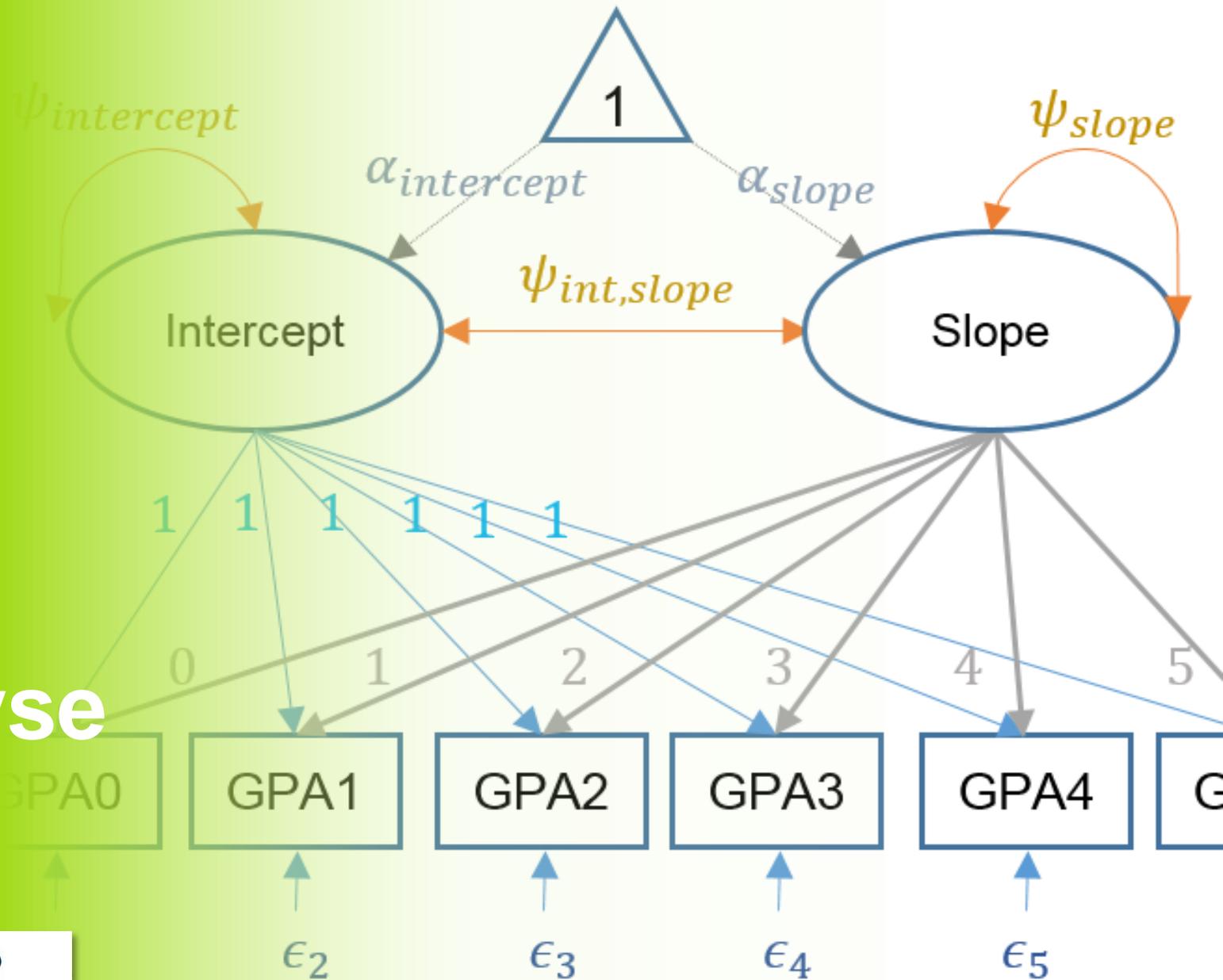
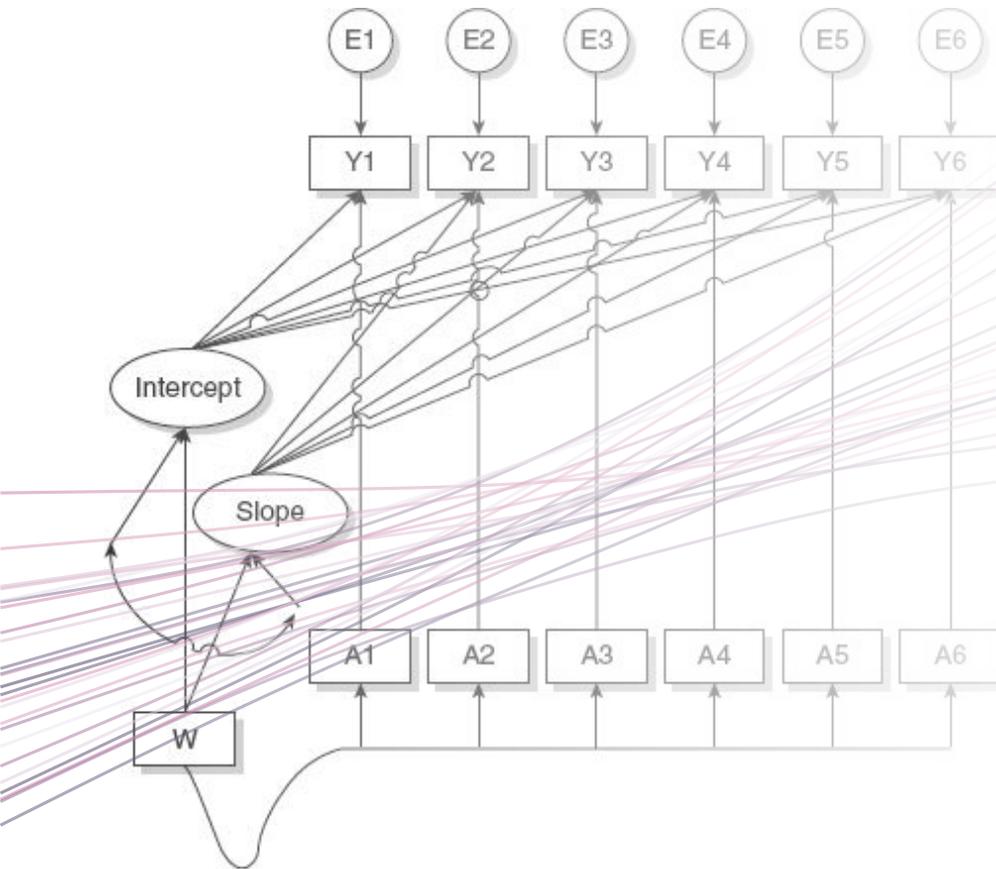


Mehrebenenanalyse mit Mplus



Agenda



I. Aufbereitung in SPSS

**II. Struktur der Mplus-Syntax: Random-Intercept
und Random-Slope**

III. Cross-level Interactions

IV. Indirect Effects

V. Difference Test

VI. Moderated Mediation

Einleitung

- Self-control capacity: Hohe interindividuelle Unterschiede in der willentlichen Steuerung des emotionalen Ausdrucks, im Widerstehen von Versuchungen sowie in der Impulskontrolle
- Mechanismus: Hohe Selbstkontrollfähigkeit impliziert hohe Effizienz effiziente Investition von begrenzten psychischen Ressourcen.
- **Implikation:** Selbstkontrollfähigkeit als protektive Ressource schwächt die negative Wirkung von Arbeitsbelastungen auf psychisches Wohlbefinden ab.

