 1) THEN T3\_HAZ = 1; !6+ DRINKS LESS THAN WEEKLY

IF(T3\_AUDIT3 >=2) THEN T3\_HAZ = 2; !6+ DRINKS 1+ TIMES/WEEK

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

!STARTS = 0;

MODEL:

%OVERALL%

MODEL T1: !TIME 1 CROSS-SECTIONAL MODEL WITH ITS START VALUES

%T1#1%

[ t1\_freq$1\*0.40232 ] (P1); !LABELED PARAMETERS FOR CONSTRAINTS ACROSS TIME

[ t1\_freq$2\*3.02300 ] (P2);

[ t1\_num$1\*4.71709 ] (P3);

[ t1\_num$2\*5.37712 ] (P4);

[ t1\_haz$1\*6.34737 ] (P5);

[ t1\_haz$2\*15 ] (P6);

%T1#2%

[ t1\_freq$1\*-15 ] (P11);

[ t1\_freq$2\*0.59494 ] (P12);

[ t1\_num$1\*0.66546 ] (P13);

[ t1\_num$2\*2.05610 ] (P14);

[ t1\_haz$1\*-0.23210 ] (P15);

[ t1\_haz$2\*3.43156 ] (P16);

%T1#3%

[ t1\_freq$1\*-1.24193 ] (P21);

[ t1\_freq$2\*-0.13269 ] (P22);

[ t1\_num$1\*-1.68098 ] (P23);

[ t1\_num$2\*-1.16641 ] (P24);

[ t1\_haz$1\*-15 ] (P25);

[ t1\_haz$2\*-2.93170 ] (P26);

MODEL T2:

%T2#1% !PARAMETER LABELS MATCH CORRESPONDING CLASS PARAMETERS AT TIME 1

[ t2\_freq$1\*-1.00203 ] (P1);

[ t2\_freq$2\*-0.23343 ] (P2);

[ t2\_num$1\*-1.11018 ] (P3);

[ t2\_num$2\*-0.56427 ] (P4);

[ t2\_haz$1\*-2.05905 ] (P5);

[ t2\_haz$2\*-1.87027 ] (P6);

%T2#2%

[ t2\_freq$1\*-2.85764 ] (P11);

[ t2\_freq$2\*1.37409 ] (P12);

[ t2\_num$1\*-0.25386 ] (P13);

[ t2\_num$2\*2.00902 ] (P14);

[ t2\_haz$1\*-1.48252 ] (P15);

[ t2\_haz$2\*2.63169 ] (P16);

%T2#3%

[ t2\_freq$1\*0.69391 ] (P21);

[ t2\_freq$2\*2.91353 ] (P22);

[ t2\_num$1\*2.40960 ] (P23);

[ t2\_num$2\*2.42739 ] (P24);

[ t2\_haz$1\*4.61329 ] (P25);

[ t2\_haz$2\*15 ] (P26);

MODEL T3:

%T3#1% !PARAMETER LABELS MATCH CORRESPONDING CLASS PARAMETERS AT TIMES 1 & 2

[ t3\_freq$1\*-2.76438 ] (P1);

[ t3\_freq$2\*0.80358 ] (P2);

[ t3\_num$1\*-5.96376 ] (P3);

[ t3\_num$2\*15 ] (P4);

[ t3\_haz$1\*-5.95583 ] (P5);

[ t3\_haz$2\*15 ] (P6);

%T3#2%

[ t3\_freq$1\*-3.13760 ] (P11);

[ t3\_freq$2\*-1.40381 ] (P12);

[ t3\_num$1\*-5.80225 ] (P13);

[ t3\_num$2\*-5.13741 ] (P14);

[ t3\_haz$1\*-15 ] (P15);

[ t3\_haz$2\*-6.95648 ] (P16);

%T3#3%

[ t3\_freq$1\*0.03164 ] (P21);

[ t3\_freq$2\*2.22665 ] (P22);

[ t3\_num$1\*] (P23);

[ t3\_num$2\* ] (P24);

[ t3\_haz$1\* ] (P25);

[ t3\_haz$2\* ] (P26);

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

plot: type=plot3;

series = T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ (\*);

savedata:

response = LTA\_INVAR\_response.txt; !SAVING RESPONSE PATTERNS FROM THIS INVARIANT MODEL

file = LTA\_INVAR\_BCH.txt; !SAVING DATASET FROM THIS INVARIANT MODEL TO USE WITH COVARIATES

save=bch;

format = free;

missflag = 9999;

