

**Supplementary Material**

- 1) Representativeness of the analytic sample
- 2) Cross-sectional latent class analyses
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WORKING CONDITIONS AMONG HIGH-SKILLED WORKERS S2

1) Representativeness of the analytic sample

Supplementary Table 1

Comparison between Analytic Sample and Full Sample of High-Skilled Workers

2008	Analytic Sample (N = 1744)			Full Sample (N = 5955)			p
	Mean (SD)	n	% valid	Mean (SD)	n	% valid	
Age	47.36 (8.55)			49.27 (11.27)			<.01
Women		1060	60.8		3318	55.7	<.01
Managers		205	11.8		802	13.5	.06
Technicians		706	40.5		2591	43.5	.02
Born in Sweden		1635	93.9		5617	94.4	.33
University degree		1263	72.5		3718	62.5	<.01
Married or cohabitating		1061	60.8		3561	59.8	.44
Children living at home		1035	57.9		2825	47.9	<.01
Employed by government		967	57.7		2549	49.9	<.01
Employed by private		631	37.6		2092	41.0	.42
Small enterprises		731	43.5		2470	48.2	.74
Day job		1502	87.4		5012	85.6	.05
Shift work		121	7.0		386	6.6	.50
Non-regulated work hours		75	4.4		309	5.3	.13
<i>Working conditions</i>							
Learning opportunities	1.53 (0.59)	901	57.7	1.58 (.62)	2870	48.5	<.01
Creativity requirement	1.36 (0.56)	1174	67.4	1.40 (.58)	3836	64.9	.01
Freedom how to work	1.45 (0.61)	1054	60.6	1.47 (.64)	3550	60.1	.23
Freedom what to do	1.96 (0.77)	505	29.0	1.93 (.80)	1946	32.9	.16
Working fast	1.94 (0.68)	425	24.4	1.96 (.70)	1424	24.1	.28
Working intensively	2.14 (0.81)	371	21.4	2.12 (.80)	1260	21.4	.36
Working with too much effort	2.07 (0.74)	396	21.9	2.09 (.76)	1147	22.3	.32

Note: Sample selected for this study included high-skilled workers who were gainfully employed

and completed the questionnaire at all the measurement occasions. Small enterprises were

defined as those employing fewer than 50 individuals. Psychological working conditions were

coded 1= "yes, often", 2= "yes, sometimes", 3= "no, seldom" or 4= "no, hardly ever". The

figures present the prevalence in percentage of the response coded as "1".

## 2) Cross-sectional latent class analyses

The analysis of a latent mixture reveals diversity within a population. The number of possible subpopulations is finite, and some patterns will typically occur more often than others (Bergman, & Magnusson, 1997; Foti, Thompson, & Allgood, 2011). This unobserved heterogeneity can be identified and modeled through mixture models, such as Latent Class Analysis, LCA (e.g., McLachlan & Peel, 2000; Nylund-Gibson et al., 2014). LCA identifies subtypes of individuals who exhibit similar patterns of certain characteristics (Collins & Lanza, 2010; Wang & Hanges, 2011) meaning that individuals classified together have a similar pattern of responses to a set of questions representing individual characteristics.

The goal of cross-sectional analyses was twofold: 1) to examine how many groups with distinguished working conditions (classes) that emerge at each time point, and 2) to examine the similarity of the structure of the classes across time points. Thus, this preliminary analysis allowed us to test whether the class structure would replicate across three time points.

All the analyses were performed with Mplus 7.11 using the same specification and model fit indices as in the main analyses (Latent Transition Analyses). The Bootstrapped Likelihood Ratio Test (BLRT) was only used in cross-sectional analyses as it is unavailable for models with more than one categorical latent variable (Muthén and Muthén, 1998-2012). The BLRT compares a  $k$  class model with a  $k-1$  class model, with a significant  $p$  value indicating that a model with less latent classes should be rejected in favor of a model with more latent classes (Nylund, Asparouhov, & Muthén, 2007).

The Supplementary Table 2 present results of the cross-sectional latent class analyses. According to the BLRT, a six-class solution had the best fit at times 1 and 3, while a five-class solution had the best fit at time 2. However, the six-class solution suffered from estimation problems at time 2 and resulted in small classes (only 1.8% prevalence) at time 1. The drop in BIC value flattened out already around four classes. The change from the four to the five-class model resulted in a significant increase in BIC value at time 1 ( $\Delta\text{BIC} = 23.4$ ), an insignificant increase at time 2 ( $\Delta\text{BIC} = 1.5$ ), and an insignificant decrease at time 3 ( $\Delta\text{BIC} = 3.6$ ). Thus, the BIC value provided strong support for the four-class model at time 1, and no evidence of the four-class model being worse than the five-class model at times 2 and 3.

