MPLUS Analysis Examples Replication Chapter 8

Mplus includes all input code and output in the *.out file. This document contains selected output from each analysis for Chapter 8. All data preparation and management was done using SAS and then read into Mplus using a text file format produced by SAS. Plots can be produced in MPlus with additional coding but are not included here, see the Mplus documentation for details and examples.

Some options available in Stata or other software presented in Chapter 8 including design-adjusted GOF tests, margins plots prepared via a simple command using model output, and design-adjusted model fit statistics are not available in Mplus. They are, therefore, not included in this document.

Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017 10:27 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: AGE
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar numsecu prevmar racecat sexf sexm;

    USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 ;

    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are mde ;

    ANALYSIS:
    type is complex;
    estimator is mlr ;

    Model:
    mde on
    ag3044 (pag3044)
    ag4559 (pag4559)
    ag60 (pag60) ;
    Model test:
    pag3044=0 ;
    pag4559=0 ;
    pag60=0 ;

INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: AGE

SUMMARY OF ANALYSIS

Number of groups   1
Number of observations   9282

Number of dependent variables   1
Number of independent variables   3
Number of continuous latent variables   0

Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    AG3044   AG4559   AG60

Variables with special functions

  Stratification   SESTRAT
  Cluster variable   NUMSECU
  Weight variable   NCSRWTLG

Estimator   MLR
Information matrix   OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations   100

```
    Convergence criterion                          0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                        500
  Convergence criteria
    Loglikelihood change                         0.100D-02
    Relative loglikelihood change                0.100D-05
    Derivative                                   0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                    ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                    ITERATION
  Maximum value for logit thresholds                   15
  Minimum value for logit thresholds                  -15
  Minimum expected cell size for chi-square      0.100D-01
Maximum number of iterations for H1                  2000
Convergence criterion for H1                     0.100D-03
Optimization algorithm                                EMA
Integration Specifications
  Type                                           STANDARD
  Number of integration points                         15
  Dimensions of numerical integration                   0
  Adaptive quadrature                                  ON
Link                                                LOGIT
Cholesky                                              OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE


SUMMARY OF DATA

     Number of missing data patterns         1
     Number of y missing data patterns       0
     Number of u missing data patterns       1
     Number of strata             42
     Number of clusters           84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value   0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

    MDE
      Category 1    0.808        7502.042
      Category 2    0.192        1779.958


THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters                  4

Loglikelihood

        H0 Value                      -4469.780
        H0 Scaling Correction Factor     1.7672
           for MLR


Information Criteria

        Akaike (AIC)                   8947.560
        Bayesian (BIC)                 8976.103
```

```
             Sample-Size Adjusted BIC        8963.392
                (n* = (n + 2) / 24)


Wald Test of Parameter Constraints

             Value                           60.871
             Degrees of Freedom                   3
             P-Value                         0.0000

MODEL RESULTS

                                                    Two-Tailed
                    Estimate      S.E.  Est./S.E.    P-Value

 MDE        ON
    AG3044            0.274      0.074      3.692      0.000
    AG4559            0.243      0.092      2.648      0.008
    AG60             -0.595      0.107     -5.542      0.000


 Thresholds
    MDE$1             1.490      0.059     25.259      0.000


LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
    AG3044            1.316
    AG4559            1.275
    AG60              0.552


QUALITY OF NUMERICAL RESULTS

     Condition Number for the Information Matrix              0.382E-01
        (ratio of smallest to largest eigenvalue)


DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 bivariate age.dgm

     Beginning Time:  10:27:26
        Ending Time:  10:27:27
       Elapsed Time:  00:00:01
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  10:30 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: SEX
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

    USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG SEXM;

    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are mde ;

    ANALYSIS:
    type is complex;
    estimator is mlr ;

    Model:
    mde on sexm ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: SEX

SUMMARY OF ANALYSIS

Number of groups                                                 1
Number of observations                                        9282

Number of dependent variables                                    1
Number of independent variables                                  1
Number of continuous latent variables                            0

Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    SEXM

Variables with special functions

  Stratification          SESTRAT
  Cluster variable        NUMSECU
  Weight variable         NCSRWTLG


Estimator                                                      MLR
Information matrix                                         OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                               100
  Convergence criterion                               0.100D-05
Optimization Specifications for the EM Algorithm
```

```
     Maximum number of iterations                           500
     Convergence criteria
       Loglikelihood change                            0.100D-02
       Relative loglikelihood change                   0.100D-05
       Derivative                                      0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
     Number of M step iterations                             1
     M step convergence criterion                    0.100D-02
     Basis for M step termination                    ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
     Number of M step iterations                             1
     M step convergence criterion                    0.100D-02
     Basis for M step termination                    ITERATION
     Maximum value for logit thresholds                     15
     Minimum value for logit thresholds                    -15
     Minimum expected cell size for chi-square       0.100D-01
Maximum number of iterations for H1                       2000
Convergence criterion for H1                        0.100D-03
Optimization algorithm                                     EMA
Integration Specifications
     Type                                             STANDARD
     Number of integration points                          15
     Dimensions of numerical integration                    0
     Adaptive quadrature                                    ON
Link                                                     LOGIT
Cholesky                                                   OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE


SUMMARY OF DATA

     Number of missing data patterns           1
     Number of y missing data patterns         0
     Number of u missing data patterns         1
     Number of strata                  42
     Number of clusters                84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     MDE
       Category 1     0.808          7502.042
       Category 2     0.192          1779.958


THE MODEL ESTIMATION TERMINATED NORMALLY


MODEL FIT INFORMATION

Number of Free Parameters                      2

Loglikelihood

         H0 Value                    -4496.281
         H0 Scaling Correction Factor    2.0415
            for MLR
```

6

Information Criteria

```
        Akaike (AIC)                    8996.561
        Bayesian (BIC)                  9010.833
        Sample-Size Adjusted BIC        9004.477
          (n* = (n + 2) / 24)
```

MODEL RESULTS

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
MDE	ON				
	SEXM	-0.482	0.072	-6.660	0.000
Thresholds					
	MDE$1	1.230	0.038	32.000	0.000

LOGISTIC REGRESSION ODDS RATIO RESULTS

MDE	ON	
	SEXM	0.618

QUALITY OF NUMERICAL RESULTS

```
    Condition Number for the Information Matrix          0.167E+00
      (ratio of smallest to largest eigenvalue)
```

DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 bivariate sex.dgm

     Beginning Time: 10:30:08
        Ending Time: 10:30:08
       Elapsed Time: 00:00:00

Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017 10:35 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: ALD
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG ALD ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are mde ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;

   Model:
   mde on
    ald (p1) ;
   model test:
    p1=0 ;

INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: ALD

SUMMARY OF ANALYSIS

Number of groups   1
Number of observations   9282

Number of dependent variables   1
Number of independent variables   1
Number of continuous latent variables   0

Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    ALD

Variables with special functions

  Stratification   SESTRAT
  Cluster variable   NUMSECU
  Weight variable   NCSRWTLG