**APPENDX 9**

**CONDITIONAL LTA, VAM APPROACH TO ESTIMATE SINGLE LAG TRANSITION PATHS SYNTAX**

TITLE: LTA TIME 1-3 DRINKING

3 CLASS ENUMERATION MEASUREMENT INVARIANT

DATA:

FILE IS "LTA\_INVAR\_BCH.TXT"; !DATASET OUTPUTTED BY THE MEASUREMENT INVARIANT MODEL

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

!LIST OF VARIABLES CAN BE FOUND AT THE END OF THE PRIOR MODEL’S OUTPUT FILE

!FIRST HAVE INDICATORS, THEN AUXILIARY VARIABLES

T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ

Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5

!BCHWEIGHTS ARE BELOW AND USED AS CLASS INDICATORS WHEN USE BCH APPROACH

BCHW1 BCHW2 BCHW3 BCHW4 BCHW5 BCHW6 BCHW7 BCHW8 BCHW9 BCHW10 BCHW11

BCHW12 BCHW13 BCHW14 BCHW15 BCHW16 BCHW17 BCHW18 BCHW19 BCHW20 BCHW21

BCHW22 BCHW23 BCHW24 BCHW25 BCHW26 BCHW27

!CPROBS ARE THE POSTER CLASS PROBABILITIES

CPROB1 CPROB2 CPROB3 CPROB4 CPROB5 CPROB6 CPROB7 CPROB8 CPROB9 CPROB10

CPROB11 CPROB12 CPROB13 CPROB14 CPROB15 CPROB16 CPROB17 CPROB18 CPROB19

CPROB20 CPROB21 CPROB22 CPROB23 CPROB24 CPROB25 CPROB26 CPROB27

!BELOW ARE THE MODAL CLASS ASSIGNMENTS FOR EACH TIMEPOINT. THE NAMES COME FROM THE PRIOR MODEL’S NAMES FOR THOSE LATENT CLASS CONSTRUCTS

T1 T2 T3

MLCJOINT

;

USEVARIABLES ARE T1 T2 T3; !MODAL CLASS ASSIGNMENT VARIABLES FROM MEASUREMENT INVARIANT SOLUTION

MISSING IS ALL (9999);

NOMINAL = T1 T2 T3; !HAVE TO SPECIFY THESE ARE NOMINAL VARIABLES

CLASSES = MAY(3) AUG(3) OCT(3); !NEW NAMES FOR THE LATENT CLASS CONSTRUCTS FOR THE NEW MODEL BECAUSE CANNOT BE SAME AS THE INDICATOR NAMES.

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 0; !DO NOT NEED MULTIPLE RANDOM STARTS ANYMORE

MODEL:

%OVERALL%

! TRANSITION REGRESSION PATHS WITH OUTCOME REGRESSED ON THE PREDICTOR

OCT#1 ON AUG#1; !OCTOBER CLASS 1 MEMBERSHIP PREDICTED BY AUGUST CLASS 1 MEMBERSHIP

OCT#1 ON AUG#2; !OCTOBER CLASS 2 MEMBERSHIP PREDICTED BY AUGUST CLASS 2 MEMBERSHIP

OCT#2 ON AUG#1;

OCT#2 ON AUG#2;

AUG#1 ON MAY#1;

AUG#1 ON MAY#2;

AUG#2 ON MAY#1;

AUG#2 ON MAY#2;

MODEL MAY:

!MAY CLASS LOGITS FOR EACH PROFILE FOR THOSE MODALLY ASSIGNED TO PROFILE 1; THIS IS HOW THE UNCERTAINTY OF PROFILE ASSIGNMENT IS INCORPORATED INTO THE MODEL. THESE LOGIT VALUES ARE TAKEN FROM THE OUTPUT OF THE PREVIOUS MODEL. IN MPLUS THEY ARE IN A TABLE DIRECTLY ABOVE THE MODEL RESULTS SECTION. CLASS 3 AS THE REFERENCE CLASS DOES NOT NEED A LOGIT VALUE TO BE INCLUDED IN THE SYNTAX AS IT IS @0 IN THE SYNTAX FOR ALL CLASSES. THIS IS WHY ONLY LOGITS FOR CLASSES 1 AND 2 ARE PRESENTED.

