

## Mplus Syntax

**Title: cross-lagged panel model - academic sample (Study 1)**

data: file = AppendixC\_data\_study1.dat;

variable: names =

CodeNo

Gender

Age

Edu

Job

Study

SC1

SC2

SC3

Stress1

Stress2

Stress3

Denial1

Denial2

Denial3

ACT1

ACT2

ACT3

ACC1

ACC2

ACC3

BehDis1

BehDis2

BehDis3

PR1

PR2

PR3

SB1

SB2

SB3

AC31

AC32

AC33

MC31

MC32

MC33

PA1

PA2

PA3

NA1

NA2

NA3

AWB1

AWB2

AWB3

N1

N2

N3

C1

C2

C3

usevar =

SC1

SC2

SC3

Stress1

Stress2

Stress3

AC31

AC32

AC33

MC31

MC32

MC33

AWB1

AWB2

AWB3;

missing = all (99);

analysis: type = general;

estimator = ML;

bootstrap = 5000;

process = 4;

MODEL:

! AR Terms

SC3 ON SC2 (AR1\_SC);

SC2 ON SC1 (AR1\_SC);

Stress3 ON Stress2 (AR1\_ST);

Stress2 ON Stress1 (AR1\_ST);

AC33 ON AC32 (AR1\_AC);

AC32 ON AC31 (AR1\_AC);  
MC33 ON MC32 (AR1\_MC);  
MC32 ON MC31 (AR1\_MC);  
AWB3 ON AWB2 (AR1\_WB);  
AWB2 ON AWB1 (AR1\_WB);

! CL Terms

AWB3 ON Stress2 (CL1\_WBST);  
AWB2 ON Stress1 (CL2\_WBST);  
AWB3 ON AC32 (CL1\_WBAC);  
AWB2 ON AC31 (CL2\_WBAC);  
AWB3 ON MC32 (CL1\_WBMC);  
AWB2 ON MC31 (CL2\_WBMC);  
Stress3 ON SC2 (CL1\_STSC);  
Stress2 ON SC1 (CL2\_STSC);  
AC33 ON SC2 (CL1\_ACSC);  
AC32 ON SC1 (CL2\_ACSC);  
MC33 ON SC2 (CL1\_MCSC);  
MC32 ON SC1 (CL2\_MCSC);  
AWB3 ON SC1 (CL1\_WBSC);  
AWB3 ON SC2;  
AWB2 ON SC1;

! Co-Movements

SC1 with Stress1;  
SC1 with AC31;  
SC1 with MC31;  
SC1 with AWB1;  
Stress1 with AC31;  
Stress1 with MC31;  
Stress1 with AWB1;

AC31 with MC31;  
AC31 with AWB1;  
MC31 with AWB1;  
SC2 with Stress2;  
SC2 with AC32;  
SC2 with MC32;  
SC2 with AWB2;  
Stress2 with AC32;  
Stress2 with MC32;  
Stress2 with AWB2;  
AC32 with MC32;  
AC32 with AWB2;  
MC32 with AWB2;  
SC3 with Stress3;  
SC3 with AC33;  
SC3 with MC33;  
SC3 with AWB3;  
Stress3 with AC33;  
Stress3 with MC33;  
Stress3 with AWB3;  
AC33 with MC33;  
AC33 with AWB3;  
MC33 with AWB3;

!Use model constraint to calculate specific indirect paths and total indirect effect

MODEL CONSTRAINT:

NEW(WBSTSTSC WBACACSC WBMCMCSC TOTALIND TOTAL);

$WBSTSTSC = CL1\_WBST * CL2\_STSC$ ; ! Specific indirect effect of X on Y via M1 only

$WBACACSC = CL1\_WBAC * CL2\_ACSC$ ; ! Specific indirect effect of X on Y via M2 only

WBMCMCSC = CL1\_WBMC \* CL2\_MCSC; ! Specific indirect effect of X on Y via M3  
only

TOTALIND = WBSTSTSC + WBACACSC + WBMCMCSC; ! Total indirect effect of X on  
Y via M1, M2, M3

TOTAL = WBSTSTSC + WBACACSC + WBMCMCSC + CL1\_WBSC; ! Total effect of X  
on Y

OUTPUT:

STAND CINT(bcbootstrap) tech4;