Estimator   MLR
Information matrix   OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for

```
Continuous Outcomes
  Maximum number of iterations                        100
  Convergence criterion                          0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                        500
  Convergence criteria
    Loglikelihood change                         0.100D-02
    Relative loglikelihood change                0.100D-05
    Derivative                                   0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                   ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                   ITERATION
  Maximum value for logit thresholds                   15
  Minimum value for logit thresholds                  -15
  Minimum expected cell size for chi-square      0.100D-01
Maximum number of iterations for H1                  2000
Convergence criterion for H1                     0.100D-03
Optimization algorithm                                EMA
Integration Specifications
  Type                                           STANDARD
  Number of integration points                         15
  Dimensions of numerical integration                   0
  Adaptive quadrature                                  ON
Link                                                LOGIT
Cholesky                                              OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE


SUMMARY OF DATA

     Number of missing data patterns          1
     Number of y missing data patterns        0
     Number of u missing data patterns        1
     Number of strata                   42
     Number of clusters                 84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     MDE
       Category 1    0.808          7502.042
       Category 2    0.192          1779.958


THE MODEL ESTIMATION TERMINATED NORMALLY


MODEL FIT INFORMATION

Number of Free Parameters                      2

Loglikelihood
```

```
          H0 Value                         -4443.031
          H0 Scaling Correction Factor      2.1300
            for MLR


Information Criteria

          Akaike (AIC)                      8890.062
          Bayesian (BIC)                    8904.333
          Sample-Size Adjusted BIC          8897.978
            (n* = (n + 2) / 24)


Wald Test of Parameter Constraints

          Value                             106.144
          Degrees of Freedom                      1
          P-Value                            0.0000




MODEL RESULTS

                                                    Two-Tailed
                        Estimate       S.E.  Est./S.E.    P-Value


MDE        ON
    ALD                    1.343      0.130     10.303      0.000


 Thresholds
    MDE$1                   1.537      0.045     34.405      0.000



LOGISTIC REGRESSION ODDS RATIO RESULTS

MDE        ON
    ALD                    3.831



QUALITY OF NUMERICAL RESULTS

     Condition Number for the Information Matrix          0.794E-01
        (ratio of smallest to largest eigenvalue)



DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 bivariate ald.dgm

     Beginning Time:  10:35:56
        Ending Time:  10:35:56
       Elapsed Time:  00:00:00
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  10:38 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: EDUCATION
  DATA:
  FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
  VARIABLE:
  NAMES ARE
  AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
  REGION SECLUSTR SESTRAT SEX
  SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
  ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

  USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG ED12 ED1315 ED16 ;

  missing are . ;
  WEIGHT IS NCSRWTlg ;
  stratification is sestrat ;
  cluster is numsecu ;
  categorical are mde ;

  ANALYSIS:
  type is complex;
  estimator is mlr ;

  Model:
  mde on
   ED12 (p1)
   ED1315 (P2)
   ED16 (P3) ;
  model test:
   p1=0 ;
   P2=0 ;
   P3=0 ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: EDUCATION

SUMMARY OF ANALYSIS

Number of groups                                       1
Number of observations                              9282

Number of dependent variables                          1
Number of independent variables                        3
Number of continuous latent variables                  0

Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    ED12       ED1315      ED16

Variables with special functions

  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG
```

```
Estimator                                            MLR
Information matrix                              OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                       100
  Convergence criterion                        0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                       500
  Convergence criteria
    Loglikelihood change                       0.100D-02
    Relative loglikelihood change              0.100D-05
    Derivative                                 0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                          1
  M step convergence criterion               0.100D-02
  Basis for M step termination                 ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                          1
  M step convergence criterion               0.100D-02
  Basis for M step termination                 ITERATION
  Maximum value for logit thresholds                  15
  Minimum value for logit thresholds                 -15
  Minimum expected cell size for chi-square    0.100D-01
Maximum number of iterations for H1                 2000
Convergence criterion for H1                   0.100D-03
Optimization algorithm                               EMA
Integration Specifications
  Type                                          STANDARD
  Number of integration points                        15
  Dimensions of numerical integration                  0
  Adaptive quadrature                                 ON
Link                                               LOGIT
Cholesky                                             OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

    Number of missing data patterns            1
    Number of y missing data patterns          0
    Number of u missing data patterns          1
    Number of strata                 42
    Number of clusters               84



COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100



UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

    MDE
      Category 1    0.808        7502.042
      Category 2    0.192        1779.958




THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION
```

```
Number of Free Parameters                    4

Loglikelihood

        H0 Value                      -4528.475
        H0 Scaling Correction Factor    1.5793
           for MLR

Information Criteria

        Akaike (AIC)                   9064.951
        Bayesian (BIC)                 9093.494
        Sample-Size Adjusted BIC       9080.783
           (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                            12.090
        Degrees of Freedom                    3
        P-Value                          0.0071




MODEL RESULTS

                                              Two-Tailed
                    Estimate     S.E.  Est./S.E.   P-Value

 MDE        ON
    ED12             0.156      0.088      1.775     0.076
    ED1315           0.325      0.095      3.435     0.001
    ED16             0.228      0.100      2.280     0.023

 Thresholds
    MDE$1            1.635      0.089     18.416     0.000


LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
    ED12             1.169
    ED1315           1.385
    ED16             1.256


QUALITY OF NUMERICAL RESULTS

    Condition Number for the Information Matrix        0.267E-01
       (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 bivariate education.dgm

    Beginning Time:  10:38:56
       Ending Time:  10:38:58
       Elapsed Time:  00:00:02
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  10:41 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: MARITAL STATUS
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG PREVMAR NEVMAR ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are mde ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;

   Model:
   mde on
    PREVMAR (P1)
    NEVMAR  (P2) ;

   model test:
    p1=0 ;
    P2=0 ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: MARITAL STATUS

SUMMARY OF ANALYSIS

Number of groups                                                  1
Number of observations                                         9282

Number of dependent variables                                     1
Number of independent variables                                   2
Number of continuous latent variables                             0

Observed dependent variables

  Binary and ordered categorical (ordinal)
   MDE

Observed independent variables
   PREVMAR     NEVMAR

Variables with special functions

  Stratification         SESTRAT
  Cluster variable       NUMSECU
  Weight variable        NCSRWTLG
```

```
Estimator                                              MLR
Information matrix                                 OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                          100
  Convergence criterion                           0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                          500
  Convergence criteria
    Loglikelihood change                          0.100D-02
    Relative loglikelihood change                 0.100D-05
    Derivative                                    0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                             1
  M step convergence criterion                    0.100D-02
  Basis for M step termination                    ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                             1
  M step convergence criterion                    0.100D-02
  Basis for M step termination                    ITERATION
  Maximum value for logit thresholds                     15
  Minimum value for logit thresholds                    -15
  Minimum expected cell size for chi-square       0.100D-01
Maximum number of iterations for H1                    2000
Convergence criterion for H1                       0.100D-03
Optimization algorithm                                  EMA
Integration Specifications
  Type                                             STANDARD
  Number of integration points                           15
  Dimensions of numerical integration                     0
  Adaptive quadrature                                    ON
Link                                                  LOGIT
Cholesky                                                OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

     Number of missing data patterns            1
     Number of y missing data patterns          0
     Number of u missing data patterns          1
     Number of strata                  42
     Number of clusters                84



COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100



UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

    MDE
      Category 1    0.808         7502.042
      Category 2    0.192         1779.958




THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION
```

```
Number of Free Parameters                    3

Loglikelihood

        H0 Value                      -4517.714
        H0 Scaling Correction Factor      2.0224
          for MLR

Information Criteria

        Akaike (AIC)                   9041.428
        Bayesian (BIC)                 9062.835
        Sample-Size Adjusted BIC       9053.302
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                            28.562
        Degrees of Freedom                    2
        P-Value                          0.0000
MODEL RESULTS
                                            Two-Tailed
                 Estimate     S.E.  Est./S.E.   P-Value


  MDE        ON
    PREVMAR       0.405      0.076      5.344     0.000
    NEVMAR        0.138      0.096      1.446     0.148


  Thresholds
    MDE$1         1.563      0.052     30.169     0.000



LOGISTIC REGRESSION ODDS RATIO RESULTS

  MDE        ON
    PREVMAR       1.499
    NEVMAR        1.148



QUALITY OF NUMERICAL RESULTS

    Condition Number for the Information Matrix        0.977E-01
       (ratio of smallest to largest eigenvalue)



DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 bivariate marital.dgm

    Beginning Time:  10:41:38
       Ending Time:  10:41:39
      Elapsed Time:  00:00:01
```

Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017 11:01 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST AGE
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar numsecu prevmar racecat sexf sexm;

    USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
    ED12 ED1315 ED16 PREVMAR NEVMAR ;

    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are mde ;

    ANALYSIS:
    type is complex;
    estimator is mlr ;

    Model:
    mde on
     AG3044 (P1)
     AG4559 (P2)
     AG60 (P3)
     SEXM (p4)
     ALD (p5)
     ED12 (p6)
     ED1315 (p7)
     ED16 (p8)
     PREVMAR (p9)
     NEVMAR (p10) ;

    model test:
    0=P1 ;
    0=P2 ;
    0=P3 ;

INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST AGE

SUMMARY OF ANALYSIS

Number of groups   1
Number of observations   9282

Number of dependent variables   1
Number of independent variables   10
Number of continuous latent variables   0

Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables

```
   AG3044      AG4559       AG60        SEXM        ALD         ED12
   ED1315      ED16        PREVMAR     NEVMAR


Variables with special functions

  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG


Estimator                                                    MLR
Information matrix                                       OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                              100
  Convergence criterion                             0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                              500
  Convergence criteria
    Loglikelihood change                            0.100D-02
    Relative loglikelihood change                   0.100D-05
    Derivative                                      0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                                 1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                                 1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
  Maximum value for logit thresholds                         15
  Minimum value for logit thresholds                        -15
  Minimum expected cell size for chi-square         0.100D-01
Maximum number of iterations for H1                       2000
Convergence criterion for H1                        0.100D-03
Optimization algorithm                                     EMA
Integration Specifications
  Type                                               STANDARD
  Number of integration points                              15
  Dimensions of numerical integration                        0
  Adaptive quadrature                                       ON
Link                                                     LOGIT
Cholesky                                                   OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

     Number of missing data patterns             1
     Number of y missing data patterns           0
     Number of u missing data patterns           1
     Number of strata            42
     Number of clusters          84



COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100



UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

    MDE
      Category 1     0.808        7502.042
      Category 2     0.192        1779.958
```

```
THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters                    11

Loglikelihood

        H0 Value                      -4295.718
        H0 Scaling Correction Factor     1.6444
          for MLR

Information Criteria

        Akaike (AIC)                   8613.437
        Bayesian (BIC)                 8691.931
        Sample-Size Adjusted BIC       8656.975
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                            59.949
        Degrees of Freedom                    3
        P-Value                          0.0000



MODEL RESULTS

                                              Two-Tailed
                    Estimate     S.E.  Est./S.E.    P-Value

 MDE        ON
    AG3044         0.256      0.094      2.708      0.007
    AG4559         0.206      0.092      2.256      0.024
    AG60          -0.676      0.141     -4.783      0.000
    SEXM          -0.577      0.077     -7.477      0.000
    ALD            1.424      0.154      9.235      0.000
    ED12           0.079      0.097      0.818      0.413
    ED1315         0.231      0.093      2.477      0.013
    ED16           0.163      0.111      1.473      0.141
    PREVMAR        0.486      0.085      5.695      0.000
    NEVMAR         0.116      0.108      1.071      0.284

 Thresholds
    MDE$1          1.583      0.121     13.120      0.000


LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
    AG3044         1.291
    AG4559         1.229
    AG60           0.509
    SEXM           0.561
    ALD            4.152
    ED12           1.082
    ED1315         1.259
    ED16           1.177
    PREVMAR        1.626
    NEVMAR         1.123


QUALITY OF NUMERICAL RESULTS
```

```
      Condition Number for the Information Matrix              0.132E-01
        (ratio of smallest to largest eigenvalue)
```

DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test age.dgm

     Beginning Time: 11:01:11
        Ending Time: 11:01:13
       Elapsed Time: 00:00:02

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  11:02 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST EDUCATION
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are mde ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;

   Model:
   mde on
    AG3044 (P1)
    AG4559 (P2)
    AG60 (P3)
    SEXM (p4)
    ALD (p5)
    ED12 (p6)
    ED1315 (p7)
    ED16 (p8)
    PREVMAR (p9)
    NEVMAR (p10) ;

   model test:
   0=P6 ;
   0=P7 ;
   0=P8 ;


INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST EDUCATION

SUMMARY OF ANALYSIS

Number of groups                                                 1
Number of observations                                        9282


Number of dependent variables                                    1
Number of independent variables                                 10
Number of continuous latent variables                            0

Observed dependent variables

  Binary and ordered categorical (ordinal)
   MDE

Observed independent variables
   AG3044       AG4559       AG60         SEXM         ALD          ED12
   ED1315       ED16         PREVMAR      NEVMAR
```

```
Variables with special functions

  Stratification       SESTRAT
  Cluster variable     NUMSECU
  Weight variable      NCSRWTLG


Estimator                                        MLR
Information matrix                           OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                   100
  Convergence criterion                    0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                   500
  Convergence criteria
    Loglikelihood change                   0.100D-02
    Relative loglikelihood change          0.100D-05
    Derivative                             0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                      1
  M step convergence criterion             0.100D-02
  Basis for M step termination             ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                      1
  M step convergence criterion             0.100D-02
  Basis for M step termination             ITERATION
  Maximum value for logit thresholds              15
  Minimum value for logit thresholds             -15
  Minimum expected cell size for chi-square 0.100D-01
Maximum number of iterations for H1             2000
Convergence criterion for H1               0.100D-03
Optimization algorithm                           EMA
Integration Specifications
  Type                                      STANDARD
  Number of integration points                    15
  Dimensions of numerical integration              0
  Adaptive quadrature                             ON
Link                                           LOGIT
Cholesky                                         OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE


SUMMARY OF DATA

     Number of missing data patterns          1
     Number of y missing data patterns        0
     Number of u missing data patterns        1
     Number of strata                42
     Number of clusters              84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value   0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

    MDE
      Category 1    0.808       7502.042
      Category 2    0.192       1779.958
```

```
THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters                     11

Loglikelihood

        H0 Value                        -4295.718
        H0 Scaling Correction Factor      1.6444
          for MLR

Information Criteria

        Akaike (AIC)                     8613.437
        Bayesian (BIC)                   8691.931
        Sample-Size Adjusted BIC         8656.975
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                              6.709
        Degrees of Freedom                     3
        P-Value                           0.0818



MODEL RESULTS

                                                   Two-Tailed
                    Estimate     S.E.  Est./S.E.    P-Value

 MDE        ON
    AG3044            0.256     0.094     2.708      0.007
    AG4559            0.206     0.092     2.256      0.024
    AG60             -0.676     0.141    -4.783      0.000
    SEXM             -0.577     0.077    -7.477      0.000
    ALD               1.424     0.154     9.235      0.000
    ED12              0.079     0.097     0.818      0.413
    ED1315            0.231     0.093     2.477      0.013
    ED16              0.163     0.111     1.473      0.141
    PREVMAR           0.486     0.085     5.695      0.000
    NEVMAR            0.116     0.108     1.071      0.284

 Thresholds
    MDE$1             1.583     0.121    13.120      0.000



LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
    AG3044            1.291
    AG4559            1.229
    AG60              0.509
    SEXM              0.561
    ALD               4.152
    ED12              1.082
    ED1315            1.259
    ED16              1.177
    PREVMAR           1.626
    NEVMAR            1.123



QUALITY OF NUMERICAL RESULTS

    Condition Number for the Information Matrix          0.132E-01
        (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
```

```
   Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
   If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
   Diagram output
     p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test education.dg
       Beginning Time:  11:02:42
          Ending Time:  11:02:43
         Elapsed Time:  00:00:01
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  11:03 AM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST MARITAL
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
    USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
    ED12 ED1315 ED16 PREVMAR NEVMAR ;
    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are mde ;
    ANALYSIS:
    type is complex;
    estimator is mlr ;
    Model:
    mde on
     AG3044 (P1)
     AG4559 (P2)
     AG60 (P3)
     SEXM (p4)
     ALD (p5)
     ED12 (p6)
     ED1315 (p7)
     ED16 (p8)
     PREVMAR (p9)
     NEVMAR (p10) ;
    model test:
    0=P9 ;
    0=P10;


INPUT READING TERMINATED NORMALLY
ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA BIVARIATE TEST: INITIAL MODEL TEST MARITAL
SUMMARY OF ANALYSIS
Number of groups                                                   1
Number of observations                                         9282
Number of dependent variables                                     1
Number of independent variables                                  10
Number of continuous latent variables                             0
Observed dependent variables
  Binary and ordered categorical (ordinal)
    MDE
Observed independent variables
    AG3044      AG4559      AG60        SEXM        ALD         ED12
    ED1315      ED16        PREVMAR     NEVMAR
Variables with special functions
  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG
Estimator                                                       MLR
Information matrix                                          OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                                  100
  Convergence criterion                                   0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                                  500
  Convergence criteria
    Loglikelihood change                                  0.100D-02
    Relative loglikelihood change                         0.100D-05
    Derivative                                            0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
```

```
Categorical Latent variables
  Number of M step iterations                        1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                        1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
  Maximum value for logit thresholds               15
  Minimum value for logit thresholds              -15
  Minimum expected cell size for chi-square  0.100D-01
Maximum number of iterations for H1             2000
Convergence criterion for H1              0.100D-03
Optimization algorithm                           EMA
Integration Specifications
  Type                                        STANDARD
  Number of integration points                    15
  Dimensions of numerical integration              0
  Adaptive quadrature                             ON
Link                                            LOGIT
Cholesky                                          OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
    Number of missing data patterns            1
    Number of y missing data patterns         0
    Number of u missing data patterns         1
    Number of strata                 42
    Number of clusters               84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
    MDE
      Category 1    0.808        7502.042
      Category 2    0.192        1779.958




THE MODEL ESTIMATION TERMINATED NORMALLY




MODEL FIT INFORMATION
Number of Free Parameters                       11
Loglikelihood
        H0 Value                        -4295.718
        H0 Scaling Correction Factor      1.6444
          for MLR
Information Criteria
        Akaike (AIC)                     8613.437
        Bayesian (BIC)                   8691.931
        Sample-Size Adjusted BIC         8656.975
          (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                             34.016
        Degrees of Freedom                     2
        P-Value                           0.0000




MODEL RESULTS
                                         Two-Tailed
                 Estimate    S.E.  Est./S.E.  P-Value
  MDE       ON
    AG3044         0.256    0.094     2.708    0.007
    AG4559         0.206    0.092     2.256    0.024
    AG60          -0.676    0.141    -4.783    0.000
```