The structure of the four-class solution at each point in time is presented in the Supplementary Figure 1. The estimated classes were very similar across time points. The same four-class structure was replicated in the longitudinal model reported in the main manuscript.

### References:

- Bergman, L. R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology*, *9*(2), 291–319. doi:10.1017/S095457949700206X
- Foti, R. J., Thompson, N. J., & Allgood, S. F. (2011). The pattern-oriented approach: A framework for the experience of work. *Industrial and Organizational Psychology*, *4*(1), 122–125. doi:10.1111/j.1754-9434.2010.01309.x
- McLachlan, G., & Peel, D. (2000). *Finite Mixture Models*. New York, NY: John Wiley & Sons, Inc.
- Nylund-Gibson, K., Grimm, R., Quirk, M., & Furlong, M. (2014). A latent transition mixture model using the three-step specification. *Structural Equation Modeling: A Multidisciplinary Journal*, *21*(3), 439–454. doi:10.1080/10705511.2014.915375
- Collins, L. M., & Lanza, S. T. (2010). *Latent Class and Latent Transition Analysis with Applications in the Social, Behavioral and Health Sciences*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Wang, M., & Hanges, P. J. (2011). Latent class procedures: Applications to organizational research. *Organizational Research Methods*, *14*(1), 24–31. doi:10.1177/1094428110383988
- Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(4), 535–569. doi:10.1080/10705510701575396
- Muthén, L.K., & Muthén, B. (1998-2012). *Mplus User's Guide. 7th Edn*. Los Angeles, CA: Muthén and Muthén.

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Supplementary Table 2

Model Comparison in Cross-Sectional Latent Class Analyses

<i>k</i>	BLRT	LL	SCF	#fp	AIC	BIC	SABIC	Entropy
<i>Time 1 (2008)</i>								
2	<.000	-6885.59	1.03	15	13801.17	13883.12	13835.47	0.80
3	<.000	-6677.15	1.05	23	13400.29	13525.95	13452.88	0.71
4	<.000	-6607.68	1.03	31	13277.36	13446.73	13348.24	0.73
5	<.000	-6589.55	1.05	39	13257.09	13470.16	13346.26	0.75
6	<.000	-6575.80	1.08	47	13245.61	13502.38	13353.07	0.78
7	0.092	-6565.45	1.03	55	13240.90	13541.39	13366.66	0.80
<i>Time 2 (2010)</i>								
2	<.000	-6446.73	1.03	15	12923.46	13005.41	12957.76	0.81
3	<.000	-6194.42	1.03	23	12434.83	12560.49	12487.42	0.74
4	<.000	-6148.52	1.06	31	12359.05	12528.41	12429.93	0.77
5	<.000	-6119.40	1.01	39	12316.81	12529.88	12405.98	0.78
6	0.208	-6110.32	1.05	47	12314.65	12571.43	12422.11	0.74
7	0.999	-6105.00	1.04	55	12320.01	12620.49	12445.76	0.75
<i>Time 3 (2012)</i>								
2	<.000	-6341.11	1.05	15	12712.22	12794.17	12746.51	0.84
3	<.000	-6083.22	1.04	23	12212.45	12338.10	12265.03	0.73
4	<.000	-6050.48	1.19	31	12162.96	12332.33	12233.84	0.75
5	<.000	-6018.85	1.27	39	12115.70	12328.77	12204.87	0.71
6	<.000	-6000.55	1.04	47	12095.10	12351.88	12202.57	0.73
7	0.182	-5992.27	1.11	55	12094.54	12395.02	12220.29	0.74

*Note:* *k* = number of latent classes in the model; BLRT = *p* value of the parametric bootstrapped

likelihood ratio test for *k*-1 vs. *k* classes; LL = model log likelihood; SCF = scaling correction