**Title: cross-lagged panel model - GESIS Panel sample (Study 2)**

data: file = GesisData\_August2020.dat;

variable: names =

Code

Gender

Age

citger

citother

SC1

SC2

SC3

Stress1

Stress2

Stress3

Denial1

BehDis1

PR1

ACC1

ACG1

MCG1

Denial2

BehDis2

PR2

ACC2

ACG2

MCG2

Denial3

BehDis3

PR3

ACC3

ACG3

MCG3

CWB1

CWB2

CWB3

PA1

NA1

AWB1

PA2

NA2

AWB2

PA3

NA3

AWB3;

usevar =

SC1

SC2

SC3

Stress1

Stress2

Stress3

ACG1

ACG2

ACG3

MCG1



MCG2

MCG3

AWB1

AWB2

AWB3;

missing = all (99);

analysis: type = general;

estimator = ML;

bootstrap = 5000

process = 4;

MODEL:

! AR Terms

SC3 ON SC2;

SC2 ON SC1;

Stress3 ON Stress2;

Stress2 ON Stress1;

ACG3 ON ACG2;

ACG2 ON ACG1;

MCG3 ON MCG2;

MCG2 ON MCG1;

AWB3 ON AWB2;

AWB2 ON AWB1;

! CL Terms

AWB3 ON Stress2 (CL1\_WBST);

AWB2 ON Stress1 (CL2\_WBST);

AWB3 ON ACG2 (CL1\_WBAC);

AWB2 ON ACG1 (CL2\_WBAC);  
AWB3 ON MCG2 (CL1\_WBMC);  
AWB2 ON MCG1 (CL2\_WBMC);  
Stress3 ON SC2 (CL1\_STSC);  
Stress2 ON SC1 (CL2\_STSC);  
ACG3 ON SC2 (CL1\_ACSC);  
ACG2 ON SC1 (CL2\_ACSC);  
MCG3 ON SC2 (CL1\_MCSC);  
MCG2 ON SC1 (CL2\_MCSC);  
SC2 ON ACG1;  
AWB2 ON SC1;  
AWB3 ON SC2;  
AWB3 ON SC1 (CL1\_WBSC);

**! Co-Movements**

SC1 with Stress1;  
SC1 with ACG1;  
SC1 with MCG1;  
SC1 with AWB1;  
Stress1 with ACG1;  
Stress1 with MCG1;  
Stress1 with AWB1;  
ACG1 with MCG1;  
ACG1 with AWB1;  
MCG1 with AWB1;  
SC2 with Stress2;  
SC2 with ACG2;  
SC2 with MCG2;  
SC2 with AWB2;  
Stress2 with ACG2;  
Stress2 with MCG2;

Stress2 with AWB2;  
ACG2 with MCG2;  
ACG2 with AWB2;  
MCG2 with AWB2;  
SC3 with Stress3;  
SC3 with ACG3;  
SC3 with MCG3;  
SC3 with AWB3;  
Stress3 with ACG3;  
Stress3 with MCG3;  
Stress3 with AWB3;  
ACG3 with MCG3;  
ACG3 with AWB3;  
MCG3 with AWB3;

!additional AR terms

SC3 ON SC1;  
STRESS3 ON STRESS1;  
ACG3 ON ACG1;  
MCG3 ON MCG1;

! Use model constraint to calculate specific indirect paths and total indirect effect

MODEL CONSTRAINT:

NEW(WBSTSTSC WBMCMCSC WBACACSC`TOTALIND TOTAL);

WBSTSTSC = CL1\_WBST \* CL2\_STSC; ! Specific indirect effect of X on Y via M1 only

WBACACSC = CL1\_WBAC \* CL2\_ACSC; ! Specific indirect effect of X on Y via M2  
only

WBMCMCSC = CL1\_WBMC \* CL2\_MCSC; ! Specific indirect effect of X on Y via M3  
only

TOTALIND = WBSTSTSC + WBACACSC + WBMCMCSC; ! Total indirect effect of X on Y via M1, M2, M3

TOTAL = WBSTSTSC + WBACACSC + CL1\_WBSC + WBMCMCSC; ! Total effect of X on Y

OUTPUT:

STAND CINT(bcbootstrap);