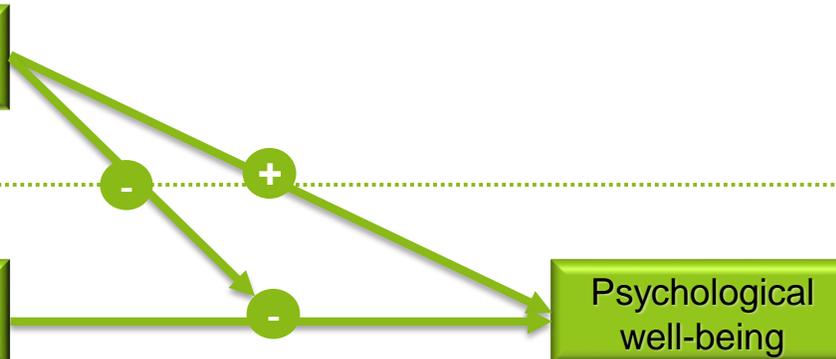
Person-
level:

Self-control
capacity

Day-
level:

Emotional
dissonance

Psychological
well-being



1. Aufbereitungsprozedur in SPSS

I. Definition der Untersuchungsvariablen

II. Erstellung und Sortierung der Level-ID

III. Aggregation auf Level 2 (und ggf. Level 3) im selben Datensatz

1. Aufbereitungsprozedur in SPSS

The screenshot shows the SPSS Statistics Data Editor interface. The main window displays a data table with columns: ID, tag, Egodep, WorkEng, EmotDiss, Sleep, NA, Age, Gender, and SelfCon. The data rows contain numerical values for each variable. Two dialog boxes are overlaid on the data table:

- Recode into Same Variables:** This dialog box has a list of variables on the left. The variable 'ID' is selected and moved to the 'Numeric Variables:' list on the right. The 'Old and New Values...' button is highlighted.
- Recode into Same Variables: Old and New Values:** This dialog box shows the configuration for recoding the selected variable. The 'Old Value' is set to 'Value:'. The 'New Value' is set to 'Value:'. The 'Old -> New:' list contains 'SYSMIS -> 999'. The 'Continue' button is highlighted.

In SPSS müssen fehlende Datenpunkte durch entsprechende Werte (bspw. 999) ersetzt werden (Mplus akzeptiert keine Leerstellen).

1. Aufbereitungsprozedur in SPSS

Level ID: Zuordnung der Level-1-Einheiten (bspw. Personen oder Messzeitpunkte) zu Level-2-Einheiten (bspw. Gruppen oder Personen)

SelfControl_EmotionalDissonance.sav [DataSet1] - IBM SPSS Statistics Data Editor

	ID	tag	Egodep	WorkEng	EmotDiss	Sleep	NA	Age	Gender	SelfCon	var	var
1	1.00	1.00	2.00	1.00	3.60	4.00	3.20	45.00	2.00	3.88		
2	1.00	2.00	2.00	1.00	2.80	5.00	3.20	45.00	2.00	3.88		
3	1.00	3.00	2.00	1.00	2.00	2.00	3.20	45.00	2.00	3.88		
4	1.00	4.00	2.00	2.33	3.20	1.00	3.20	45.00	2.00	3.88		
5	1.00	5.00	1.60	3.56	2.60	1.00	3.20	45.00	2.00	3.88		
6	1.00	6.00	2.20	1.67	2.80	1.00	3.20	45.00	2.00	3.88		
7	1.00	7.00	3.00	.00	3.80	3.00	3.20	45.00	2.00	3.88		
8	1.00	8.00	3.00	.44	3.00	2.00	3.20	45.00	2.00	3.88		
9	1.00	9.00	2.60	.44	3.20	1.00	3.20	45.00	2.00	3.88		
10	1.00	10.00	1.40	2.44	2.40	1.00	3.20	45.00	2.00	3.88		
11	2.00	1.00	2.60	.56	2.00	11.00	3.00	35.00	2.00	2.38		
12	2.00	2.00	1.80	2.44	1.40	8.00	3.00	35.00	2.00	2.38		
13	2.00	3.00	1.00	1.56	2.40	6.00	3.00	35.00	2.00	2.38		
14	2.00	4.00	2.20	1.89	2.00	7.00	3.00	35.00	2.00	2.38		
15	2.00	5.00	2.00	1.78	1.80	6.00	3.00	35.00	2.00	2.38		
16	2.00	6.00	1.00	2.22	1.60	11.00	3.00	35.00	2.00	2.38		
17	2.00	7.00	2.00	2.22	2.00	5.00	3.00	35.00	2.00	2.38		
18	2.00	8.00	1.20	2.44	2.00	2.00	3.00	35.00	2.00	2.38		
19	2.00	9.00	1.20	2.22	2.00	4.00	3.00	35.00	2.00	2.38		
20	2.00	10.00	1.00	2.22	2.00	3.00	3.00	35.00	2.00	2.38		
21	3.00	1.00	2.40	.22	2.40	1.00	2.40	35.00	1.00	3.63		
22	3.00	2.00	2.00	.00	1.00	3.00	2.40	35.00	1.00	3.63		
23	3.00	3.00	2.00	.00	1.00	1.00	2.40	35.00	1.00	3.63		
24	3.00	4.00	2.00	.11	2.00	1.00	2.40	35.00	1.00	3.63		
25	3.00	5.00	1.00	.11	2.00	.00	2.40	35.00	1.00	3.63		
26	3.00	6.00	1.00	3.33	2.00	1.00	2.40	35.00	1.00	3.63		
27	3.00	7.00	1.00	2.44	2.00	1.00	2.40	35.00	1.00	3.63		
28	3.00	8.00	1.00	2.67	1.00	.00	2.40	35.00	1.00	3.63		
29	3.00	9.00	1.00	2.33	1.00	.00	2.40	35.00	1.00	3.63		

1. Aufbereitungsprozedur in SPSS: Aggregation

Aggregation

Integration der aggregierten Variablen im selben Datensatz

**Level-ID:
Zuordnungs-
variable**

Auswahl der zu aggregierenden Variablen

Auswahl der Aggregierungsfunktion

Aggregate Data

Break Variable(s):
tag
ID

Aggregated Variables

Summaries of Variable(s):
Sleep_mean = MEAN(Sleep)

Function... Name & Label...
Number of cases Name: N_BREAK

Save
 Add aggregated variables to active dataset
 Create a new dataset containing only the aggregated variables
 Write a new data file containing only the aggregated variables

Options for Very Large Datasets
 File is already sorted on break variable(s)
 Sort file before aggregating

Aggregate Data: Aggregate Function

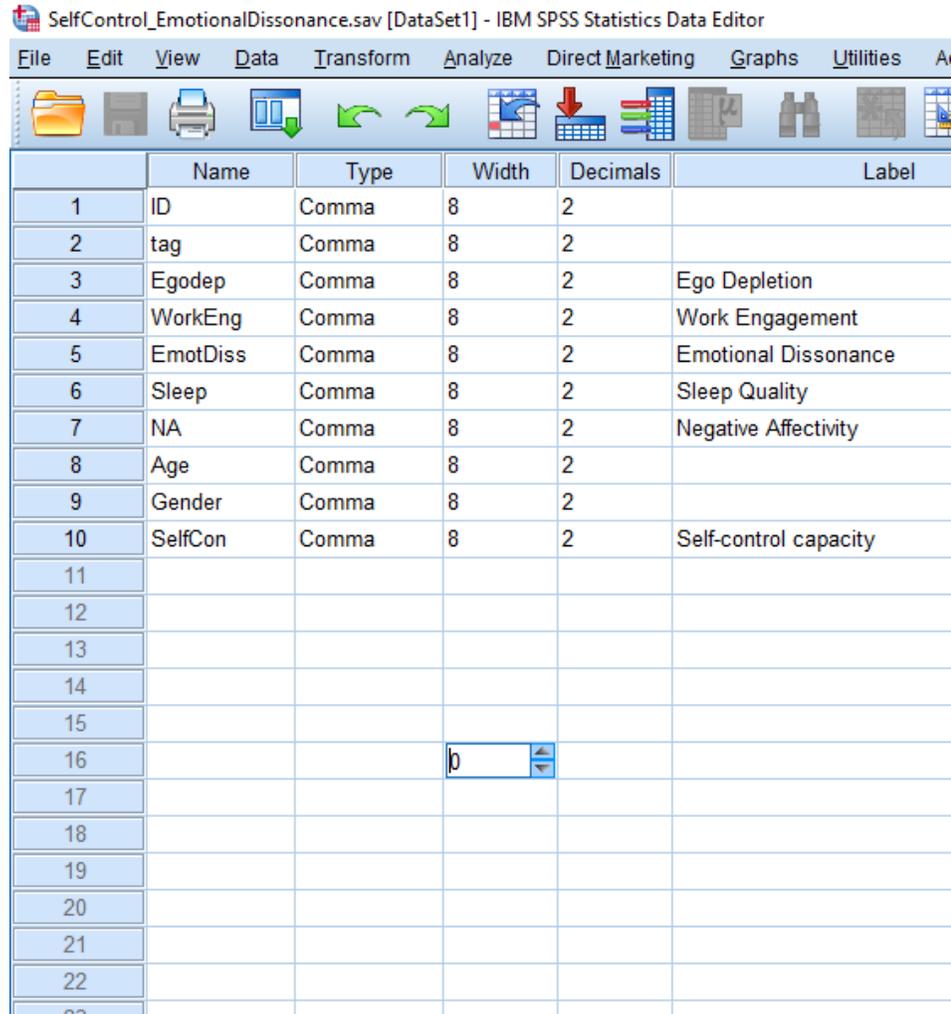
Summary Statistics	Specific Values	Number of cases
<input checked="" type="radio"/> Mean	<input type="radio"/> First	<input type="radio"/> Weighted
<input type="radio"/> Median	<input type="radio"/> Last	<input type="radio"/> Weighted missing
<input type="radio"/> Sum	<input type="radio"/> Minimum	<input type="radio"/> Unweighted
<input type="radio"/> Standard Deviation	<input type="radio"/> Maximum	<input type="radio"/> Unweighted missing