%MAY#1%

[T1#1@3.926];

[T1#2@1.632];

%MAY#2%

[T1#1@-1.283];

[T1#2@2.589];

%MAY#3%

[T1#1@-8.255];

[T1#2@-5.440];

MODEL AUG:

!AUGUST CLASS LOGITS FROM THE PRIOR MODEL OUTPUT (MEASUREMENT INVARIANCE MODEL)

%AUG#1%

[T2#1@4.415];

[T2#2@-0.498];

%AUG#2%

[T2#1@0.630];

[T2#2@2.807];

%AUG#3%

[T2#1@-3.949];

[T2#2@-5.660];

MODEL OCT:

!OCTOBER CLASS LOGITS FROM THE PRIOR MODEL OUTPUT (MEASUREMENT INVARIANCE MODEL)

%OCT#1%

[T3#1@6.595];

[T3#2@-1.240];

%OCT#2%

[T3#1@-1.215];

[T3#2@2.716];

%OCT#3%

[T3#1@-7.562];

[T3#2@-9.495];

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat; !PATTERNS GIVES MISSING DATA PATTERNS

!stdyx cinterval;

**APPENDIX 10**

**INVARIANT VAM WITH PREDICTOR SYNTAX**

TITLE: LTA TIME 1-3 CLASSES

MEASUREMENT INVARIANT

PREDICTORS ADDED AND MALE PREDICTOR OMNIBUS TEST

DATA:

FILE IS "LTA\_INVAR\_BCH.TXT"; !DATASET OUTPUTTED BY THE MEASUREMENT INVARIANT MODEL

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ

Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5

BCHW1 BCHW2 BCHW3 BCHW4 BCHW5 BCHW6 BCHW7 BCHW8 BCHW9 BCHW10 BCHW11

BCHW12 BCHW13 BCHW14 BCHW15 BCHW16 BCHW17 BCHW18 BCHW19 BCHW20 BCHW21

BCHW22 BCHW23 BCHW24 BCHW25 BCHW26 BCHW27

CPROB1 CPROB2 CPROB3 CPROB4 CPROB5 CPROB6 CPROB7 CPROB8 CPROB9 CPROB10

CPROB11 CPROB12 CPROB13 CPROB14 CPROB15 CPROB16 CPROB17 CPROB18 CPROB19

CPROB20 CPROB21 CPROB22 CPROB23 CPROB24 CPROB25 CPROB26 CPROB27

T1 T2 T3

MLCJOINT

;

USEVARIABLES ARE T1 T2 T3

MALE

DEP1 DEP2 DEP3; !THESE LAST THREE VARIABLES ARE CALCULATED IN THE DEFINE COMMAND BELOW

MISSING IS ALL (9999);

NOMINAL = T1 T2 T3;

CLASSES = MAY(3) AUG(3) OCT(3);

DEFINE:

!CALCULATING DEPRESSION TOTAL (SUM) SCORES FOR EACH TIMEPOINT

DEP1 = SUM(PHQ1 PHQ2);

DEP2 = SUM(T2\_PHQ1 T2\_PHQ2);

DEP3 = SUM(T3\_PHQ1 T3\_PHQ2);

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 0; !DO NOT NEED MULTPLE RANDOM STARTS ANYMORE

MODEL:

%OVERALL%

!PREDICTORS

OCT ON MALE (COV1); !UNIQUE LABELS OF REGRESSIONS FOR CLASSES PREDICTED BY MALE

AUG ON MALE (COV2);

MAY ON MALE (COV3);

MAY ON DEP1 (COV7); !UNIQUE LABELS OF REGRESSIONS FOR CLASSES PREDICTED BY CROSS-SECTIONAL DEPRESSION SCORES

AUG ON DEP2 (COV8);

OCT ON DEP3 (COV9);

!MAINTAINING THE SYNTAX FOR SINGLE LAG TRANSITION COEFFICIENTS

OCT#1 ON AUG#1;

OCT#1 ON AUG#2;

OCT#2 ON AUG#1;

OCT#2 ON AUG#2;

AUG#1 ON MAY#1;

AUG#1 ON MAY#2;

AUG#2 ON MAY#1;

AUG#2 ON MAY#2;

MODEL MAY:

%MAY#1%

[T1#1@3.926];

[T1#2@1.632];

%MAY#2%

[T1#1@-1.283];

[T1#2@2.589];

%MAY#3%

[T1#1@-8.255];

[T1#2@-5.440];

MODEL AUG:

%AUG#1%

[T2#1@4.415];

[T2#2@-0.498];

%AUG#2%

[T2#1@0.630];

[T2#2@2.807];

%AUG#3%

[T2#1@-3.949];

[T2#2@-5.660];

MODEL OCT:

%OCT#1%

[T3#1@6.595];