```
     SEXM              -0.577      0.077     -7.477      0.000
     ALD                1.424      0.154      9.235      0.000
     ED12               0.079      0.097      0.818      0.413
     ED1315             0.231      0.093      2.477      0.013
     ED16               0.163      0.111      1.473      0.141
     PREVMAR            0.486      0.085      5.695      0.000
     NEVMAR             0.116      0.108      1.071      0.284
  Thresholds
     MDE$1              1.583      0.121     13.120      0.000
LOGISTIC REGRESSION ODDS RATIO RESULTS
 MDE        ON
     AG3044             1.291
     AG4559             1.229
     AG60               0.509
     SEXM               0.561
     ALD                4.152
     ED12               1.082
     ED1315             1.259
     ED16               1.177
     PREVMAR            1.626
     NEVMAR             1.123
QUALITY OF NUMERICAL RESULTS
     Condition Number for the Information Matrix              0.132E-01
       (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test marital.dgm
     Beginning Time:  11:03:40
        Ending Time:  11:03:41
       Elapsed Time:  00:00:01
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  11:42 AM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS TEST AGE
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
    USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
    ED12 ED1315 ED16 PREVMAR NEVMAR
    SAG3044 SAG4559 SAG60 SALD SED12 SED1315 SED16 SPREVMAR SNEVMAR ;
    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are mde ;
  DEFINE:
    SAG3044=SEXM*AG3044 ;
    SAG4559=SEXM*AG4559 ;
    SAG60=SEXM*AG60 ;
    SALD=SEXM*ALD ;
    SED12=SEXM*ED12 ;
    SED1315=SEXM*ED1315 ;
    SED16=SEXM*ED16 ;
    SPREVMAR=SEXM*PREVMAR ;
    SNEVMAR=SEXM*NEVMAR ;

    ANALYSIS:
    type is complex;
    estimator is mlr ;
    Model:
    mde on
      AG3044 AG4559 AG60 SEXM ALD ED12 ED1315 ED16 PREVMAR NEVMAR
      SAG3044 (P1)
      SAG4559 (P2)
      SAG60 (P3)
      SALD (P4)
      SED12 (P5)
      SED1315 (P6)
      SED16 (P7)
      SPREVMAR (P8)
      SNEVMAR (P9) ;
    MODEL TEST :
    P1=0 ;
    P2=0 ;
    P3=0 ;

INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS
SUMMARY OF ANALYSIS
Number of groups                                                  1
Number of observations                                        9282
Number of dependent variables                                    1
Number of independent variables                                 19
Number of continuous latent variables                            0
Observed dependent variables
  Binary and ordered categorical (ordinal)
    MDE
Observed independent variables
    AG3044      AG4559      AG60        SEXM        ALD         ED12
    ED1315      ED16        PREVMAR     NEVMAR      SAG3044     SAG4559
    SAG60       SALD        SED12       SED1315     SED16       SPREVMAR
    SNEVMAR
Variables with special functions
```

```
   Stratification        SESTRAT
   Cluster variable       NUMSECU
   Weight variable        NCSRWTLG
Estimator                                                 MLR
Information matrix                                    OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
   Maximum number of iterations                           100
   Convergence criterion                            0.100D-05
Optimization Specifications for the EM Algorithm
   Maximum number of iterations                           500
   Convergence criteria
     Loglikelihood change                           0.100D-02
     Relative loglikelihood change                  0.100D-05
     Derivative                                     0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
   Number of M step iterations                              1
   M step convergence criterion                     0.100D-02
   Basis for M step termination                     ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
   Number of M step iterations                              1
   M step convergence criterion                     0.100D-02
   Basis for M step termination                     ITERATION
   Maximum value for logit thresholds                      15
   Minimum value for logit thresholds                     -15
   Minimum expected cell size for chi-square        0.100D-01
Maximum number of iterations for H1                     2000
Convergence criterion for H1                         0.100D-03
Optimization algorithm                                    EMA
Integration Specifications
   Type                                              STANDARD
   Number of integration points                           15
   Dimensions of numerical integration                     0
   Adaptive quadrature                                     ON
Link                                                    LOGIT
Cholesky                                                  OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
     Number of missing data patterns            1
     Number of y missing data patterns          0
     Number of u missing data patterns          1
     Number of strata                42
     Number of clusters              84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
     MDE
       Category 1    0.808         7502.042
       Category 2    0.192         1779.958


THE MODEL ESTIMATION TERMINATED NORMALLY


MODEL FIT INFORMATION
Number of Free Parameters                 20
Loglikelihood
        H0 Value                    -4292.727
        H0 Scaling Correction Factor     1.7006
          for MLR
Information Criteria
        Akaike (AIC)                 8625.454
        Bayesian (BIC)               8768.171
        Sample-Size Adjusted BIC     8704.614
          (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                            0.780
```

```
             Degrees of Freedom                   3
             P-Value                          0.8543


MODEL RESULTS
                                                 Two-Tailed
                    Estimate     S.E.   Est./S.E.   P-Value
 MDE        ON
    AG3044            0.220     0.114     1.937      0.053
    AG4559            0.215     0.102     2.094      0.036
    AG60             -0.646     0.175    -3.685      0.000
    SEXM             -0.546     0.357    -1.530      0.126
    ALD               1.553     0.211     7.360      0.000
    ED12              0.131     0.084     1.559      0.119
    ED1315            0.297     0.117     2.540      0.011
    ED16              0.242     0.152     1.595      0.111
    PREVMAR           0.418     0.111     3.780      0.000
    NEVMAR            0.017     0.130     0.134      0.894
    SAG3044           0.097     0.201     0.482      0.630
    SAG4559           0.003     0.213     0.012      0.990
    SAG60            -0.038     0.302    -0.125      0.900
    SALD             -0.200     0.242    -0.827      0.408
    SED12            -0.138     0.271    -0.508      0.611
    SED1315          -0.169     0.269    -0.627      0.531
    SED16            -0.194     0.344    -0.564      0.573
    SPREVMAR          0.183     0.208     0.878      0.380
    SNEVMAR           0.232     0.212     1.094      0.274
 Thresholds
    MDE$1             1.600     0.134    11.939      0.000
LOGISTIC REGRESSION ODDS RATIO RESULTS
 MDE        ON
    AG3044            1.247
    AG4559            1.239
    AG60              0.524
    SEXM              0.579
    ALD               4.726
    ED12              1.139
    ED1315            1.346
    ED16              1.274
    PREVMAR           1.519
    NEVMAR            1.017
    SAG3044           1.102
    SAG4559           1.003
    SAG60             0.963
    SALD              0.818
    SED12             0.871
    SED1315           0.845
    SED16             0.824
    SPREVMAR          1.200
    SNEVMAR           1.261
QUALITY OF NUMERICAL RESULTS
     Condition Number for the Information Matrix          0.244E-02
       (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test interactions
    Beginning Time:  11:42:29
      Ending Time:  11:42:31
      Elapsed Time:  00:00:02


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```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  11:47 AM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS TEST EDUCATION
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR
   SAG3044 SAG4559 SAG60 SALD SED12 SED1315 SED16 SPREVMAR SNEVMAR ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are mde ;

  DEFINE:
   SAG3044=SEXM*AG3044 ;
   SAG4559=SEXM*AG4559 ;
   SAG60=SEXM*AG60 ;
   SALD=SEXM*ALD ;
   SED12=SEXM*ED12 ;
   SED1315=SEXM*ED1315 ;
   SED16=SEXM*ED16 ;
   SPREVMAR=SEXM*PREVMAR ;
   SNEVMAR=SEXM*NEVMAR ;


   ANALYSIS:
   type is complex;
   estimator is mlr ;

   Model:
   mde on
    AG3044 AG4559 AG60 SEXM ALD ED12 ED1315 ED16 PREVMAR NEVMAR
    SAG3044 (P1)
    SAG4559 (P2)
    SAG60 (P3)
    SALD (P4)
    SED12 (P5)
    SED1315 (P6)
    SED16 (P7)
    SPREVMAR (P8)
    SNEVMAR (P9) ;
    !TEST EDUCATION ;
   MODEL TEST :
   P5=0 ;
   P6=0 ;
   P7=0 ;


INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS TEST EDUCATION

SUMMARY OF ANALYSIS

Number of groups                                                 1
```

```
Number of observations                                    9282


Number of dependent variables                                1
Number of independent variables                             19
Number of continuous latent variables                        0


Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    AG3044      AG4559      AG60        SEXM        ALD         ED12
    ED1315      ED16        PREVMAR     NEVMAR      SAG3044     SAG4559
    SAG60       SALD        SED12       SED1315     SED16       SPREVMAR
    SNEVMAR