Percentages, Fractions, Counts
 Percentages
 Fractions
 Counts

Above
 Below
 Inside
 Outside

1. Aufbereitungsprozedur in SPSS: Variableneigenschaften

Variableneigenschaften



SelfControl_EmotionalDissonance.sav [DataSet1] - IBM SPSS Statistics Data Editor

	Name	Type	Width	Decimals	Label
1	ID	Comma	8	2	
2	tag	Comma	8	2	
3	Egodep	Comma	8	2	Ego Depletion
4	WorkEng	Comma	8	2	Work Engagement
5	EmotDiss	Comma	8	2	Emotional Dissonance
6	Sleep	Comma	8	2	Sleep Quality
7	NA	Comma	8	2	Negative Affectivity
8	Age	Comma	8	2	
9	Gender	Comma	8	2	
10	SelfCon	Comma	8	2	Self-control capacity
11					
12					
13					
14					
15					
16			0		
17					
18					
19					
20					
21					
22					
23					

- Keine Variablennamen mit mehr als 8 Zeichen (beginnend mit Buchstaben und keine Sonderzeichen außer ,_')
- Type: Comma
- Breite (Width): 8
- Dezimalstellen: 2
- Empfehlung: Nur die Untersuchungsvariablen speichern (ursprüngliche Items sollten entfernt werden).

1. Aufbereitungsprozedur in SPSS: dat.Datei

dat.Datei

SelfControl_Emotionaldissonance.sav [DataSet1] - IBM SPSS Statistics Data Editor

File Edit View Data Transform Analyze Direct Marketing Graphs Utilities Add-ons Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
1	ID	Comma	8							Scale	Input
2	tag	Comma	8							Scale	Input
3	Egodep	Comma	8							Scale	Input
4	WorkEng	Comma	8							Scale	Input
5	EmotDiss	Comma	8							Scale	Input
6	Sleep	Comma	8							Scale	Input
7	NA	Comma	8							Scale	Input
8	Age	Comma	8							Scale	Input
9	Gender	Comma	8							Scale	Input
10	SelfCon	Comma	8							Scale	Input
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											

Save Data As

Look in: 2 Self-control capacity

Keeping 10 of 10 variables.

File name: SelfControl_Emotionaldissonance.dat

Save as type: Fixed ASCII (*.dat)

Encoding: Local Encoding

Write variable names to spreadsheet

Save value labels where defined instead of data values

Save value labels into a .sas file

Encrypt file with password

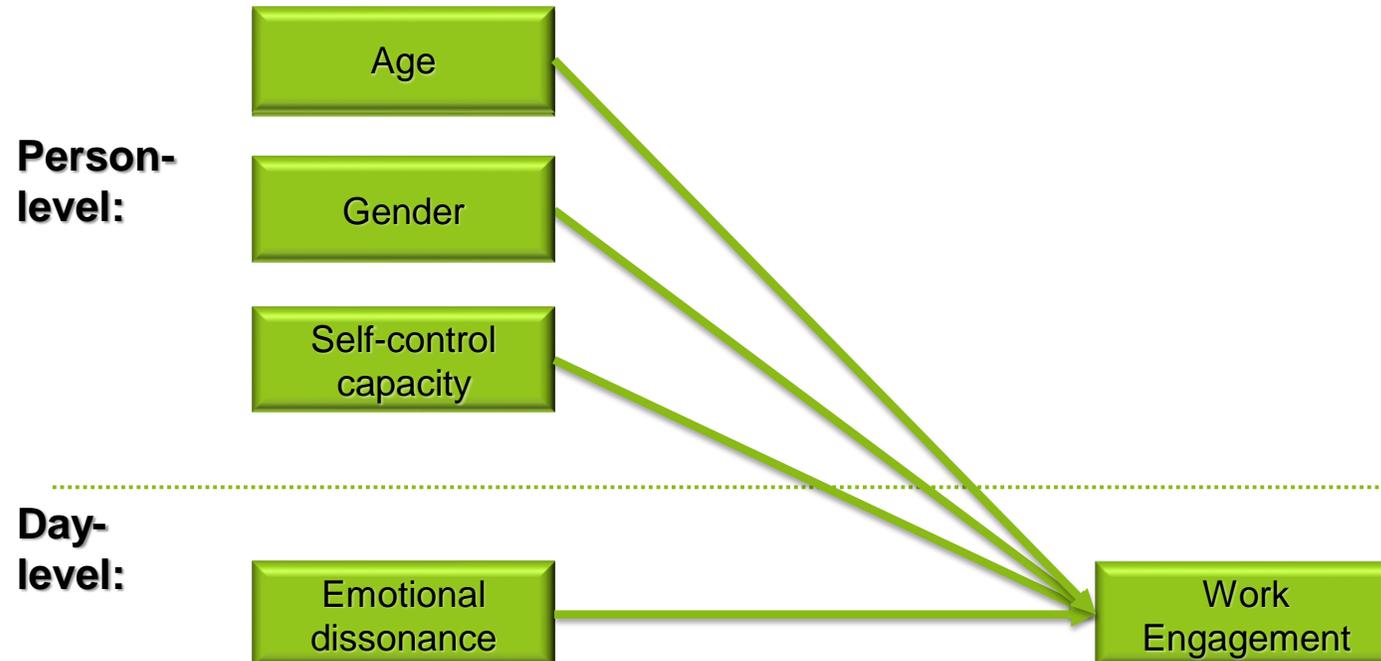
Buttons: Variables..., Save, Paste, Cancel, Help, Store File To Repository...