[T3#2@-1.240];

%OCT#2%

[T3#1@-1.215];

[T3#2@2.716];

%OCT#3%

[T3#1@-7.562];

[T3#2@-9.495];

!SYNTAX ADDED BELOW TO HAVE A WALD TEST FOR THE OMNIBUS TEST OF MALE COVARIATE PREDICTING EACH OF THE LATENT CLASSES FOR ALL THREE TIMEPOINTS. BY HAVING ALL THREE REGRESSIONS SET EQUAL TO 0, THE OUTPUT WILL INCLUDE THE RESULTS OF A WALD TEST COMPARING THE MODEL SPECIFIED ABOVE WITH THESE THREE REGRESSIONS ESTIMATED COMPARED TO THE MODEL SPECIFIED BELOW WITH THOSE THREE REGRESSIONS SET TO 0. MPLUS RUNS THE MODEL WITH THE SPECIFICATIONS BELOW IN THE BACKGROUND AND INCLUDES THE WALD TEST AT THE END OF THE MODEL FIT INFORMATION SECTION.

MODEL TEST:

0=COV1;

0=COV2;

0=COV3;

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat;

**APPENDIX 11**

**MOVER/STAYER CONSTRUCT SYNTAX**

TITLE: LTA TIME 1-3

MEASUREMENT INVARIANT, PREDICTORS

MOVER/STAYER CONSTRUCT SPECIFIED

DATA:

FILE IS "LTA\_INVAR\_BCH.TXT"; !DATASET OUTPUTTED BY THE MEASUREMENT INVARIANT MODEL

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ

Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5

BCHW1 BCHW2 BCHW3 BCHW4 BCHW5 BCHW6 BCHW7 BCHW8 BCHW9 BCHW10 BCHW11

BCHW12 BCHW13 BCHW14 BCHW15 BCHW16 BCHW17 BCHW18 BCHW19 BCHW20 BCHW21

BCHW22 BCHW23 BCHW24 BCHW25 BCHW26 BCHW27

CPROB1 CPROB2 CPROB3 CPROB4 CPROB5 CPROB6 CPROB7 CPROB8 CPROB9 CPROB10

CPROB11 CPROB12 CPROB13 CPROB14 CPROB15 CPROB16 CPROB17 CPROB18 CPROB19

CPROB20 CPROB21 CPROB22 CPROB23 CPROB24 CPROB25 CPROB26 CPROB27

T1 T2 T3

MLCJOINT

;

USEVARIABLES ARE T1 T2 T3

MALE

DEP1 DEP2 DEP3;

MISSING IS ALL (9999);

NOMINAL = T1 T2 T3;

CLASSES = MS(2) MAY(3) AUG(3) OCT(3); !MS IS MOVER/STAYER CLASS CONSTRUCT

DEFINE:

DEP1 = SUM(PHQ1 PHQ2);

DEP2 = SUM(T2\_PHQ1 T2\_PHQ2);

DEP3 = SUM(T3\_PHQ1 T3\_PHQ2);

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 0;

MODEL:

%OVERALL%

!PREDICTORS

MAY ON MALE (COV3); !BASED ON PRIOR MODELS, MALE ONLY SIGNIFICANTLY PREDICTED MAY CLASS MEMBERSHIP

MAY ON DEP1 (COV7); !EACH OF THESE PATHS WAS FOUND SIGNIFICANT AND MAINTAINED

AUG ON DEP2 (COV8);

OCT ON DEP3 (COV9);

MS ON MALE (COV11); !NEW PATH OF MALE PREDICTING THE MOVER/STAYER CONSTRUCT

!MS IS THE MOVER-STAYER LATENT VARIABLE

!MS#1 IS THE MOVER CLASS

!MS#2 IS THE STAYER CLASS

!SPECIFY MOVER CLASS BY ALLOWING FREELY MOVING RELATIONSHIPS BETWEEN TIME POINT CLASSES

[MAY#1];

[MAY#2];

[AUG#1];

[AUG#2];

!GENERAL LOADINGS FOR THE HIGHER-ORDER MOVER/STAYER CONSTRUCT ARE REGRESSIONS

MAY#1 ON MS#1;

MAY#2 ON MS#1;

AUG#1 ON MS#1;

AUG#2 ON MS#1;

OCT#1 ON MS#1;

OCT#2 ON MS#1;