Variables with special functions

  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG


Estimator                                                  MLR
Information matrix                                     OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                             100
  Convergence criterion                             0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                             500
  Convergence criteria
    Loglikelihood change                            0.100D-02
    Relative loglikelihood change                   0.100D-05
    Derivative                                      0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                                1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                                1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
  Maximum value for logit thresholds                        15
  Minimum value for logit thresholds                       -15
  Minimum expected cell size for chi-square         0.100D-01
Maximum number of iterations for H1                       2000
Convergence criterion for H1                        0.100D-03
Optimization algorithm                                     EMA
Integration Specifications
  Type                                                STANDARD
  Number of integration points                              15
  Dimensions of numerical integration                        0
  Adaptive quadrature                                       ON
Link                                                     LOGIT
Cholesky                                                   OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

    Number of missing data patterns           1
    Number of y missing data patterns         0
    Number of u missing data patterns         1
```

```
     Number of strata                    42
     Number of clusters                  84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     MDE
        Category 1   0.808        7502.042
        Category 2   0.192        1779.958



THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters               20

Loglikelihood

        H0 Value                    -4292.727
        H0 Scaling Correction Factor    1.7006
          for MLR

Information Criteria

        Akaike (AIC)                 8625.454
        Bayesian (BIC)               8768.171
        Sample-Size Adjusted BIC     8704.614
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                          0.395
        Degrees of Freedom                 3
        P-Value                       0.9412

MODEL RESULTS
                                             Two-Tailed
                    Estimate     S.E.  Est./S.E.   P-Value

  MDE        ON
     AG3044          0.220     0.114     1.937     0.053
     AG4559          0.215     0.102     2.094     0.036
     AG60           -0.646     0.175    -3.685     0.000
     SEXM           -0.546     0.357    -1.530     0.126
     ALD             1.553     0.211     7.360     0.000
     ED12            0.131     0.084     1.559     0.119
     ED1315          0.297     0.117     2.540     0.011
     ED16            0.242     0.152     1.595     0.111
     PREVMAR         0.418     0.111     3.780     0.000
     NEVMAR          0.017     0.130     0.134     0.894
     SAG3044         0.097     0.201     0.482     0.630
     SAG4559         0.003     0.213     0.012     0.990
     SAG60          -0.038     0.302    -0.125     0.900
     SALD           -0.200     0.242    -0.827     0.408
     SED12          -0.138     0.271    -0.508     0.611
     SED1315        -0.169     0.269    -0.627     0.531
     SED16          -0.194     0.344    -0.564     0.573
     SPREVMAR        0.183     0.208     0.878     0.380
     SNEVMAR         0.232     0.212     1.094     0.274

  Thresholds
```

```
     MDE$1                 1.600      0.134     11.939      0.000


LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
    AG3044              1.247
    AG4559              1.239
    AG60                0.524
    SEXM                0.579
    ALD                 4.726
    ED12                1.139
    ED1315              1.346
    ED16                1.274
    PREVMAR             1.519
    NEVMAR              1.017
    SAG3044             1.102
    SAG4559             1.003
    SAG60               0.963
    SALD                0.818
    SED12               0.871
    SED1315             0.845
    SED16               0.824
    SPREVMAR            1.200
    SNEVMAR             1.261


QUALITY OF NUMERICAL RESULTS

    Condition Number for the Information Matrix              0.244E-02
       (ratio of smallest to largest eigenvalue)


DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test interactions

     Beginning Time:  11:47:07
        Ending Time:  11:47:09
       Elapsed Time:  00:00:02



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```

```
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INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS TEST MARITAL
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE SESTRAT NUMSECU MDE NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR
   SAG3044 SAG4559 SAG60 SALD SED12 SED1315 SED16 SPREVMAR SNEVMAR ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are mde ;

  DEFINE:
   SAG3044=SEXM*AG3044 ;
   SAG4559=SEXM*AG4559 ;
   SAG60=SEXM*AG60 ;
   SALD=SEXM*ALD ;
   SED12=SEXM*ED12 ;
   SED1315=SEXM*ED1315 ;
   SED16=SEXM*ED16 ;
   SPREVMAR=SEXM*PREVMAR ;
   SNEVMAR=SEXM*NEVMAR ;


   ANALYSIS:
   type is complex;
   estimator is mlr ;

   Model:
   mde on
    AG3044 AG4559 AG60 SEXM ALD ED12 ED1315 ED16 PREVMAR NEVMAR
    SAG3044 (P1)
    SAG4559 (P2)
    SAG60 (P3)
    SALD (P4)
    SED12 (P5)
    SED1315 (P6)
    SED16 (P7)
    SPREVMAR (P8)
    SNEVMAR (P9) ;
    !TEST MARITAL ;
   MODEL TEST :
   P8=0 ;
   P9=0 ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE 8.1 NCSR DATA FINAL MODEL WITH INTERACTIONS TEST MARITAL

SUMMARY OF ANALYSIS
```

```
Number of groups                                              1
Number of observations                                     9282


Number of dependent variables                                1
Number of independent variables                             19
Number of continuous latent variables                        0


Observed dependent variables

  Binary and ordered categorical (ordinal)
    MDE

Observed independent variables
    AG3044      AG4559      AG60        SEXM        ALD         ED12
    ED1315      ED16        PREVMAR     NEVMAR      SAG3044     SAG4559
    SAG60       SALD        SED12       SED1315     SED16       SPREVMAR
    SNEVMAR


Variables with special functions

  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG


Estimator                                                   MLR
Information matrix                                      OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                              100
  Convergence criterion                             0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                              500
  Convergence criteria
    Loglikelihood change                            0.100D-02
    Relative loglikelihood change                   0.100D-05
    Derivative                                      0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                                 1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                                 1
  M step convergence criterion                      0.100D-02
  Basis for M step termination                      ITERATION
  Maximum value for logit thresholds                         15
  Minimum value for logit thresholds                        -15
  Minimum expected cell size for chi-square         0.100D-01
Maximum number of iterations for H1                        2000
Convergence criterion for H1                        0.100D-03
Optimization algorithm                                      EMA
Integration Specifications
  Type                                                 STANDARD
  Number of integration points                              15
  Dimensions of numerical integration                        0
  Adaptive quadrature                                        ON
Link                                                      LOGIT
Cholesky                                                    OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

    Number of missing data patterns               1
```

```
     Number of y missing data patterns           0
     Number of u missing data patterns           1
     Number of strata                    42
     Number of clusters                  84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value   0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     MDE
       Category 1    0.808         7502.042
       Category 2    0.192         1779.958



THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters                20

Loglikelihood

        H0 Value                    -4292.727
        H0 Scaling Correction Factor    1.7006
           for MLR

Information Criteria

        Akaike (AIC)                 8625.454
        Bayesian (BIC)               8768.171
        Sample-Size Adjusted BIC     8704.614
           (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                           1.567
        Degrees of Freedom                  2
        P-Value                        0.4567



MODEL RESULTS

                                          Two-Tailed
                   Estimate     S.E.  Est./S.E.    P-Value


MDE         ON
    AG3044          0.220      0.114      1.937      0.053
    AG4559          0.215      0.102      2.094      0.036
    AG60           -0.646      0.175     -3.685      0.000
    SEXM           -0.546      0.357     -1.530      0.126
    ALD             1.553      0.211      7.360      0.000
    ED12            0.131      0.084      1.559      0.119
    ED1315          0.297      0.117      2.540      0.011
    ED16            0.242      0.152      1.595      0.111
    PREVMAR         0.418      0.111      3.780      0.000
    NEVMAR          0.017      0.130      0.134      0.894
    SAG3044         0.097      0.201      0.482      0.630
    SAG4559         0.003      0.213      0.012      0.990
    SAG60          -0.038      0.302     -0.125      0.900
    SALD           -0.200      0.242     -0.827      0.408
    SED12          -0.138      0.271     -0.508      0.611
    SED1315        -0.169      0.269     -0.627      0.531
```

```
     SED16              -0.194     0.344     -0.564     0.573
     SPREVMAR            0.183     0.208      0.878     0.380
     SNEVMAR            0.232     0.212      1.094     0.274


 Thresholds
     MDE$1              1.600     0.134     11.939     0.000


LOGISTIC REGRESSION ODDS RATIO RESULTS

 MDE        ON
     AG3044              1.247
     AG4559              1.239
     AG60                0.524
     SEXM                0.579
     ALD                 4.726
     ED12                1.139
     ED1315              1.346
     ED16                1.274
     PREVMAR             1.519
     NEVMAR              1.017
     SAG3044             1.102
     SAG4559             1.003
     SAG60               0.963
     SALD                0.818
     SED12               0.871
     SED1315             0.845
     SED16               0.824
     SPREVMAR            1.200
     SNEVMAR             1.261


QUALITY OF NUMERICAL RESULTS

     Condition Number for the Information Matrix              0.244E-02
        (ratio of smallest to largest eigenvalue)


DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.1 full model test interactions

     Beginning Time:  11:48:07
        Ending Time:  11:48:09
       Elapsed Time:  00:00:02
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:18 PM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST AGE
  DATA:
  FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
  VARIABLE:
  NAMES ARE
  AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
  REGION SECLUSTR SESTRAT SEX
  SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
  ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

  USEVARIABLES ARE
  SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
  ED12 ED1315 ED16 PREVMAR NEVMAR ;

  missing are . ;
  WEIGHT IS NCSRWTlg ;
  stratification is sestrat ;
  cluster is numsecu ;
  categorical are ald ;


  ANALYSIS:
  type is complex;
  estimator is mlr ;
  link=logit ;

  Model:
  ald on
  AG3044 (p1)
  AG4559 (p2)
  AG60 (p3)
  SEXM ED12 ED1315 ED16 PREVMAR NEVMAR ;
  model test:
  p1=0 ;
  p2=0 ;
  p3=0 ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST AGE

SUMMARY OF ANALYSIS

Number of groups                                              1
Number of observations                                     9282

Number of dependent variables                                 1
Number of independent variables                               9
Number of continuous latent variables                         0

Observed dependent variables

  Binary and ordered categorical (ordinal)
   ALD

Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR
```

```
Variables with special functions

  Stratification       SESTRAT
  Cluster variable     NUMSECU
  Weight variable      NCSRWTLG


Estimator                                          MLR
Information matrix                            OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                     100
  Convergence criterion                     0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                     500
  Convergence criteria
    Loglikelihood change                    0.100D-02
    Relative loglikelihood change           0.100D-05
    Derivative                              0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                        1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                        1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
  Maximum value for logit thresholds                15
  Minimum value for logit thresholds               -15
  Minimum expected cell size for chi-square 0.100D-01
Maximum number of iterations for H1               2000
Convergence criterion for H1                  0.100D-03
Optimization algorithm                             EMA
Integration Specifications
  Type                                        STANDARD
  Number of integration points                     15
  Dimensions of numerical integration                0
  Adaptive quadrature                               ON
Link                                             LOGIT
Cholesky                                           OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE


SUMMARY OF DATA

     Number of missing data patterns            1
     Number of y missing data patterns          0
     Number of u missing data patterns          1
     Number of strata                  42
     Number of clusters                84


COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value   0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     ALD
       Category 1    0.946        8780.166
       Category 2    0.054         501.834
```

```
THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters                      10

Loglikelihood

        H0 Value                      -1849.961
        H0 Scaling Correction Factor     1.6507
          for MLR

Information Criteria

        Akaike (AIC)                   3719.921
        Bayesian (BIC)                 3791.279
        Sample-Size Adjusted BIC       3759.501
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                            37.983
        Degrees of Freedom                    3
        P-Value                          0.0000

MODEL RESULTS

                                            Two-Tailed
                 Estimate     S.E.  Est./S.E.   P-Value

 ALD        ON
    AG3044         0.146     0.178     0.821     0.412
    AG4559        -0.051     0.144    -0.352     0.725
    AG60          -1.120     0.212    -5.273     0.000
    SEXM           0.998     0.119     8.379     0.000
    ED12          -0.268     0.194    -1.386     0.166
    ED1315        -0.264     0.176    -1.502     0.133
    ED16          -0.736     0.197    -3.734     0.000
    PREVMAR        0.518     0.142     3.645     0.000
    NEVMAR         0.065     0.169     0.387     0.699

 Thresholds
    ALD$1          3.124     0.225    13.869     0.000



LOGISTIC REGRESSION ODDS RATIO RESULTS

 ALD        ON
    AG3044         1.158
    AG4559         0.951
    AG60           0.326
    SEXM           2.713
    ED12           0.765
    ED1315         0.768
    ED16           0.479
    PREVMAR        1.678
    NEVMAR         1.067



QUALITY OF NUMERICAL RESULTS

    Condition Number for the Information Matrix       0.120E-01
      (ratio of smallest to largest eigenvalue)



DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
```