**Title: cross-lagged panel model - academic sample (Study 1) with neuroticism as control variable**

data: file = AppendixC\_data\_study1.dat;

variable: names =

CodeNo

Gender

Age

Edu

Job

Study

SC1

SC2

SC3

Stress1

Stress2

Stress3

Denial1

Denial2

Denial3

ACT1

ACT2

ACT3

ACC1

ACC2

ACC3

BehDis1

BehDis2

BehDis3

PR1

PR2

PR3

SB1

SB2

SB3

AC31

AC32

AC33

MC31

MC32

MC33

PA1

PA2

PA3

NA1

NA2

NA3

AWB1

AWB2

AWB3

N1

N2

N3

C1

C2

C3;

usevar =

SC1

SC2

SC3

N1

N2

N3

Stress1

Stress2

Stress3

AC31

AC32

AC33

MC31

MC32

MC33

AWB1

AWB2

AWB3;

missing = all (99);

analysis: type = general;

estimator = ML;

bootstrap = 5000;

process = 4;

MODEL:

! AR Terms

SC3 ON SC2 (AR1\_SC);

SC2 ON SC1 (AR1\_SC);

Stress3 ON Stress2 (AR1\_ST);

Stress2 ON Stress1 (AR1\_ST);

AC33 ON AC32 (AR1\_AC);

AC32 ON AC31 (AR1\_AC);

MC33 ON MC32 (AR1\_MC);

MC32 ON MC31 (AR1\_MC);

AWB3 ON AWB2 (AR1\_WB);

AWB2 ON AWB1 (AR1\_WB);

N3 ON N2 (AR1\_N);

N2 ON N1 (AR1\_N);

! CL Terms

AWB3 ON Stress2 (CL1\_WBST);

AWB2 ON Stress1 (CL2\_WBST);

AWB3 ON AC32 (CL1\_WBAC);

AWB2 ON AC31 (CL2\_WBAC);

AWB3 ON MC32 (CL1\_WBMC);

AWB2 ON MC31 (CL2\_WBMC);

Stress3 ON SC2 (CL1\_STSC);

Stress2 ON SC1 (CL2\_STSC);

AC33 ON SC2 (CL1\_ACSC);

AC32 ON SC1 (CL2\_ACSC);

MC33 ON SC2 (CL1\_MCSC);

MC32 ON SC1 (CL2\_MCSC);

AWB3 ON SC1 (CL1\_WBSC);

AWB3 ON SC2;

AWB2 ON SC1;



Stress3 ON N2 (CL1\_STN);  
Stress2 ON N1 (CL2\_STN);  
AC33 ON N2 (CL1\_ACN);  
AC32 ON N1 (CL2\_ACN);  
MC33 ON N2 (CL1\_MCN);  
MC32 ON N1 (CL2\_MCN);

! Co-Movements

SC1 with Stress1;  
SC1 with AC31;  
SC1 with MC31;  
SC1 with AWB1;  
Stress1 with AC31;  
Stress1 with MC31;  
Stress1 with AWB1;  
AC31 with MC31;  
AC31 with AWB1;  
MC31 with AWB1;  
N1 with Stress1;  
N1 with SC1;  
N1 with AC31;  
N1 with MC31;  
N1 with AWB1;

SC2 with Stress2;  
SC2 with AC32;  
SC2 with MC32;  
SC2 with AWB2;  
Stress2 with AC32;  
Stress2 with MC32;  
Stress2 with AWB2;

AC32 with MC32;  
AC32 with AWB2;  
MC32 with AWB2;  
N2 with Stress2;  
N2 with SC2;  
N2 with AC32;  
N2 with MC32;  
N2 with AWB2;

SC3 with Stress3;  
SC3 with AC33;  
SC3 with MC33;  
SC3 with AWB3;  
Stress3 with AC33;  
Stress3 with MC33;  
Stress3 with AWB3;  
AC33 with MC33;  
AC33 with AWB3;  
MC33 with AWB3;  
N3 with Stress3;  
N3 with SC3;  
N3 with AC33;  
N3 with MC33;  
N3 with AWB3;

!Use model constraint to calculate specific indirect paths and total indirect effect

MODEL CONSTRAINT:

NEW(WBSTSTSC WBACACSC WBMCMCSC TOTALIND TOTAL);

WBSTSTSC = CL1\_WBST \* CL2\_STSC; ! Specific indirect effect of X on Y via M1 only

$WBACACSC = CL1\_WBAC * CL2\_ACSC$ ; ! Specific indirect effect of X on Y via M2  
only

$WBMCMCSC = CL1\_WBMC * CL2\_MCSC$ ; ! Specific indirect effect of X on Y via M3  
only

$TOTALIND = WBSTSTSC + WBACACSC + WBMCMCSC$ ; ! Total indirect effect of X on  
Y via M1, M2, M3