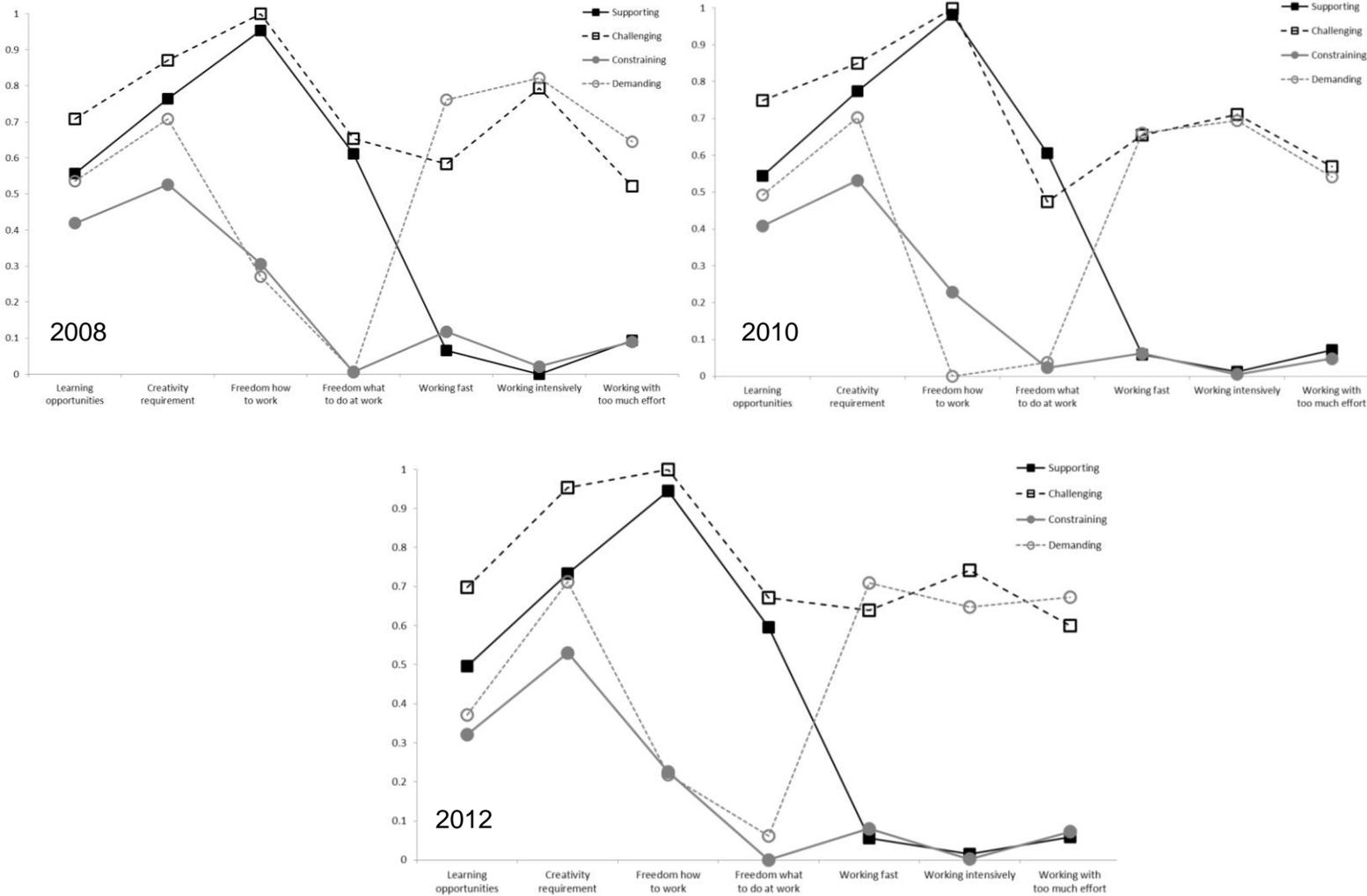
factor of the robust maximum likelihood estimator. #fp = number of free parameters; AIC =

Akaike information criterion; BIC = Bayesian information criterion; SABIC = sample-adjusted

BIC.