If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

    Diagram output
      p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model logit link test a

        Beginning Time: 12:18:14
           Ending Time: 12:18:16
          Elapsed Time: 00:00:02
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```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:19 PM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST EDU
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
   USEVARIABLES ARE
   SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR ;
   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are ald ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;
   link=logit ;
   Model:
   ald on
   AG3044 (p1)
   AG4559 (p2)
   AG60 (p3)
   SEXM
   ED12 (P4)
   ED1315 (P5)
   ED16 (P6)
   PREVMAR NEVMAR ;
   model test:
   p4=0 ;
   p5=0 ;
   p6=0 ;


INPUT READING TERMINATED NORMALLY
ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST EDU
SUMMARY OF ANALYSIS
Number of groups                                                   1
Number of observations                                          9282
Number of dependent variables                                     1
Number of independent variables                                   9
Number of continuous latent variables                             0
Observed dependent variables
  Binary and ordered categorical (ordinal)
   ALD
Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR
Variables with special functions
  Stratification         SESTRAT
  Cluster variable       NUMSECU
  Weight variable        NCSRWTLG
Estimator                                                       MLR
Information matrix                                          OBSERVED
```

```
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                        100
  Convergence criterion                          0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                        500
  Convergence criteria
    Loglikelihood change                         0.100D-02
    Relative loglikelihood change                0.100D-05
    Derivative                                   0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                   ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                           1
  M step convergence criterion                   0.100D-02
  Basis for M step termination                   ITERATION
  Maximum value for logit thresholds                   15
  Minimum value for logit thresholds                  -15
  Minimum expected cell size for chi-square      0.100D-01
Maximum number of iterations for H1                  2000
Convergence criterion for H1                     0.100D-03
Optimization algorithm                                EMA
Integration Specifications
  Type                                           STANDARD
  Number of integration points                         15
  Dimensions of numerical integration                   0
  Adaptive quadrature                                  ON
Link                                                LOGIT
Cholesky                                              OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
     Number of missing data patterns            1
     Number of y missing data patterns          0
     Number of u missing data patterns          1
     Number of strata                42
     Number of clusters              84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
     ALD
       Category 1    0.946       8780.166
       Category 2    0.054        501.834




THE MODEL ESTIMATION TERMINATED NORMALLY




MODEL FIT INFORMATION
Number of Free Parameters                    10
Loglikelihood
        H0 Value                        -1849.961
        H0 Scaling Correction Factor      1.6507
```

```
                   for MLR
Information Criteria
        Akaike (AIC)                   3719.921
        Bayesian (BIC)                 3791.279
        Sample-Size Adjusted BIC       3759.501
          (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                          15.111
        Degrees of Freedom                  3
        P-Value                        0.0017




MODEL RESULTS

                                         Two-Tailed
                   Estimate    S.E.  Est./S.E.   P-Value
 ALD       ON
    AG3044           0.146    0.178     0.821     0.412
    AG4559          -0.051    0.144    -0.352     0.725
    AG60            -1.120    0.212    -5.273     0.000
    SEXM             0.998    0.119     8.379     0.000
    ED12            -0.268    0.194    -1.386     0.166
    ED1315          -0.264    0.176    -1.502     0.133
    ED16            -0.736    0.197    -3.734     0.000
    PREVMAR          0.518    0.142     3.645     0.000
    NEVMAR           0.065    0.169     0.387     0.699
 Thresholds
    ALD$1            3.124    0.225    13.869     0.000
LOGISTIC REGRESSION ODDS RATIO RESULTS
 ALD       ON
    AG3044           1.158
    AG4559           0.951
    AG60             0.326
    SEXM             2.713
    ED12             0.765
    ED1315           0.768
    ED16             0.479
    PREVMAR          1.678
    NEVMAR           1.067
QUALITY OF NUMERICAL RESULTS
     Condition Number for the Information Matrix       0.120E-01
        (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model logit link test e
     Beginning Time:  12:19:32
        Ending Time:  12:19:33
       Elapsed Time:  00:00:01
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:20 PM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST MARITAL
    DATA:
    FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
    VARIABLE:
    NAMES ARE
    AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
    REGION SECLUSTR SESTRAT SEX
    SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
    ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
    USEVARIABLES ARE
    SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
    ED12 ED1315 ED16 PREVMAR NEVMAR ;
    missing are . ;
    WEIGHT IS NCSRWTlg ;
    stratification is sestrat ;
    cluster is numsecu ;
    categorical are ald ;