!SPECIFY STAYER CLASS BY RESTRICTING MOVEMENT BETWEEN TIMEPOINT CLASSES

[AUG#1@-15]; !PROBABILITY OF TRANSITIONING FROM CLASS 1 IN MAY TO AUG FIXED AT 0 FOR THE STAYER CLASS (LOGIT METRIC SO EXTREME VALUE OF -15 IS FIXING TO 0 FOR RELATIONSHIP)

[AUG#2@-15];

[OCT#1@-15];

[OCT#2@-15];

!DEFINE MS MEASUREMENT STRUCTURE

MODEL MS:

%MS#1% !MOVER CLASS

AUG#1 ON MAY#1;

AUG#1 ON MAY#2;

AUG#2 ON MAY#1;

AUG#2 ON MAY#2;

OCT#1 ON AUG#1;

OCT#1 ON AUG#2;

OCT#2 ON AUG#1;

OCT#2 ON AUG#2;

%MS#2% !STAYER CLASS SO FIX VALUES TO LOGIT EXTREMES (30 FOR 1 & -45 FOR 0)

AUG#1 ON MAY#1@30; !stayer

AUG#1 ON MAY#2@-45;

AUG#2 ON MAY#1@-45;

AUG#2 ON MAY#2@30; !stayer

OCT#1 ON AUG#1@30; !stayer

OCT#1 ON AUG#2@-45;

OCT#2 ON AUG#1@-45;

OCT#2 ON AUG#2@30; !stayer

!SAME MEASUREMENT MODEL FOR THE TIMEPOINT CLASSES THAT WE HAVE BEEN USING

MODEL MS.MAY:

%MS#1.MAY#1%

[T1#1@3.926];

[T1#2@1.632];

%MS#1.MAY#2%

[T1#1@-1.283];

[T1#2@2.589];

%MS#1.MAY#3%

[T1#1@-8.255];

[T1#2@-5.440];

%MS#2.MAY#1%

[T1#1@3.926];

[T1#2@1.632];

%MS#2.MAY#2%

[T1#1@-1.283];

[T1#2@2.589];

%MS#2.MAY#3%

[T1#1@-8.255];

[T1#2@-5.440];

!AUGUST CLASSES

MODEL MS.AUG:

%MS#1.AUG#1%

[T2#1@4.415];

[T2#2@-0.498];

%MS#1.AUG#2%

[T2#1@0.630];

[T2#2@2.807];

%MS#1.AUG#3%

[T2#1@-3.949];

[T2#2@-5.660];

%MS#2.AUG#1%

[T2#1@4.415];

[T2#2@-0.498];

%MS#2.AUG#2%

[T2#1@0.630];

[T2#2@2.807];

%MS#2.AUG#3%

[T2#1@-3.949];

[T2#2@-5.660];

!OCTOBER CLASSES

MODEL MS.OCT:

%MS#1.OCT#1%

[T3#1@6.595];

[T3#2@-1.240];

%MS#1.OCT#2%

[T3#1@-1.215];

[T3#2@2.716];

%MS#1.OCT#3%

[T3#1@-7.562];

[T3#2@-9.495];

%MS#2.OCT#1%

[T3#1@6.595];

[T3#2@-1.240];

%MS#2.OCT#2%

[T3#1@-1.215];

[T3#2@2.716];

%MS#2.OCT#3%

[T3#1@-7.562];

[T3#2@-9.495];

MODEL TEST:

0=COV11; !TO GET WALD TEST EXAMINING IF MALE COVARIATE SIGNIFICANTLY PREDICTS THE MOVER/STAYER CONSTRUCT AS PART OF THE MODEL FIT INFORMATION SECTION

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat;

**APPENDIX 12**

**MEASUREMENT INVARIANT LTA ADDING OUTCOME OMNIBUS TEST WITH VAM SYNTAX**

TITLE: LTA TIME 1-3

MEASUREMENT INVARIANT, PREDICTORS

DISTAL OUTCOME OMNIBUS TEST FOR SIGNIFICANT DIFFERENCE ACROSS CLASSES

DATA:

FILE IS "LTA\_INVAR\_BCH.TXT"; !DATASET OUTPUTTED BY THE MEASUREMENT INVARIANT MODEL

TYPE IS INDIVIDUAL;

VARIABLE:

NAMES ARE

T1\_FREQ T1\_NUM T1\_HAZ T2\_FREQ T2\_NUM T2\_HAZ T3\_FREQ T3\_NUM T3\_HAZ

Male PHQ1 PHQ2 T2\_PHQ1 T2\_PHQ2 T3\_PHQ1 T3\_PHQ2

T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5

BCHW1 BCHW2 BCHW3 BCHW4 BCHW5 BCHW6 BCHW7 BCHW8 BCHW9 BCHW10 BCHW11

BCHW12 BCHW13 BCHW14 BCHW15 BCHW16 BCHW17 BCHW18 BCHW19 BCHW20 BCHW21

BCHW22 BCHW23 BCHW24 BCHW25 BCHW26 BCHW27

CPROB1 CPROB2 CPROB3 CPROB4 CPROB5 CPROB6 CPROB7 CPROB8 CPROB9 CPROB10

CPROB11 CPROB12 CPROB13 CPROB14 CPROB15 CPROB16 CPROB17 CPROB18 CPROB19

CPROB20 CPROB21 CPROB22 CPROB23 CPROB24 CPROB25 CPROB26 CPROB27

T1 T2 T3

MLCJOINT

;

USEVARIABLES ARE T1 T2 T3

MALE

DEP1 DEP2 DEP3;

MISSING IS ALL (9999);

NOMINAL = T1 T2 T3;

CLASSES = MAY(3) AUG(3) OCT(3); !MOVER/STAYER CONSTRUCT WAS NOT KEPT GOING FORWARD, SO NOT HERE OR IN SYNTAX BELOW

DEFINE:

DEP1 = SUM(PHQ1 PHQ2);

DEP2 = SUM(T2\_PHQ1 T2\_PHQ2);

DEP3 = SUM(T3\_PHQ1 T3\_PHQ2);

PTSD = SUM(T4\_PTSD1 T4\_PTSD2 T4\_PTSD3 T4\_PTSD4 T4\_PTSD5);

ANALYSIS:

TYPE=MIXTURE;

ESTIMATOR=MLR;

PROCESSORS = 4;

STARTS = 0;

MODEL:

%OVERALL%

!PREDICTORS

!OCT ON MALE (COV1);

!AUG ON MALE (COV2);

MAY ON MALE (COV3);

MAY ON DEP1 (COV7);

AUG ON DEP2 (COV7);

OCT ON DEP3 (COV7);

OCT#1 ON AUG#1;

OCT#1 ON AUG#2;

OCT#2 ON AUG#1;

OCT#2 ON AUG#2;

AUG#1 ON MAY#1;

AUG#1 ON MAY#2;

AUG#2 ON MAY#1;

AUG#2 ON MAY#2;

MODEL MAY:

%MAY#1%

[T1#1@3.926];

[T1#2@1.632];

%MAY#2%

[T1#1@-1.283];

[T1#2@2.589];

%MAY#3%

[T1#1@-8.255];

[T1#2@-5.440];

MODEL AUG:

%AUG#1%

[T2#1@4.415];

[T2#2@-0.498];

%AUG#2%

[T2#1@0.630];

[T2#2@2.807];

%AUG#3%

[T2#1@-3.949];

[T2#2@-5.660];

!DISTAL OUTCOME ADDED TO T3 MODELS ONLY BECAUSE TESTING PTSD AT T4 BY T3 CLASSES

MODEL OCT:

%OCT#1%

[T3#1@6.595];

[T3#2@-1.240];

[PTSD] (A1); !CLASS-SPECIFIC MEAN ESTIMATED FOR PTSD WITH UNIQUE LABEL BY CLASS

%OCT#2%

[T3#1@-1.215];

[T3#2@2.716];

[PTSD] (A2); !CLASS-SPECIFIC MEAN ESTIMATED FOR PTSD WITH UNIQUE LABEL BY CLASS

%OCT#3%

[T3#1@-7.562];

[T3#2@-9.495];

[PTSD] (A3); !CLASS-SPECIFIC MEAN ESTIMATED FOR PTSD WITH UNIQUE LABEL BY CLASS

!SPECIFYING OMNIBUS WALD TEST FOR DIFFERENCES IN MEAN PTSD VALUES USING CLASS-SPECIFIC LABELS ABOVE. THE SYNTAX BELOW SPECIFIES CLASS 1 PTSD MEAN EQUALS CLASS 2 PTSD MEAN, THEN CLASS 1 PTSD MEAN EQUALS CLASS 3 PTSD MEAN, AND LASTLY CLASS 2 PTSD MEAN EQUALS CLASS 3 PTSD MEAN. THEREFORE ALL PAIRWISE COMPARISON ARE SET AS EQUAL.

MODEL TEST:

A1=A2;

A1=A3;

A2=A3;

OUTPUT:tech1 tech8 tech10 !tech11 tech14

patterns residual svalues sampstat;