Supplementary Figure 1

Item-Response Probabilities for the Four Classes in the Cross-Sectional Latent Class Analyses



**3) Mplus input code to estimate the latent class analysis model**

TITLE: Cross-sectional Latent Class Analyses  
 DATA: FILE = data.dat;  
 VARIABLE: NAMES =  
*!binary indicators of demands-resources at time 1*  
 t1learn t1crdem t1how t1what t1fast t1hard t1effort  
*!binary indicators of demands-resources at time 2*  
 t2learn t2crdem t2how t2what t2fast t2hard t2effort  
*!binary indicators of demands-resources at time 3*  
 t3learn t3crdem t3how t3what t3fast t3hard t3effort  
*!covariates and outcomes were not be used at this stage of the analyses*  
 t1gender t1age t1exe t1tech t2exe t2tech t3exe t3tech  
 t2ssat t2sburn t3sburn t3ssat t4sburn t4ssat;  
 MISSING are all (-9); *!defines missing values coding*  
 USEVARIABLES ARE *!list of variables for the analysis at time 1*  
 t1learn t1crdem t1how t1what t1fast t1hard t1effort;  
 CATEGORICAL = all; *!specifies all used variables as categorical*  
 CLASSES = c (4); *!defines a categorical latent variable c with 4 latent classes*  
 ANALYSIS:  
 TYPE = MIXTURE; *!defines mixture modelling*  
 PROCESSORS IS 4; *!defines nb of threads to speed up the analysis*  
 STARTS 700 100; *!increases the default nb of initial random starts to 700*  
*!and asks for 100 to be retained for final optimization*  
 LRTSTARTS (0 0 100 40); *!defines a number of iterations for the BLRT*  
 PLOT:  
 type is plot2; *!request item probabilities plot to reveal a class structure*  
 series is t1learn (1) t1crdem (2) t1how (3)  
 t1what (4) t1fast (5) t1hard (6) t1effort (7);  
 OUTPUT:  
 tech14; *!request the results of the BLRT*

**4) Mplus input code to estimate the latent transition analysis model**

TITLE: Latent Transition Analysis

DATA: FILE = data.dat;

*[VARIABLE command is specified in the same way as in the cross-sectional analyses; demands-resources indicators from all three data points are used]*

CLASSES = c1 (4) c1 (4) c3 (4); *!defines three categorical latent variables*

*!for three time points respectively with 4 classes each*

*[ANALYSIS command is specified in the same way as in the cross-sectional analyses]*

MODEL:

%OVERALL%

MODEL C1: *!specifies the model at time 1*

%C1#1%

[t1learn\$1] ; [t1crdem\$1] ; [t1how\$1] ; [t1what\$1]; [t1hard\$1] ; [t1fast\$1] ; [t1effort\$1];

%C1#2%

[t1learn\$1] ; [t1crdem\$1] ; [t1how\$1] ; [t1what\$1]; [t1hard\$1] ; [t1fast\$1] ; [t1effort\$1];

%C1#3%

[t1learn\$1] ; [t1crdem\$1] ; [t1how\$1] ; [t1what\$1]; [t1hard\$1] ; [t1fast\$1] ; [t1effort\$1];

%C1#4%

[t1learn\$1] ; [t1crdem\$1] ; [t1how\$1] ; [t1what\$1]; [t1hard\$1] ; [t1fast\$1] ; [t1effort\$1];

MODEL C2: *!specifies the model at time 2*

%C2#1%

[t2learn\$1] ; [t2crdem\$1] ; [t2how\$1] ; [t2what\$1]; [t2hard\$1] ; [t2fast\$1] ; [t2effort\$1];

%C2#2%

[t2learn\$1] ; [t2crdem\$1] ; [t2how\$1] ; [t2what\$1]; [t2hard\$1] ; [t2fast\$1] ; [t2effort\$1];

%C2#3%

[t2learn\$1] ; [t2crdem\$1] ; [t2how\$1] ; [t2what\$1]; [t2hard\$1] ; [t2fast\$1] ; [t2effort\$1];

%C2#4%

[t2learn\$1] ; [t2crdem\$1] ; [t2how\$1] ; [t2what\$1]; [t2hard\$1] ; [t2fast\$1] ; [t2effort\$1];

MODEL C3: *!specifies the model at time 3*

%C3#1%

[t3learn\$1] ; [t3crdem\$1] ; [t3how\$1] ; [t3what\$1]; [t3hard\$1] ; [t3fast\$1] ; [t3effort\$1];

%C3#2%

[t3learn\$1] ; [t3crdem\$1] ; [t3how\$1] ; [t3what\$1]; [t3hard\$1] ; [t3fast\$1] ; [t3effort\$1];

%C3#3%

[t3learn\$1] ; [t3crdem\$1] ; [t3how\$1] ; [t3what\$1]; [t3hard\$1] ; [t3fast\$1] ; [t3effort\$1];

%C3#4%

[t3learn\$1] ; [t3crdem\$1] ; [t3how\$1] ; [t3what\$1]; [t3hard\$1] ; [t3fast\$1] ; [t3effort\$1];

**5) Mplus input code to estimate the latent transition analysis model with measurement invariance across time points**

TITLE: Latent Transition Analysis

DATA: FILE = data.dat;

*[VARIABLE and ANALYSIS commands are specified as before]*

MODEL:

%OVERALL%

MODEL C1: *!specifies the model at time 1 with constraints on thresholds*

%C1#1%

[t1learn\$1] (11) ; [t1crdem\$1] (12); [t1how\$1] (13); [t1what\$1] (14); [t1hard\$1] (15) ; [t1fast\$1] (16); [t1effort\$1] (17);

%C1#2%

[t1learn\$1] (21) ; [t1crdem\$1] (22); [t1how\$1] (23); [t1what\$1] (24); [t1hard\$1] (25) ; [t1fast\$1] (26); [t1effort\$1] (27);

%C1#3%

[t1learn\$1] (31) ; [t1crdem\$1] (32); [t1how\$1] (33); [t1what\$1] (34); [t1hard\$1] (35) ; [t1fast\$1] (36); [t1effort\$1] (37);

%C1#4%

[t1learn\$1] (41) ; [t1crdem\$1] (42); [t1how\$1] (43); [t1what\$1] (44); [t1hard\$1] (45) ; [t1fast\$1] (46); [t1effort\$1] (47);

MODEL C2: *!specifies the model at time 2 with constraints on thresholds*

%C2#1%

[ t2learn\$1] (11) ; [ t2crdem\$1] (12); [ t2how\$1] (13); [ t2what\$1] (14); [ t2hard\$1] (15) ; [ t2fast\$1] (16); [ t2effort\$1] (17);

%C2#2%

[ t2learn\$1] (21) ; [ t2crdem\$1] (22); [ t2how\$1] (23); [ t2what\$1] (24); [ t2hard\$1] (25) ; [ t2fast\$1] (26); [ t2effort\$1] (27);

%C2#3%

[ t2learn\$1] (31) ; [ t2crdem\$1] (32); [ t2how\$1] (33); [ t2what\$1] (34); [ t2hard\$1] (35) ; [ t2fast\$1] (36); [ t2effort\$1] (37);

%C2#4%

[ t2learn\$1] (41) ; [ t2crdem\$1] (42); [ t2how\$1] (43); [ t2what\$1] (44); [ t2hard\$1] (45) ; [ t2fast\$1] (46); [ t2effort\$1] (47);

MODEL C3: *!specifies the model at time 3 with constraints on thresholds*

%C3#1%

[ t3learn\$1] (11) ; [ t3crdem\$1] (12); [ t3how\$1] (13); [ t3what\$1] (14); [ t3hard\$1] (15) ; [ t3fast\$1] (16); [ t3effort\$1] (17);

%C3#2%

[ t3learn\$1] (21) ; [ t3crdem\$1] (22); [ t3how\$1] (23); [ t3what\$1] (24); [ t3hard\$1] (25) ; [ t3fast\$1] (26); [ t3effort\$1] (27);

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%C3#3%

[ t3learn\$1] (31) ; [ t3crdem\$1] (32); [ t3how\$1] (33); [ t3what\$1] (34); [ t3hard\$1] (35) ; [ t3fast\$1] (36); [ t3effort\$1] (37);

%C3#4%

[ t3learn\$1] (41) ; [ t3crdem\$1] (42); [ t3how\$1] (43); [ t3what\$1] (44); [ t3hard\$1] (45) ; [ t3fast\$1] (46); [ t3effort\$1] (47);

OUTPUT:

svalues; *!requests model starting values*

tech15; *!requests estimated transition probabilities for the class variables*

**6) Mplus input code for the three-step procedure to account for measurement error using classify-analyze strategy**

For information about the three step procedure please see:

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, 0(July), 1–13. doi:10.1080/10705511.2014.915181

Nylund-Gibson, K., Grimm, R., Quirk, M., & Furlong, M. (2014). A latent transition mixture model using the three-step specification. *Structural Equation Modeling: A Multidisciplinary Journal*, (February 2015), 1–16. doi:10.1080/10705511.2014.915375

**STEP 1**

First, we saved the starting values of the latent transition analysis model with measurement invariance across time points using Mplus input presented in point 4 in this supplementary material.