    ANALYSIS:
    type is complex;
    estimator is mlr ;
    link=logit ;
    Model:
    ald on
    AG3044 (p1)
    AG4559 (p2)
    AG60 (p3)
    SEXM
    ED12 (P4)
    ED1315 (P5)
    ED16 (P6)
    PREVMAR (P7)
    NEVMAR (P8) ;
    model test:
    p7=0 ;
    p8=0 ;
INPUT READING TERMINATED NORMALLY
ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT,LOGIT TEST MARITAL
SUMMARY OF ANALYSIS
Number of groups                                                1
Number of observations                                       9282
Number of dependent variables                                   1
Number of independent variables                                 9
Number of continuous latent variables                           0
Observed dependent variables
  Binary and ordered categorical (ordinal)
   ALD
Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR
Variables with special functions
  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG
Estimator                                                     MLR
Information matrix                                        OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
```

```
Continuous Outcomes
  Maximum number of iterations                        100
  Convergence criterion                        0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                        500
  Convergence criteria
    Loglikelihood change                       0.100D-02
    Relative loglikelihood change              0.100D-05
    Derivative                                 0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                           1
  M step convergence criterion                 0.100D-02
  Basis for M step termination                  ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                           1
  M step convergence criterion                 0.100D-02
  Basis for M step termination                  ITERATION
  Maximum value for logit thresholds                   15
  Minimum value for logit thresholds                  -15
  Minimum expected cell size for chi-square    0.100D-01
Maximum number of iterations for H1                  2000
Convergence criterion for H1                   0.100D-03
Optimization algorithm                                EMA
Integration Specifications
  Type                                           STANDARD
  Number of integration points                         15
  Dimensions of numerical integration                   0
  Adaptive quadrature                                  ON
Link                                              LOGIT
Cholesky                                            OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
     Number of missing data patterns          1
     Number of y missing data patterns        0
     Number of u missing data patterns        1
     Number of strata               42
     Number of clusters             84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
     ALD
       Category 1    0.946        8780.166
       Category 2    0.054         501.834


THE MODEL ESTIMATION TERMINATED NORMALLY


MODEL FIT INFORMATION
Number of Free Parameters                    10
Loglikelihood
        H0 Value                   -1849.961
        H0 Scaling Correction Factor     1.6507
          for MLR
Information Criteria
        Akaike (AIC)                3719.921
        Bayesian (BIC)              3791.279
        Sample-Size Adjusted BIC    3759.501
```

```
        (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                           13.393
        Degrees of Freedom                   2
        P-Value                         0.0012




MODEL RESULTS

                                                 Two-Tailed
                    Estimate     S.E.  Est./S.E.    P-Value
 ALD        ON
    AG3044            0.146     0.178      0.821      0.412
    AG4559           -0.051     0.144     -0.352      0.725
    AG60             -1.120     0.212     -5.273      0.000
    SEXM              0.998     0.119      8.379      0.000
    ED12             -0.268     0.194     -1.386      0.166
    ED1315           -0.264     0.176     -1.502      0.133
    ED16             -0.736     0.197     -3.734      0.000
    PREVMAR           0.518     0.142      3.645      0.000
    NEVMAR            0.065     0.169      0.387      0.699
 Thresholds
    ALD$1             3.124     0.225     13.869      0.000
LOGISTIC REGRESSION ODDS RATIO RESULTS
 ALD        ON
    AG3044            1.158
    AG4559            0.951
    AG60              0.326
    SEXM              2.713
    ED12              0.765
    ED1315            0.768
    ED16              0.479
    PREVMAR           1.678
    NEVMAR            1.067
QUALITY OF NUMERICAL RESULTS
     Condition Number for the Information Matrix              0.120E-01
        (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model logit link test m
     Beginning Time:  12:20:31
        Ending Time:  12:20:33
       Elapsed Time:  00:00:02
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:13 PM

INPUT INSTRUCTIONS

  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST AGE PROBIT
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;

   USEVARIABLES ARE
   SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR ;

   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are ald ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;
   link=probit ;

   Model:
   ald on
   AG3044 (p1)
   AG4559 (p2)
   AG60 (p3)
   SEXM ED12 ED1315 ED16 PREVMAR NEVMAR ;
   model test:
   p1=0 ;
   p2=0 ;
   p3=0 ;

INPUT READING TERMINATED NORMALLY

ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST AGE PROBIT

SUMMARY OF ANALYSIS

Number of groups                                      1
Number of observations                             9282

Number of dependent variables                         1
Number of independent variables                       9
Number of continuous latent variables                 0
```

```
Observed dependent variables

  Binary and ordered categorical (ordinal)
   ALD


Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR


Variables with special functions

  Stratification      SESTRAT
  Cluster variable    NUMSECU
  Weight variable     NCSRWTLG


Estimator                                          MLR
Information matrix                            OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                     100
  Convergence criterion                      0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                     500
  Convergence criteria
    Loglikelihood change                     0.100D-02
    Relative loglikelihood change            0.100D-05
    Derivative                               0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                        1
  M step convergence criterion               0.100D-02
  Basis for M step termination               ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                        1
  M step convergence criterion               0.100D-02
  Basis for M step termination               ITERATION
  Maximum value for logit thresholds                10
  Minimum value for logit thresholds               -10
  Minimum expected cell size for chi-square  0.100D-01
Maximum number of iterations for H1             2000
Convergence criterion for H1                   0.100D-03
Optimization algorithm                            EMA
Integration Specifications
  Type                                        STANDARD
  Number of integration points                     15
  Dimensions of numerical integration                0
  Adaptive quadrature                               ON
Link                                           PROBIT
Cholesky                                          OFF


Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE



SUMMARY OF DATA

    Number of missing data patterns            1
```

```
     Number of y missing data patterns          0
     Number of u missing data patterns          1
     Number of strata                   42
     Number of clusters                 84



COVARIANCE COVERAGE OF DATA

Minimum covariance coverage value    0.100


UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES

     ALD
        Category 1    0.946         8780.166
        Category 2    0.054          501.834




THE MODEL ESTIMATION TERMINATED NORMALLY



MODEL FIT INFORMATION

Number of Free Parameters                  10

Loglikelihood

        H0 Value                    -1848.750
        H0 Scaling Correction Factor    1.6208
          for MLR

Information Criteria

        Akaike (AIC)                 3717.500
        Bayesian (BIC)               3788.859
        Sample-Size Adjusted BIC     3757.080
          (n* = (n + 2) / 24)

Wald Test of Parameter Constraints

        Value                          48.057
        Degrees of Freedom                  3
        P-Value                        0.0000



MODEL RESULTS

                                          Two-Tailed
                    Estimate    S.E.  Est./S.E.   P-Value

 ALD        ON
    AG3044            0.065    0.085     0.772     0.440
    AG4559           -0.034    0.067    -0.515     0.607
    AG60             -0.531    0.093    -5.694     0.000
    SEXM              0.471    0.056     8.357     0.000
    ED12             -0.124    0.095    -1.302     0.193
    ED1315           -0.124    0.085    -1.461     0.144
    ED16             -0.340    0.092    -3.672     0.000
```

```
   PREVMAR           0.255      0.070      3.652      0.000
   NEVMAR            0.039      0.077      0.506      0.613


 Thresholds
   ALD$1             1.719      0.105     16.320      0.000


QUALITY OF NUMERICAL RESULTS


    Condition Number for the Information Matrix              0.128E-01
       (ratio of smallest to largest eigenvalue)


DIAGRAM INFORMATION


  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.