$TOTAL = WBSTSTSC + WBACACSC + WBMCMCSC + CL1\_WBSC$ ; ! Total effect of X  
on Y

OUTPUT:

STAND CINT(bcbootstrap) tech4;

**Title: cross-lagged panel model, Gesis Panel (Study 2) - model with cognitive well-being as dependent variable**

data: file = GesisData\_August2020.dat;

variable: names =

Code

Gender

Age

citger

citother

SC1

SC2

SC3

Stress1

Stress2

Stress3

Denial1

BehDis1

PR1

ACC1

ACG1

MCG1

Denial2

BehDis2

PR2

ACC2

ACG2

MCG2

Denial3

BehDis3

PR3

ACC3

ACG3

MCG3

CWB1

CWB2

CWB3

PA1

NA1

AWB1

PA2

NA2

AWB2

PA3

NA3

AWB3;

usevar =

SC1

SC2

SC3

Stress1

Stress2

Stress3

ACG1

ACG2

ACG3

MCG1

MCG2

MCG3

CWB1

CWB2

CWB3;

missing = all (99);

analysis: type = general;

estimator = ML;

bootstrap = 5000;

process = 4;

MODEL:

! AR Terms

SC3 ON SC2;

SC2 ON SC1;

Stress3 ON Stress2;

Stress2 ON Stress1;

ACG3 ON ACG2;

ACG2 ON ACG1;

MCG3 ON MCG2;

MCG2 ON MCG1;

CWB3 ON CWB2;

CWB2 ON CWB1;

! CL Terms

CWB3 ON Stress2 (CL1\_WBST);

CWB2 ON Stress1 (CL2\_WBST);

CWB3 ON ACG2 (CL1\_WBAC);  
CWB2 ON ACG1 (CL2\_WBAC);  
CWB3 ON MCG2 (CL1\_WBMC);  
CWB2 ON MCG1 (CL2\_WBMC);  
Stress3 ON SC2 (CL1\_STSC);  
Stress2 ON SC1 (CL2\_STSC);  
ACG3 ON SC2 (CL1\_ACSC);  
ACG2 ON SC1 (CL2\_ACSC);  
MCG3 ON SC2 (CL1\_MCSC);  
MCG2 ON SC1 (CL2\_MCSC);  
SC2 ON ACG1;  
CWB2 ON SC1;  
CWB3 ON SC2;  
CWB3 ON SC1 (CL1\_WBSC);

!additional AR terms

SC3 ON SC1;  
STRESS3 ON STRESS1;  
ACG3 ON ACG1;  
MCG3 ON MCG1;

! Co-Movements

SC1 with Stress1;  
SC1 with ACG1;  
SC1 with MCG1;  
SC1 with CWB1;  
Stress1 with ACG1;  
Stress1 with MCG1;  
Stress1 with CWB1;  
ACG1 with MCG1;  
ACG1 with CWB1;

MCG1 with CWB1;  
 SC2 with Stress2;  
 SC2 with ACG2;  
 SC2 with MCG2;  
 SC2 with CWB2;  
 Stress2 with ACG2;  
 Stress2 with MCG2;  
 Stress2 with CWB2;  
 ACG2 with MCG2;  
 ACG2 with CWB2;  
 MCG2 with CWB2;  
 SC3 with Stress3;  
 SC3 with ACG3;  
 SC3 with MCG3;  
 SC3 with CWB3;  
 Stress3 with ACG3;  
 Stress3 with MCG3;  
 Stress3 with CWB3;  
 ACG3 with MCG3;  
 ACG3 with CWB3;  
 MCG3 with CWB3;

! Use model constraint to calculate specific indirect paths and total indirect effect

MODEL CONSTRAINT:

NEW(WBMCMCSC WBSTSTSC WBACACSC TOTALIND TOTAL); !

WBSTSTSC = CL1\_WBST \* CL2\_STSC; ! Specific indirect effect of X on Y via M1 only

WBACACSC = CL1\_WBAC \* CL2\_ACSC; ! Specific indirect effect of X on Y via M2 only

WBMCMCSC = CL1\_WBMC \* CL2\_MCSC; ! Specific indirect effect of X on Y via M3 only



TOTALIND = WBSTSTSC + WBACACSC + WBMCMCSC; ! Total indirect effect of X on Y via M1, M2, M3

TOTAL = WBSTSTSC + WBACACSC + CL1\_WBSC + WBMCMCSC; ! Total effect of X on Y

OUTPUT:

STAND CINT(bcbootstrap);