Annotations:

- ASCII-Datei (fixed) (points to 'Fixed ASCII (*.dat)')
- Lokale Kodierung (points to 'Local Encoding')

2. Struktur der Mplus-Syntax: Random-Intercept

Random-Intercept



2. Struktur der Mplus-Syntax: Random-Intercept

Random-Intercept

```
Mplus - [Model_RandomIntercept]
File Edit View Mplus Plot Diagram Window Help
TITLE: Emotional dissonance & Self-Control Capacity
DATA: FILE IS SelfControl_EmotionalDissonance.dat;
VARIABLE:
NAMES ARE ID tag Egodep WorkEng EmotDiss Sleep NA
Age Gender SelfCon;
MISSING ARE ALL(999.00);
USEVARIABLES ARE WorkEng EmotDiss Age Gender SelfCon;
WITHIN IS EmotDiss;
BETWEEN IS Age Gender SelfCon;
CLUSTER = ID;
DEFINE:
CENTER SelfCon Age(Grandmean);
CENTER EmotDiss (Groupmean);
ANALYSIS: TYPE = TWOLEVEL RANDOM;
ESTIMATOR = ML;
MODEL:
%WITHIN%
WorkEng ON EmotDiss;
%BETWEEN%
WorkEng SelfCon Age Gender;
WorkEng ON SelfCon Age Gender;
OUTPUT: SAMPSTAT TECH1 TECH8;
```

**ASCII-Datei (immer im selben
Ordner)**

**Variablenamen (max. 8 Zeichen:
Reihenfolge muss beachtet werden!)**

Definition der fehlenden Werte

Verwendete Variablen

**Differenzierung nach within (Level1) und
between (Level2)**

Level ID

Zentrierung:

- ‚Grandmean‘: Zentrierung am Gesamtmittelwert
- ‚Groupmean‘: Zentrierung innerhalb der Level 2-Einheiten

Analyseprozedur:

- ‚Type‘: Art der Analyse (TWOLEVEL: Multilevel modeling)
- ‚Estimator‘: ML = Full information ML; MLR: Restricted ML

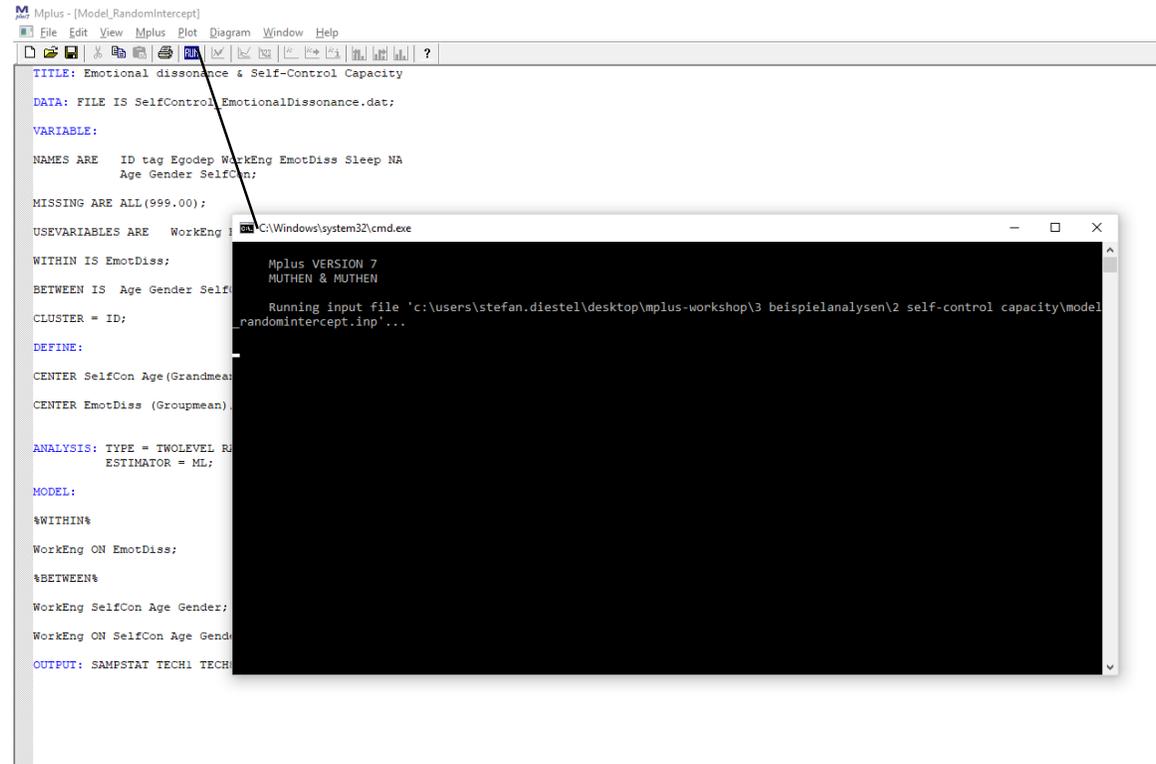
Modellspezifikation:

- ‚Within‘: Level 1 und ‚Between‘: Level 2
- Regressionsfunktion: abhängige Variable ON unabhängige Variable ($y = x \cdot \beta$)

Definition der Outputs

2. Struktur der Mplus-Syntax: Analyse

Analyse



The screenshot shows the Mplus software interface with a syntax file open. The syntax includes the following sections:

```
TITLE: Emotional dissonance & Self-Control Capacity
DATA: FILE IS SelfControl_EmotionalDissonance.dat;
VARIABLE:
NAMES ARE ID tag EgoDep WorkEng EmotDiss Sleep NA
Age Gender SelfCon;
MISSING ARE ALL(999.00);
USEVARIABLES ARE WorkEng;
WITHIN IS EmotDiss;
BETWEEN IS Age Gender SelfCon;
CLUSTER = ID;
DEFINE:
CENTER SelfCon Age(Grandmean);
CENTER EmotDiss (Groupmean);
ANALYSIS: TYPE = TWOLEVEL RANDOM;
ESTIMATOR = ML;
MODEL:
%WITHIN%
WorkEng ON EmotDiss;
%BETWEEN%
WorkEng SelfCon Age Gender;
WorkEng ON SelfCon Age Gender;
OUTPUT: SAMPSTAT TECH1 TECH2
```

A command prompt window is overlaid on the syntax, showing the execution of the Mplus command:

```
C:\Windows\system32\cmd.exe
Mplus VERSION 7
MUTHEN & MUTHEN
Running input file 'c:\users\stefan.diestel\desktop\mplus-workshop\3 beispielanalysen\2 self-control capacity\model_randomintercept.inp'...
```

2. Struktur der Mplus-Outputs: Random-Intercept

Random-Intercept

```
Number of groups                1
Number of observations          1073

Number of dependent variables   1
Number of independent variables 4
Number of continuous latent variables 0

Observed dependent variables

Continuous
WORKENG

Observed independent variables
EMOTDISS  AGE  GENDER  SELFCON

Variables with special functions

Cluster variable  ID

Within variables
EMOTDISS

Between variables
AGE  GENDER  SELFCON

Centering (GRANDMEAN)
SELFCON  AGE

Centering (GROUPMEAN)
EMOTDISS

Estimator                ML
Information matrix       OBSERVED
Maximum number of iterations 100
Convergence criterion    0.100E-05
Maximum number of EM iterations 500
Convergence criteria for the EM algorithm
Loglikelihood change    0.100E-02
Relative loglikelihood change 0.100E-05
Derivative              0.100E-03
Minimum variance       0.100E-03
Maximum number of steepest descent iterations 20
Maximum number of iterations for H1 2000
Convergence criterion for H1 0.100E-03
Optimization algorithm  EMA

Input data file(s)
SelfControl_EmoctionalDissonance.dat
Input data format  FREE

SUMMARY OF DATA

Number of missing data patterns 1
Number of clusters 108

Average cluster size 9.935

Estimated Intraclass Correlations for the Y Variables

Intraclass
Variable Correlation
WORKENG 0.668
```

Allgemeine Informationen des Datensatzes und der Analyse

Allgemeine Informationen zur Parameterschätzung

Durchschnittliche Level-2-Größe

Intraklassenkoeffizient (ICC(1)) der abhängigen Variable

2. Struktur der Mplus-Outputs: Random-Intercept

dat.Datei

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 13

Loglikelihood

H0 Value -2030.530
H1 Value -2028.427

Freiheitsgrade des geschätzten Modells

Log-Likelihood-Wert für den Differenztest

Information Criteria

Akaike (AIC) 4087.060
Bayesian (BIC) 4151.777
Sample-Size Adjusted BIC 4110.487
(n* = (n + 2) / 24)