  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model probit test age.d

     Beginning Time:  12:13:52
        Ending Time:  12:13:53
       Elapsed Time:  00:00:01
```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:15 PM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST EDUCATION PROBIT
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
   USEVARIABLES ARE
   SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR ;
   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are ald ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;
   link=probit ;
   ! TEST EDUCATION
   Model:
   ald on
   AG3044 AG4559 AG60
   SEXM
   ED12 (P1)
   ED1315 (P2)
   ED16 (P3)
   PREVMAR NEVMAR ;
   model test:
   p1=0 ;
   p2=0 ;
   p3=0 ;




INPUT READING TERMINATED NORMALLY



ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST EDUCATION PROBIT
SUMMARY OF ANALYSIS
Number of groups                                         1
Number of observations                                9282
Number of dependent variables                            1
Number of independent variables                          9
Number of continuous latent variables                    0
Observed dependent variables
  Binary and ordered categorical (ordinal)
   ALD
Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR
```

```
Variables with special functions
  Stratification       SESTRAT
  Cluster variable     NUMSECU
  Weight variable      NCSRWTLG
Estimator                                               MLR
Information matrix                                  OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                          100
  Convergence criterion                           0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                          500
  Convergence criteria
    Loglikelihood change                          0.100D-02
    Relative loglikelihood change                 0.100D-05
    Derivative                                    0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                             1
  M step convergence criterion                    0.100D-02
  Basis for M step termination                    ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                             1
  M step convergence criterion                    0.100D-02
  Basis for M step termination                    ITERATION
  Maximum value for logit thresholds                     10
  Minimum value for logit thresholds                    -10
  Minimum expected cell size for chi-square       0.100D-01
Maximum number of iterations for H1                    2000
Convergence criterion for H1                        0.100D-03
Optimization algorithm                                  EMA
Integration Specifications
  Type                                             STANDARD
  Number of integration points                           15
  Dimensions of numerical integration                     0
  Adaptive quadrature                                    ON
Link                                                  PROBIT
Cholesky                                                 OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
     Number of missing data patterns           1
     Number of y missing data patterns         0
     Number of u missing data patterns         1
     Number of strata               42
     Number of clusters             84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
     ALD
       Category 1    0.946         8780.166
       Category 2    0.054          501.834




THE MODEL ESTIMATION TERMINATED NORMALLY
```

```
MODEL FIT INFORMATION

Number of Free Parameters                 10
Loglikelihood
        H0 Value                    -1848.750
        H0 Scaling Correction Factor    1.6208
          for MLR
Information Criteria
        Akaike (AIC)                 3717.500
        Bayesian (BIC)               3788.859
        Sample-Size Adjusted BIC     3757.080
          (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                          15.078
        Degrees of Freedom                  3
        P-Value                        0.0018




MODEL RESULTS

                                          Two-Tailed
                Estimate     S.E.  Est./S.E.    P-Value
 ALD       ON
    AG3044         0.065    0.085      0.772      0.440
    AG4559        -0.034    0.067     -0.515      0.607
    AG60          -0.531    0.093     -5.694      0.000
    SEXM           0.471    0.056      8.357      0.000
    ED12          -0.124    0.095     -1.302      0.193
    ED1315        -0.124    0.085     -1.461      0.144
    ED16          -0.340    0.092     -3.672      0.000
    PREVMAR        0.255    0.070      3.652      0.000
    NEVMAR         0.039    0.077      0.506      0.613
 Thresholds
    ALD$1          1.719    0.105     16.320      0.000
QUALITY OF NUMERICAL RESULTS

     Condition Number for the Information Matrix           0.128E-01
        (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION

  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model probit test educa
      Beginning Time:  12:15:21
        Ending Time:  12:15:22
       Elapsed Time:  00:00:01




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Fax: (310) 391-8971
Web: www.StatModel.com
Support: Support@StatModel.com
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```

```
Mplus VERSION 7.4
MUTHEN & MUTHEN
08/01/2017  12:16 PM
INPUT INSTRUCTIONS
  TITLE: ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST MARITAL PROBIT
   DATA:
   FILE IS "P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt";
   VARIABLE:
   NAMES ARE
   AGE CASEID DSM_SO ED4CAT MAR3CAT MDE_OND NCSRWTLG NCSRWTSH OBESE6CA
   REGION SECLUSTR SESTRAT SEX
   SO_OND WKSTAT3C ag60 ag1829 ag3044 ag4559 ag4cat ald ed011 ed12 ed16
   ed1315 married mde nevmar  numsecu prevmar racecat sexf sexm;
   USEVARIABLES ARE
   SESTRAT NUMSECU NCSRWTLG AG3044 AG4559 AG60 SEXM ALD
   ED12 ED1315 ED16 PREVMAR NEVMAR ;
   missing are . ;
   WEIGHT IS NCSRWTlg ;
   stratification is sestrat ;
   cluster is numsecu ;
   categorical are ald ;

   ANALYSIS:
   type is complex;
   estimator is mlr ;
   link=probit ;
   ! TEST MARITAL
   Model:
   ald on
   AG3044 AG4559 AG60
   SEXM
   ED12 (P1)
   ED1315 (P2)
   ED16 (P3)
   PREVMAR (P4)
   NEVMAR (P5) ;
   model test:
   p4=0 ;
   p5=0 ;




INPUT READING TERMINATED NORMALLY




ASDA2 ANALYSIS EXAMPLE SECTION 8.8 COMPARE LOGIT AND PROBIT, TEST MARITAL PROBIT
SUMMARY OF ANALYSIS
Number of groups                                          1
Number of observations                                 9282
Number of dependent variables                             1
Number of independent variables                           9
Number of continuous latent variables                     0
Observed dependent variables
  Binary and ordered categorical (ordinal)
   ALD
Observed independent variables
   AG3044      AG4559      AG60        SEXM        ED12        ED1315
   ED16        PREVMAR     NEVMAR
```

```
Variables with special functions
  Stratification        SESTRAT
  Cluster variable      NUMSECU
  Weight variable       NCSRWTLG
Estimator                                        MLR
Information matrix                          OBSERVED
Optimization Specifications for the Quasi-Newton Algorithm for
Continuous Outcomes
  Maximum number of iterations                   100
  Convergence criterion                     0.100D-05
Optimization Specifications for the EM Algorithm
  Maximum number of iterations                   500
  Convergence criteria
    Loglikelihood change                    0.100D-02
    Relative loglikelihood change           0.100D-05
    Derivative                              0.100D-02
Optimization Specifications for the M step of the EM Algorithm for
Categorical Latent variables
  Number of M step iterations                      1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
Optimization Specifications for the M step of the EM Algorithm for
Censored, Binary or Ordered Categorical (Ordinal), Unordered
Categorical (Nominal) and Count Outcomes
  Number of M step iterations                      1
  M step convergence criterion              0.100D-02
  Basis for M step termination              ITERATION
  Maximum value for logit thresholds              10
  Minimum value for logit thresholds             -10
  Minimum expected cell size for chi-square 0.100D-01
Maximum number of iterations for H1             2000
Convergence criterion for H1              0.100D-03
Optimization algorithm                           EMA
Integration Specifications
  Type                                      STANDARD
  Number of integration points                   15
  Dimensions of numerical integration              0
  Adaptive quadrature                             ON
Link                                          PROBIT
Cholesky                                         OFF
Input data file(s)
  P:\ASDA 2\Data sets\NCSR\ncsr_sub_5apr2017_mplus.txt
Input data format  FREE
SUMMARY OF DATA
    Number of missing data patterns         1
    Number of y missing data patterns       0
    Number of u missing data patterns       1
    Number of strata              42
    Number of clusters            84
COVARIANCE COVERAGE OF DATA
Minimum covariance coverage value   0.100
UNIVARIATE PROPORTIONS AND COUNTS FOR CATEGORICAL VARIABLES
    ALD
      Category 1   0.946         8780.166
      Category 2   0.054          501.834




THE MODEL ESTIMATION TERMINATED NORMALLY
```

```
MODEL FIT INFORMATION
Number of Free Parameters                  10
Loglikelihood
        H0 Value                     -1848.750
        H0 Scaling Correction Factor    1.6208
          for MLR
Information Criteria
        Akaike (AIC)                  3717.500
        Bayesian (BIC)                3788.859
        Sample-Size Adjusted BIC      3757.080
          (n* = (n + 2) / 24)
Wald Test of Parameter Constraints
        Value                           13.646
        Degrees of Freedom                   2
        P-Value                         0.0011


MODEL RESULTS
                                          Two-Tailed
                Estimate     S.E.  Est./S.E.    P-Value
 ALD        ON
    AG3044         0.065    0.085      0.772      0.440
    AG4559        -0.034    0.067     -0.515      0.607
    AG60          -0.531    0.093     -5.694      0.000
    SEXM           0.471    0.056      8.357      0.000
    ED12          -0.124    0.095     -1.302      0.193
    ED1315        -0.124    0.085     -1.461      0.144
    ED16          -0.340    0.092     -3.672      0.000
    PREVMAR        0.255    0.070      3.652      0.000
    NEVMAR         0.039    0.077      0.506      0.613
 Thresholds
    ALD$1          1.719    0.105     16.320      0.000


QUALITY OF NUMERICAL RESULTS
    Condition Number for the Information Matrix         0.128E-01
      (ratio of smallest to largest eigenvalue)
DIAGRAM INFORMATION
  Use View Diagram under the Diagram menu in the Mplus Editor to view the diagram.
  If running Mplus from the Mplus Diagrammer, the diagram opens automatically.
  Diagram output
    p:\asda 2\analysis example replication\mplus\chapter 8\asda 2 ex8.2 full model probit test marit
    Beginning Time:  12:16:35
       Ending Time:  12:16:36
      Elapsed Time:  00:00:01
```