**STEP 2**

Second, we saved the classification into participants' most probable latent class. We fixed the measurement model of latent classes using the starting values from step 1. This has to be done separately for each categorical latent variable.

***Mplus input file for the time 1 categorical latent variable:***

DATA: FILE = data.dat;

VARIABLE:

*[NAMES specified as before]*

MISSING ARE ALL (-9); *!defines missing values coding*

USEVARIABLES ARE *!list of variables for the analysis at time 1*

t1learn t1crdem t1how t1what t1fast t1hard t1effort;

CATEGORICAL = all; *!specifies all used variables as categorical*

CLASSES = c1 (4); *!defines categorical latent variable c1 at time 1 with 4 latent classes*

AUXILIARY = *!defines variables that will not be used in the analyses*

*! but will be included in the "savedata" command to enable further use*

t2learn t2crdem t2how t2what t2fast t2hard t2effort

t3learn t3crdem t3how t3what t3fast t3hard t3effort

t1gender t1age t1exe t1tech t2exe t2tech t3exe t3tech

t2ssat t2sburn t3sburn t3ssat t4sburn t4ssat;

ANALYSIS:

TYPE = MIXTURE; *!defines mixture modelling*

STARTS 0; *!no initial random starting values are used since the measurement model is fixed at*

*!the values obtained for the longitudinal model with measurement invariance*

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MODEL:

*%OVERALL% !symbol @ replaces \* to fix the estimate at a specific value*

[ c1#2@1.00655 ];

[ c1#1@1.08878 ];

[ c1#3@0.24792 ];

%C1#2%

[ t1learn\$1@0.50589 ] (1);

[ t1crdem\$1@-0.10454 ] (2);

[ t1how\$1@1.15822 ] (3);

[ t1what\$1@4.59868 ] (4);

[ t1fast\$1@2.41916 ] (5);

[ t1hard\$1@5.11668 ] (6);

[ t1effort\$1@2.62016 ] (7);

%C2#1%

[ t1learn\$1@-0.12372 ] (8);

[ t1crdem\$1@-1.12088 ] (9);

[ t1how\$1@-3.19092 ] (10);

[ t1what\$1@-0.37944 ] (11);

[ t1fast\$1@2.79368 ] (12);

[ t1hard\$1@4.79094 ] (13);

[ t1effort\$1@2.57148 ] (14);

%C2#3%

[ t1learn\$1@0.07057 ] (15);

[ t1crdem\$1@-0.87732 ] (16);

[ t1how\$1@1.46090 ] (17);

[ t1what\$1@3.37868 ] (18);

[ t1fast\$1@-0.89747 ] (19);

[ t1hard\$1@-0.92056 ] (20);

[ t1effort\$1@-0.42118 ] (21);

%C2#4%

[ t1learn\$1@-0.92792 ] (22);

[ t1crdem\$1@-1.98470 ] (23);

[ t1how\$1@-15 ] (24);

[ t1what\$1@-0.37149 ] (25);

[ t1fast\$1@-0.44296 ] (26);

[ t1hard\$1@-1.03830 ] (27);

[ t1effort\$1@-0.23139 ] (28);

*!the following command saves the most probable classification at time 1*

SAVEDATA: file=c1.dat; save=cprob; missflag = 999;

***Mplus input file for the time 2 categorical latent variable:***

```

DATA: FILE = c1.dat;
VARIABLE: NAMES =
t1learn t1crdem t1how t1what t1fast t1hard t1effort
t2learn t2crdem t2how t2what t2fast t2hard t2effort
t3learn t3crdem t3how t3what t3fast t3hard t3effort
t1gender t1age t1exe t1tech t2exe t2tech t3exe t3tech
t2ssat t2sburn t3sburn t3ssat t4sburn t4ssat;
cprob1 cprob2 cprob3 cprob4 n1;
MISSING are all (999); !defines missing values coding
USEVARIABLES ARE !list of variables for the analysis at time 2
t2learn t2crdem t2how t2what t2fast t2hard t2effort;
CATEGORICAL = all; !specifies all used variables as categorical
CLASSES = c2 (4); !defines categorical latent variable c2 at time 2 with 4 latent classes
[AUXILIARY and ANALYSIS commands are specified in the same way as in time 1 input.
MODEL command is also specified in the same way due to the longitudinal measurement
invariance]
SAVEDATA: file=c2.dat; save=cprob; missflag = 999;