Chi-Square Test of Model Fit

Value 4.206
Degrees of Freedom 3
P-Value 0.2400

RMSEA (Root Mean Square Error Of Approximation)

Estimate 0.019

CFI/TLI

CFI 0.972
TLI 0.935

Chi-Square Test of Model Fit for the Baseline Model

Value 50.015
Degrees of Freedom 7
P-Value 0.0000

SRMR (Standardized Root Mean Square Residual)

Value for Within 0.000
Value for Between 0.061

Fit-Indizes

2. Struktur der Mplus-Outputs: Random-Intercept

Mplus - [model_randomintercept]

File Edit View Mplus Plot Diagram Window Help

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
WORKENG ON EMODISS	-0.288	0.042	-6.808	0.000
Residual Variances WORKENG	0.607	0.028	21.965	0.000
Between Level				
WORKENG ON SELFCON	-0.046	0.186	-0.247	0.805
AGE	0.006	0.008	0.671	0.503
GENDER	-0.007	0.226	-0.030	0.976
Means				
AGE	-0.024	1.278	-0.019	0.985
GENDER	1.509	0.048	31.375	0.000
SELFCON	0.000	0.058	-0.004	0.997
Intercepts				
WORKENG	3.187	0.358	8.891	0.000
Variances				
AGE	176.305	23.992	7.348	0.000
GENDER	0.250	0.034	7.348	0.000
SELFCON	0.367	0.050	7.348	0.000
Residual Variances				
WORKENG	1.268	0.181	7.011	0.000

Level 1-Effekte

Restvarianz der abhängigen Variablen auf Level 1

Level 2-Effekte

Intercept

Restvarianz der abhängigen Variablen auf Level 2

2. Struktur der Mplus-Outputs: Random-Intercept

Level 1-Statistiken

ESTIMATED SAMPLE STATISTICS FOR WITHIN

		Means				
		AGE	GENDER	SELFCON	WORKENG	EMOTDISS
1		0.000	0.000	0.000	0.000	0.000
		Covariances				
		AGE	GENDER	SELFCON	WORKENG	EMOTDISS
AGE		0.000				
GENDER		0.000	0.000			
SELFCON		0.000	0.000	0.000		
WORKENG		0.000	0.000	0.000	0.633	
EMOTDISS		0.000	0.000	0.000	-0.091	0.315

Restvarianz der abhängigen
Variablen auf Level 1: 0.607

Level 2-Statistiken

ESTIMATED SAMPLE STATISTICS FOR BETWEEN

		Means				
		AGE	GENDER	SELFCON	WORKENG	EMOTDISS
1		-0.024	1.509	0.000	3.177	0.000
		Covariances				
		AGE	GENDER	SELFCON	WORKENG	EMOTDISS
AGE		176.305				
GENDER		-0.511	0.250			
SELFCON		-0.428	-0.051	0.367		
WORKENG		1.016	-0.002	-0.019	1.274	
EMOTDISS		0.000	0.000	0.000	0.000	0.000

Restvarianz der abhängigen
Variablen auf Level 2: 1.268

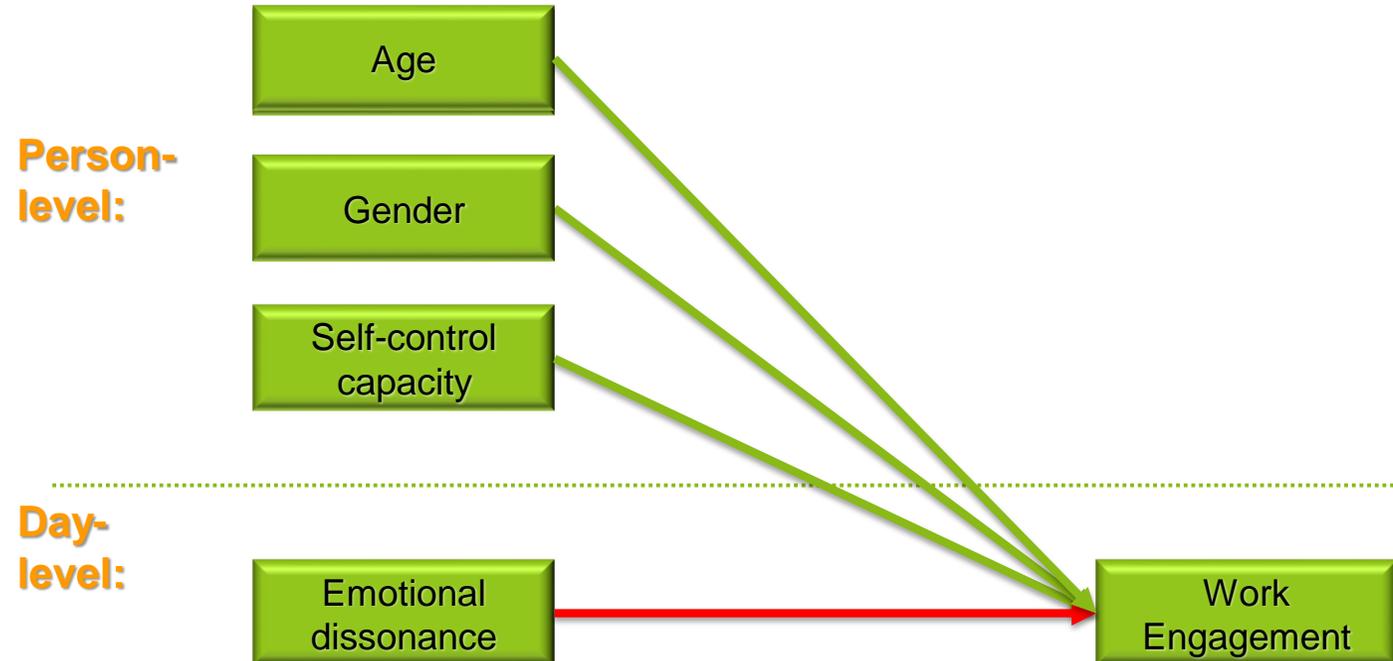
$$R^2_{LEVEL1} = \frac{\sigma_0^2 - \sigma_{FIT}^2}{\sigma_0^2}$$

$$0.633 - 0.607 / 0.633 = \underline{.04}$$

$$R^2_{LEVEL2} = \frac{\tau_0^2 - \tau_{FIT}^2}{\tau_0^2}$$

$$1.274 - 1.268 / 1.274 = \underline{.00}$$

2. Struktur der Mplus-Syntax: Random-Slope



2. Struktur der Mplus-Syntax: Random-Slope

```
MODEL:  
  
%WITHIN%  
  
GAM1 | WorkEng ON EmotDiss;  
  
%BETWEEN%  
  
WorkEng SelfCon Age Gender;  
  
WorkEng ON SelfCon Age Gender;  
  
OUTPUT: SAMPSTAT TECH1 TECH8;
```

Variation des Zusammenhangs zwischen
unabhängiger und abhängiger Variable
auf Level 1: Spezifikation des Random-
Slope

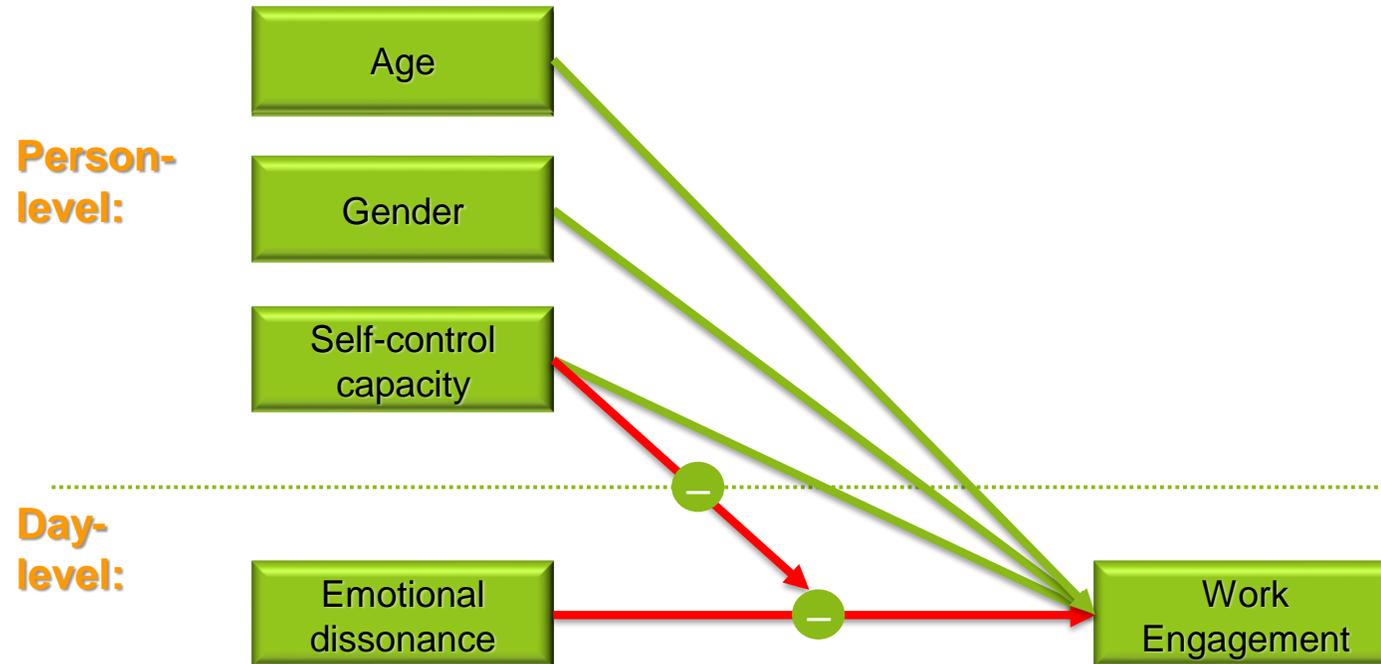
2. Struktur der Mplus-Outputs: Random-Slope

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
Residual Variances				
WORKENG	0.550	0.026	21.186	0.000
Between Level				
WORKENG ON				
SELFCON	-0.046	0.186	-0.247	0.805
AGE	0.006	0.008	0.670	0.503
GENDER	-0.007	0.226	-0.030	0.976
Means				
AGE	-0.024	1.278	-0.019	0.985
GENDER	1.509	0.048	31.375	0.000
SELFCON	0.000	0.058	-0.004	0.997
GAM1	-0.269	0.059	-4.538	0.000
Intercepts				
WORKENG	3.187	0.359	8.890	0.000
Variances				
AGE	176.305	23.992	7.348	0.000
GENDER	0.250	0.034	7.348	0.000
SELFCON	0.367	0.050	7.348	0.000
GAM1	0.144	0.041	3.518	0.000
Residual Variances				
WORKENG	1.273	0.181	7.042	0.000

Level 1-Effekt des Random-Slope

Signifikanz des Random-Slope

3. Cross-Level Moderation



3. Cross-Level Moderation

```
MODEL:  
  
%WITHIN%  
  
GAM1 | WorkEng ON EmotDiss;  
  
%BETWEEN%  
  
WorkEng SelfCon Age Gender;  
  
WorkEng ON SelfCon Age Gender;  
  
Gam1 ON SelfCon;  
  
OUTPUT: SAMPSTAT TECH1 TECH8;
```

Cross-Level Interaction: Vorhersage des Random-Slope durch eine Level-2-Variable

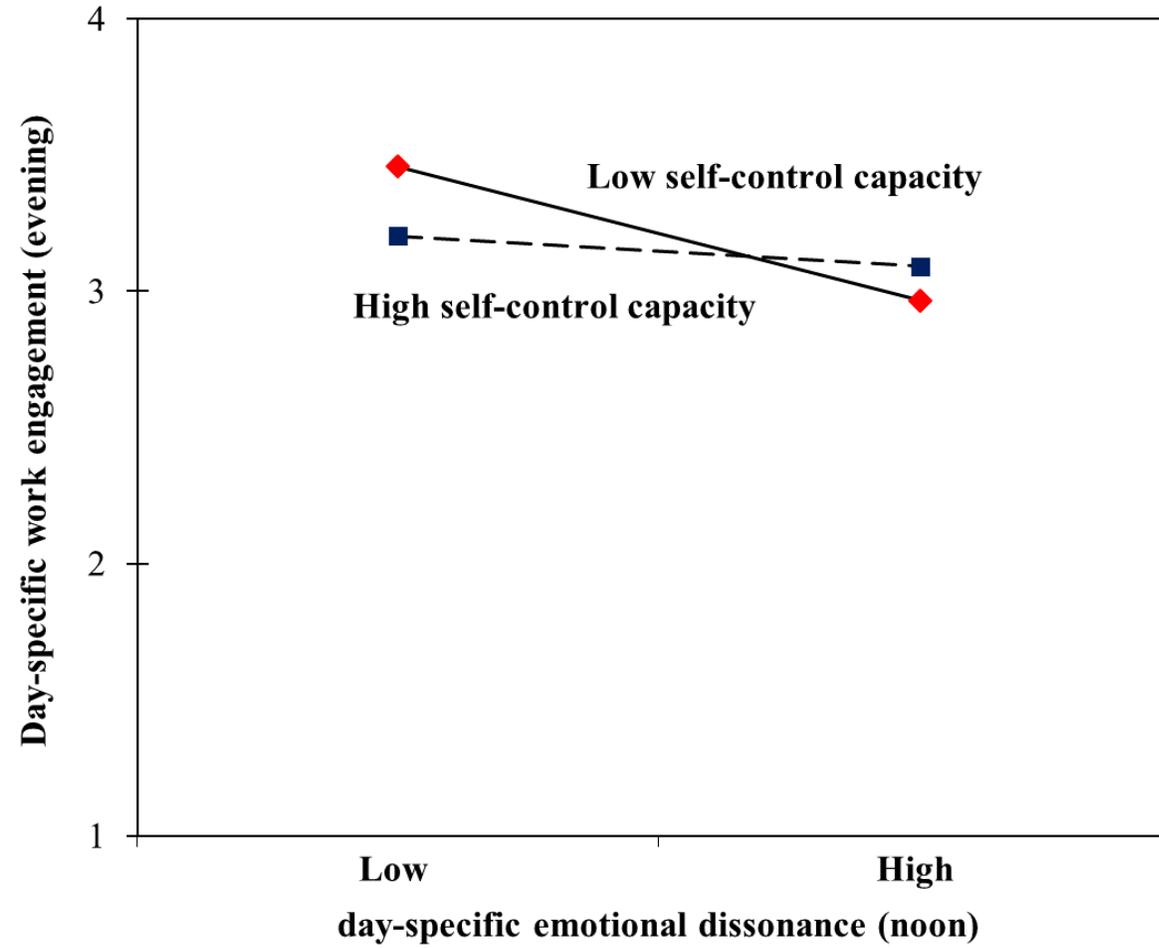
3. Cross-Level Moderation

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
Residual Variances				
WORKENG	0.550	0.026	21.190	0.000
Between Level				
GAM1 ON				
SELFCON	0.264	0.092	2.873	0.004
WORKENG ON				
SELFCON	-0.046	0.186	-0.247	0.805
AGE	0.006	0.008	0.670	0.503
GENDER	-0.007	0.226	-0.030	0.976
Means				
AGE	-0.024	1.278	-0.019	0.985
GENDER	1.509	0.048	31.375	0.000
SELFCON	0.000	0.058	-0.004	0.997
Intercepts				
WORKENG	3.187	0.359	8.890	0.000
GAM1	-0.269	0.057	-4.726	0.000
Variances				
AGE	176.305	23.992	7.348	0.000
GENDER	0.250	0.034	7.348	0.000
SELFCON	0.367	0.050	7.348	0.000
Residual Variances				
WORKENG	1.273	0.181	7.042	0.000
GAM1	0.121	0.038	3.205	0.001