```

***Mplus input file for the time 3 categorical latent variable:***

```

DATA: FILE = c2.dat;
VARIABLE: NAMES =
t2learn t2crdem t2how t2what t2fast t2hard t2effort
t1learn t1crdem t1how t1what t1fast t1hard t1effort
t3learn t3crdem t3how t3what t3fast t3hard t3effort
t1gender t1age t1exe t1tech t2exe t2tech t3exe t3tech
t2ssat t2sburn t3sburn t3ssat t4sburn t4ssat;
n1 cprob1 cprob2 cprob3 cprob4 n2;
MISSING are all (999); !defines missing values coding
USEVARIABLES ARE !list of variables for the analysis at time 3
t3learn t3crdem t3how t3what t3fast t3hard t3effort;
CATEGORICAL = all; !specifies all used variables as categorical
CLASSES = c3 (4); !defines categorical latent variable c3 at time 3 with 4 latent classes
[AUXILIARY and ANALYSIS commands are specified in the same way as in time 1 input.
MODEL command is also specified in the same way due to the longitudinal measurement
invariance]
!the following command saves the most probable classification at time 1
SAVEDATA: file=c3.dat; save=cprob; missflag = 999;

```

**STEP 3**

Third, we fixed latent classes at the values established for the time-invariant measurement model while taking into account the measurement error. Please find a detailed description of the procedure in e.g., Nylund, Asparouhov, & Muthén, 2007.

```

DATA: FILE = c3.dat;
VARIABLE: NAMES =
t3learn t3crdem t3how t3what t3fast t3hard t3effort
t1learn t1crdem t1how t1what t1fast t1hard t1effort
t2learn t2crdem t2how t2what t2fast t2hard t2effort
t1gender t1lage t1exe t1tech t2exe t2tech t3exe t3tech
t2ssat t2sburn t3sburn t3ssat t4sburn t4ssat;
n1 n2 cprob1 cprob2 cprob3 cprob4 n3;
MISSING are all (999); !defines missing values coding
USEVARIABLES ARE !list of variables for the analysis at time 3
t3learn t3crdem t3how t3what t3fast t3hard t3effort;
usevar = n2 n3 n4; !modal classes assignment variables
nominal n2 n3 n4;
CLASSES = c1 (4) c2 (4) c3 (4);
ANALYSIS:
TYPE = MIXTURE;STARTS = 0;
MODEL:
%OVERALL%
c2 on c1; c3 on c2; !specifies an autoregressive structure
Model c1:
!Mixed model is specified to have just one indicator, a class assignment variable, and it is fixed
!at a value representing measurement error of the assignment. The values are obtained from the
!Step 2 output named "Logits for the Classification Probabilities for the Most Likely Latent
!Class Membership"
%C1#1%
[n1#1@4.427]; [n1#2@2.011]; [n1#3@-1.807];
%C1#2%
[n1#1@4.811]; [n1#2@6.417]; [n1#3@1.952];
%C1#3%
[n1#1@-1.035]; [n1#2@0.586]; [n1#3@2.043];
%C1#4%
[n1#1@-1.427]; [n1#2@-5.011]; [n1#3@-2.415];
Model c2:
%C2#1%
[n2#1@4.359]; [n2#2@1.803]; [n2#3@-2.071];
%C2#2%

```

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[n2#1@4.799]; [n2#2@6.532]; [n2#3@2.200];

%C2#3%

[n2#1@-1.266]; [n2#2@0.354]; [n2#3@2.102];

%C2#4%

[n2#1@-1.431]; [n2#2@-5/296]; [n2#3@-2.840];

Model c3:

%C3#1%

[n3#1@4.713]; [n3#2@2.619]; [n3#3@-0.986];

%C3#2%

[n3#1@5.608]; [n3#2@7.536]; [n3#3@3.201];

%C3#3%

[n3#1@-0.593]; [n3#2@1.148]; [n3#3@2.789];

%C3#4%

[n3#1@-1.287]; [n3#2@-4.024]; [n3#3@-1.729];

OUTPUT:

tech15; *!requests estimated transition probabilities for the class variables*

**7) Mplus input code to estimate the autoregressive latent transition analysis model with stationary transition probabilities**

To specify stationary transition probabilities, the code used for defining an autoregressive structure was replaced with the following code:

```
c1#1 ON c1#1 (t11);
c2#1 ON c1#2 (t12);
c2#1 ON c1#3 (t13);
c2#2 ON c1#1 (t21);
c2#2 ON c1#2 (t22);
c2#2 ON c1#3 (t23);
c2#3 ON c1#1 (t31);
c2#3 ON c1#2 (t32);
c2#3 ON c1#3 (t33);
c3#1 ON c2#1 (t11);
c3#1 ON c2#2 (t12);
c3#1 ON c2#3 (t13);
c3#2 ON c2#1 (t21);
c3#2 ON c2#2 (t22);
c3#2 ON c2#3 (t23);
c3#3 ON c2#1 (t31);
c3#3 ON c2#2 (t32);
c3#3 ON c2#3 (t33);
```

**8) Mplus input code to estimate the autoregressive latent transition analysis model with covariates**

To include the covariates in the model and to specify their time-invariant effects, the following code was added under MODEL OVERALL command:

```
c1 on t1age t1gender (d1-d6);
c1 on t1exe t1tech (o1-o6);
c2 on t1age t1gender (d1-d6);
c2 on t2exe t2tech (o1-o6);
c3 on t1age t1gender (d1-d6);
c3 on t3exe t3tech (o1-o6);
```

**9) Mplus input code to estimate the autoregressive latent transition analysis model with distal outcomes**

To estimate means of the distal outcomes for each class, the following MODEL command was used (this is an example for job satisfaction, the same code was used for exhaustion):

Model c1:

%C1#1%

[n1#1@4.427]; [n1#2@2.011]; [n1#3@-1.807];

[t2ssat] (a1); t2ssat; *!outcome means were labeled for each time point and each class*

%C1#2%

[n1#1@4.811]; [n1#2@6.417]; [n1#3@1.952];

[t2ssat] (a2); t2ssat;

%C1#3%

[n1#1@-1.035]; [n1#2@0.586]; [n1#3@2.043];

[t2ssat] (a3); t2ssat;

%C1#4%

[n1#1@-1.427]; [n1#2@-5.011]; [n1#3@-2.415];

[t2ssat] (a4); t2ssat;

Model c2:

%C2#1%

[n2#1@4.359]; [n2#2@1.803]; [n2#3@-2.071];

[t3ssat] (b1); t3ssat;

%C2#2%

[n2#1@4.799]; [n2#2@6.532]; [n2#3@2.200];

[t3ssat] (b2); t3ssat;

%C2#3%

[n2#1@-1.266]; [n2#2@0.354]; [n2#3@2.102];

[t3ssat] (b3); t3ssat;

%C2#4%

[n2#1@-1.431]; [n2#2@-5/296]; [n2#3@-2.840];

[t3ssat] (b4); t3ssat;

Model c3:

%C3#1%

[n3#1@4.713]; [n3#2@2.619]; [n3#3@-0.986];

[t4ssat] (c1); t4ssat;

%C3#2%

[n3#1@5.608]; [n3#2@7.536]; [n3#3@3.201];

[t4ssat] (c1); t4ssat;

%C3#3%

[n3#1@-0.593]; [n3#2@1.148]; [n3#3@2.789];

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```
[t4ssat] (c2); t4ssat;  
%C3#4%  
[n3#1@-1.287]; [n3#2@-4.024]; [n3#3@-1.729];  
[t4ssat] (c3); t4ssat;
```

MODEL CONSTRAINT: *!defines comparisons between classes*

```
new (a12 a13 a14 a23 a24 a34 b12 b13 b14 b23 b24 b34  
c12 c13 c14 c23 c24 c34 ab1 ab2 ab3 ab4  
bc1 bc2 bc3 bc4 ac1 ac2 ac3 ac4);
```

*!within-time comparisons*

```
a12 = a1-a2; a13 = a1-a3; a14 = a1-a4; a23 = a2-a3;  
a24 = a2-a4; a34 = a3-a4; b12 = b1-b2; b13 = b1-b3;  
b14 = b1-b4; b23 = b2-b3; b24 = b2-b4; b34 = b3-b4;  
c12 = c1-c2; c13 = c1-c3; c14 = c1-c4; c23 = c2-c3;  
c24 = c2-c4; c34 = c3-c4;
```

*!between time comparisons*

```
ab1 = a1-b1; ab2 = a2-b2; ab3 = a3-b3; ab4 = a4-b4;  
bc1 = b1-c1; bc2 = b2-c2; bc3 = b3-c3; bc4 = b4-c4;  
ac1 = a1-c1; ac2 = a2-c2; ac3 = a3-c3; ac4 = a4-c4;
```