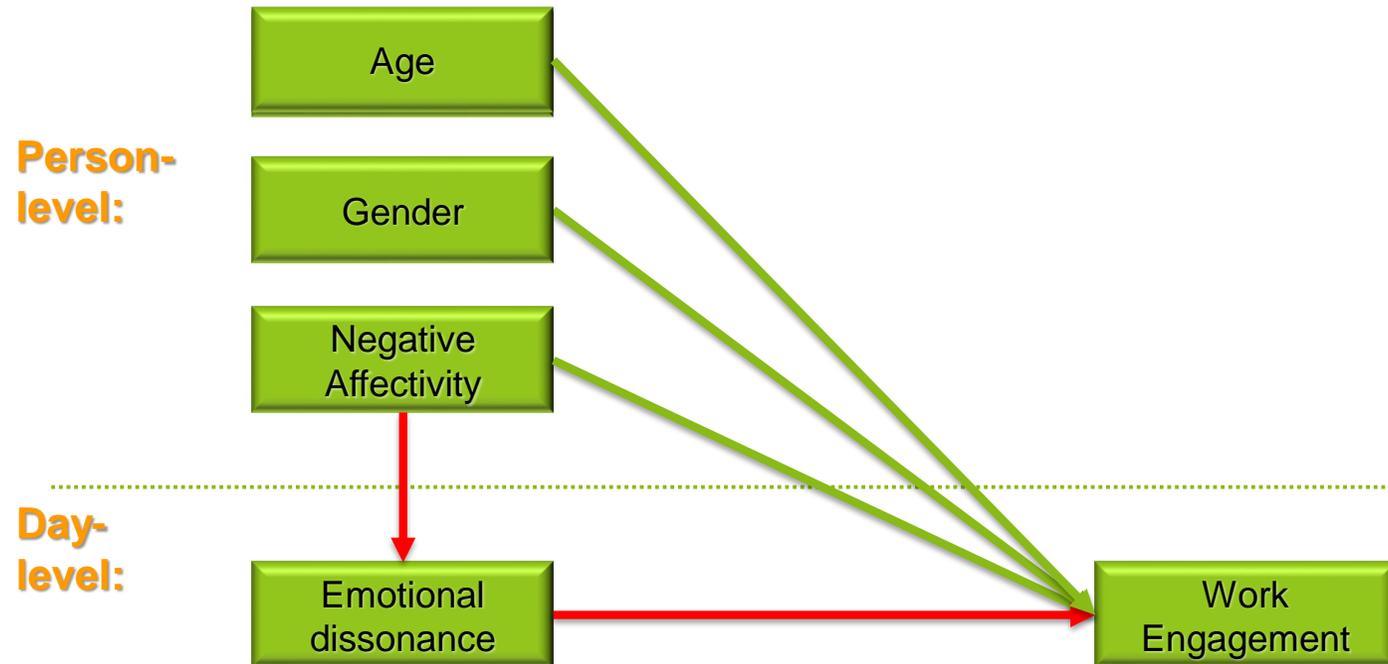
Cross-Level Interaction: Parameterschätzung und Signifikanz

Berechnung der Effektstärke (R²):
 $0.144 - 0.121 / 0.144 = .16$

3. Cross-Level Moderation



4. Indirect effects



4. Indirect effects

```
USEVARIABLES ARE    WorkEng EmotDiss Age Gender NA;

BETWEEN IS    Age Gender NA;

CLUSTER = ID;

DEFINE:

CENTER NA Age (Grandmean);

CENTER EmotDiss (Grandmean);

ANALYSIS: TYPE = TWOLEVEL RANDOM;
          ESTIMATOR = ML;

MODEL:

%WITHIN%

WorkEng ON EmotDiss (b);

%BETWEEN%

WorkEng NA EmotDiss Age Gender;

WorkEng ON NA Age Gender;

EmotDiss ON NA (a);

MODEL CONSTRAINT:

NEW(ind);

ind=a*b;

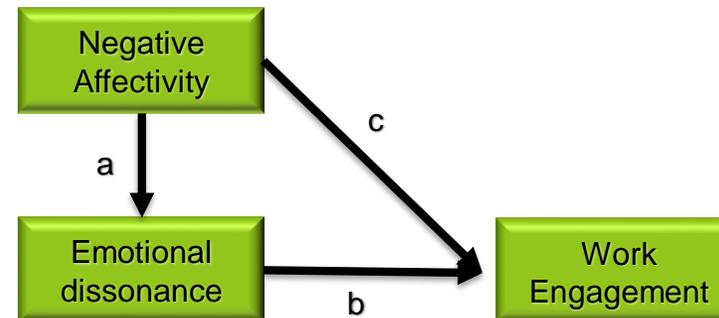
OUTPUT:  SAMPSTAT TECH1 TECH8 CINTERVAL;
```

Spezifikation des b-Pfades

Spezifikation des a-Pfades

Da der Level-1-Mediator sowohl abhängige als auch unabhängige Variable ist, wird er nicht zu within oder between zugeordnet

Bei indirekten Effekten muss der Level-1-Mediator stets um den Gesamtmittelwert zentriert werden



Definition des indirekten Effekts (a*b-Pfad)

4. Indirect effects

MODEL RESULTS				
	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
WORKENG ON EMOTDISS	-0.288	0.042	-6.807	0.000
Variances				
EMOTDISS	0.351	0.016	21.965	0.000
Residual Variances				
WORKENG	0.607	0.028	21.965	0.000
Between Level				
WORKENG ON NA	-0.497	0.177	-2.810	0.005
AGE	0.007	0.008	0.912	0.362
GENDER	-0.078	0.219	-0.354	0.723
EMOTDISS ON NA	0.480	0.118	4.061	0.000
EMOTDISS WITH WORKENG	-0.023	0.082	-0.285	0.775

Intercepts				
WORKENG	3.293	0.347	9.485	0.000
EMOTDISS	0.002	0.073	0.026	0.979
Variances				
AGE	176.305	23.992	7.348	0.000
GENDER	0.250	0.034	7.348	0.000
NA	0.379	0.052	7.348	0.000
Residual Variances				
WORKENG	1.174	0.168	6.969	0.000
EMOTDISS	0.535	0.078	6.892	0.000
New/Additional Parameters				
IND	-0.138	0.040	-3.488	0.000

b-Pfad

a-Pfad

Indirekter Effekt

CONFIDENCE INTERVALS OF MODEL RESULTS							
	Lower .5%	Lower 2.5%	Lower 5%	Estimate	Upper 5%	Upper 2.5%	Upper .5%
New/Additional Parameters							
IND	-0.240	-0.216	-0.203	-0.138	-0.073	-0.061	-0.036

Schätzung der Konfidenzintervalle

5. Difference Test

Referenzmodell: Random Intercept

```
MODEL FIT INFORMATION
|
Number of Free Parameters      13
Loglikelihood
|
|-----|-----|-----|-----|
| HO Value                    -1407.518 |
| H1 Value                    -1405.415 |
|-----|-----|-----|-----|
```

Loglikelihood-Wert für Referenzmodell

Freie Parameter

Theoretisches Modell: Random Slope

```
MODEL FIT INFORMATION
|
Number of Free Parameters      14
Loglikelihood
|
|-----|-----|-----|-----|
| HO Value                    -1389.604 |
|-----|-----|-----|-----|
```

Loglikelihood-Wert für theoretisches Modell

$$\Delta -2LL = -1407.52 - (-1389.6)$$
$$\Delta -2LL = \underline{\underline{7.92}} \text{ (df}_{\text{diff}} = 1; p < .01)$$

Dfdiff = 1	* p < .01: c.r. = 6,63
	** p < .05: c.r. = 3,84

6. Moderated Mediation

Person-level:

Beliefs about will-power

Day-level:

Sleep duration

Feelings of depletion

Basic Need Satisfaction

Work Engagement



6. Moderated Mediation

```
USEVARIABLES ARE
  EG_mo
  SZ WE
  NS
  BW_s ;
```

Bezeichnungen: EG: Feelings of Depletion, SZ = Sleep duration; NS = Basic Need Satisfaction; WE = Work Engagement; BW = Beliefs about Willpower

```
CLUSTER IS SERIAL2;
```

```
Between are BW_s;
```

```
Within are SZ WE NS ;
```

```
DEFINE:
```

```
BW_s = MEAN (BW01_R BW02_R BW03 BW04 BW05_R BW06);
Center SZ (Groupmean);
Center BW_s (Grandmean);
```

Bei konditionalen indirekten Effekten muss der Level-1-Prädiktor stets um den Level-2-spezifischen Mittelwert zentriert werden

```
ANALYSIS: TYPE IS TWOLEVEL RANDOM;
Estimator = MLR;
```

```
MODEL:
```

```
%WITHIN%
```

```
sa | EG_mo ON SZ;
```

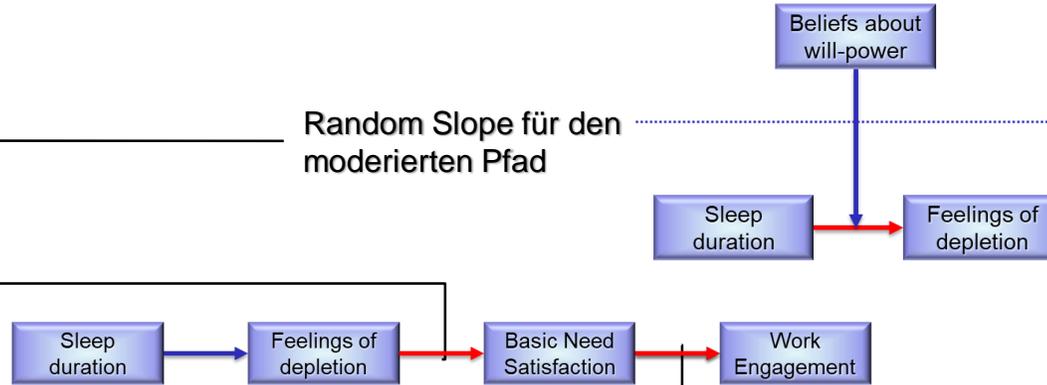
Random Slope für den moderierten Pfad

```
NS On
SZ
;
```

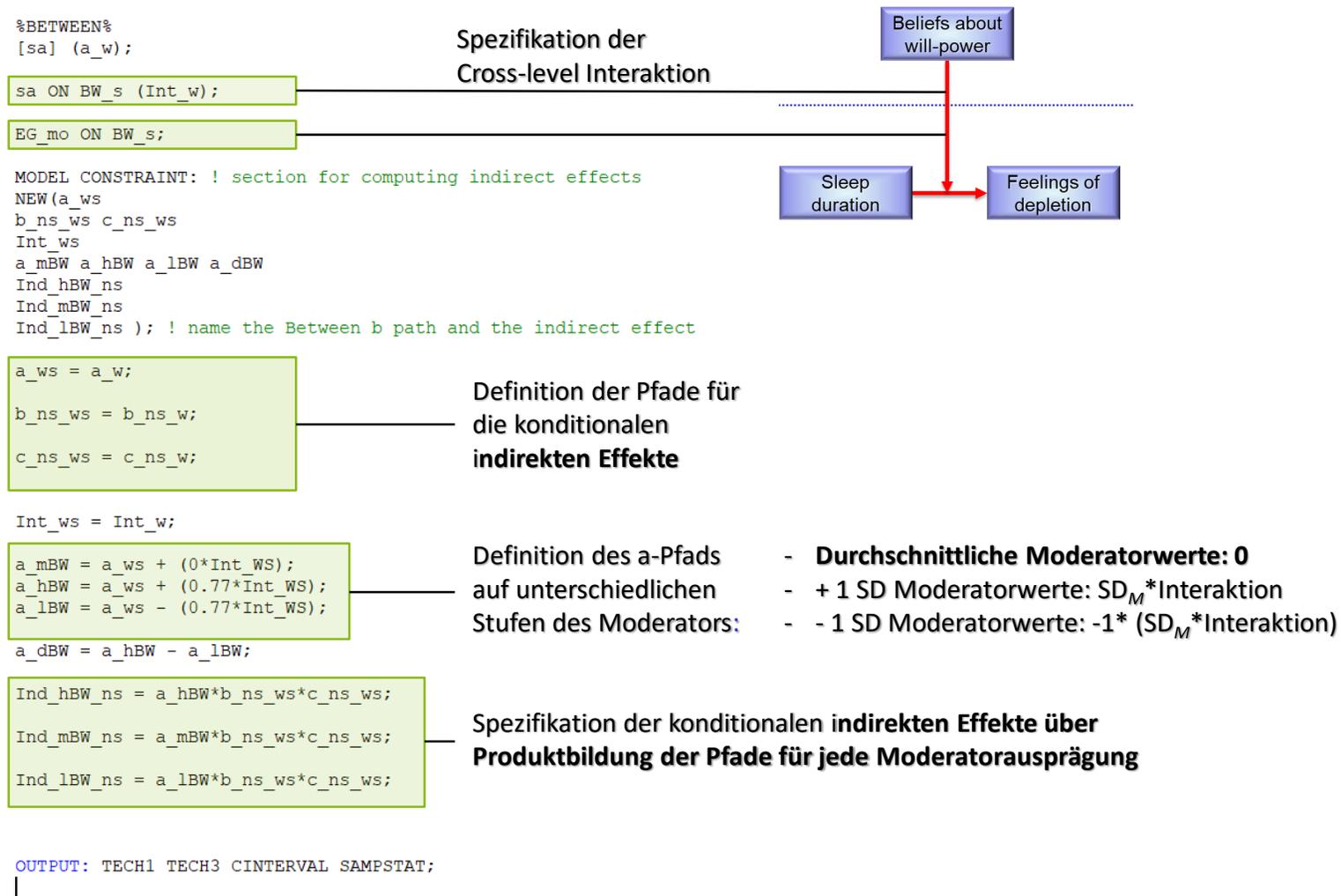
```
NS On EG_mo (b_ns_w);
```

```
WE ON EG_mo
```

```
SZ
NS (c ns w)
;
```



6. Moderated Mediation



6. Moderated Mediation

		Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level					
NS	ON				
	SZ	-0.029	0.058	-0.494	0.622
	EG_MO	-0.419	0.148	-2.841	0.004
WE	ON				
	EG_MO	-0.706	0.147	-4.815	0.000
	SZ	0.058	0.084	0.696	0.487
	NS	0.849	0.154	5.523	0.000
Intercepts					
	WE	1.049	0.630	1.664	0.096
	NS	3.929	0.102	38.658	0.000
Residual Variances					
	EG_MO	0.306	0.058	5.280	0.000
	WE	1.162	0.251	4.620	0.000
	NS	0.727	0.136	5.355	0.000
Between Level					
SA	ON				
	BW_S	0.105	0.040	2.651	0.008
EG_MO	ON				
	BW_S	-0.138	0.080	-1.731	0.083
Intercepts					
	EG_MO	1.716	0.075	22.991	0.000
	SA	-0.187	0.037	-5.006	0.000
Residual Variances					
	EG_MO	0.151	0.044	3.452	0.001
	SA	0.019	0.015	1.236	0.216
New/Additional Parameters					
	A_WS	-0.187	0.037	-5.006	0.000
	B_NS_WS	-0.419	0.148	-2.841	0.004
	C_NS_WS	0.849	0.154	5.523	0.000
	INT_WS	0.105	0.040	2.651	0.008
	A_MBW	-0.187	0.037	-5.006	0.000
	A_HBW	-0.106	0.046	-2.279	0.023
	A_LBW	-0.268	0.050	-5.373	0.000
	A_DBW	0.162	0.061	2.651	0.008
	IND_HBW	0.038	0.022	1.747	0.081
	IND_MBW	0.067	0.025	2.678	0.007
	IND_LBW	0.095	0.033	2.887	0.004

Person-level:

Day-level:

