

**Common and Unique Latent Transition Analysis (CULTA) as a Way to Examine the  
Trait-State Dynamics of Alcohol Intoxication**

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**Common and Unique Latent Transition Analysis (CULTA) as a Way to Examine the  
Trait-State Dynamics of Alcohol Intoxication**

**Mplus Input File for the Empirical Data Analysis**

**Final Model**

TITLE:

2-Profile CULTA with Covariate (Final);

DATA:

FILE = \_\_DATA\_\_;

VARIABLE:

NAMES =

id x

y1t0 y2t0 y3t0 y4t0 y1t1 y2t1 y3t1 y4t1

y1t2 y2t2 y3t2 y4t2 y1t3 y2t3 y3t3 y4t3

y1t4 y2t4 y3t4 y4t4 y1t5 y2t5 y3t5 y4t5

;

USEVARIABLES =

x

y1t0 y2t0 y3t0 y4t0 y1t1 y2t1 y3t1 y4t1

y1t2 y2t2 y3t2 y4t2 y1t3 y2t3 y3t3 y4t3

y1t4 y2t4 y3t4 y4t4 y1t5 y2t5 y3t5 y4t5

;

IDVARIABLE = id;

CLASSES = c0(2) c1(2) c2(2) c3(2) c4(2) c5(2);

MISSING = .;

DEFINE:

STANDARDIZE

y1t0 y2t0 y3t0 y4t0 y1t1 y2t1 y3t1 y4t1

y1t2 y2t2 y3t2 y4t2 y1t3 y2t3 y3t3 y4t3

y1t4 y2t4 y3t4 y4t4 y1t5 y2t5 y3t5 y4t5

```

;

ANALYSIS:

  TYPE = MIXTURE;
  STARTS = 200 100;
  STSCALE = 2;
  STITERATIONS = 200;
  PROCESS = __CORES__;
  MODEL = NOCOV;

MODEL:

  %OVERALL%

    ! unique traits -----

    !! factor loadings

    !!! k = 3

    u3 BY y3t0@1;
    u3 BY y3t1@1;
    u3 BY y3t2@1;
    u3 BY y3t3@1;
    u3 BY y3t4@1;
    u3 BY y3t5@1;

    !!! k = 4

    u4 BY y4t0@1;
    u4 BY y4t1@1;
    u4 BY y4t2@1;
    u4 BY y4t3@1;
    u4 BY y4t4@1;
    u4 BY y4t5@1;

    !! latent means

    [ u3@0 ];
    [ u4@0 ];

```

```
!! latent variances
u3 (psip3);
u4 (psip4);

! common states -----

!! factor loadings
!!! t = 0
s0 BY y1t0@1;
s0 BY y2t0 (lambdas2);
s0 BY y3t0 (lambdas3);
s0 BY y4t0 (lambdas4);
!!! t = 1
s1 BY y1t1@1;
s1 BY y2t1 (lambdas2);
s1 BY y3t1 (lambdas3);
s1 BY y4t1 (lambdas4);
!!! t = 2
s2 BY y1t2@1;
s2 BY y2t2 (lambdas2);
s2 BY y3t2 (lambdas3);
s2 BY y4t2 (lambdas4);
!!! t = 3
s3 BY y1t3@1;
s3 BY y2t3 (lambdas2);
s3 BY y3t3 (lambdas3);
s3 BY y4t3 (lambdas4);
!!! t = 4
s4 BY y1t4@1;
s4 BY y2t4 (lambdas2);
s4 BY y3t4 (lambdas3);
s4 BY y4t4 (lambdas4);
```

```
!!! t = 5

s5 BY y1t5@1;

s5 BY y2t5 (lambdas2);

s5 BY y3t5 (lambdas3);

s5 BY y4t5 (lambdas4);


!! latent means

[ s0@0 ];

[ s1@0 ];

[ s2@0 ];

[ s3@0 ];

[ s4@0 ];

[ s5@0 ];


!! latent variance of s0

s0 (psis0);


!! variance of the process noise

s1 (psis);

s2 (psis);

s3 (psis);

s4 (psis);

s5 (psis);


! unique states -----


!! variances

!!! t = 0

y1t0 (theta11);

y2t0 (theta22);

y3t0 (theta33);

y4t0 (theta44);
```

```
!!! t = 1
y1t1 (theta11);
y2t1 (theta22);
y3t1 (theta33);
y4t1 (theta44);

!!! t = 2
y1t2 (theta11);
y2t2 (theta22);
y3t2 (theta33);
y4t2 (theta44);

!!! t = 3
y1t3 (theta11);
y2t3 (theta22);
y3t3 (theta33);
y4t3 (theta44);

!!! t = 4
y1t4 (theta11);
y2t4 (theta22);
y3t4 (theta33);
y4t4 (theta44);

!!! t = 5
y1t5 (theta11);
y2t5 (theta22);
y3t5 (theta33);
y4t5 (theta44);

! constrained intercepts -----

!! t = 0
[ y1t0@0 ];
[ y2t0@0 ];
[ y3t0@0 ];
```

```

[ y4t0@0 ];
!! t = 1
[ y1t1@0 ];
[ y2t1@0 ];
[ y3t1@0 ];
[ y4t1@0 ];
!! t = 2
[ y1t2@0 ];
[ y2t2@0 ];
[ y3t2@0 ];
[ y4t2@0 ];
!! t = 3
[ y1t3@0 ];
[ y2t3@0 ];
[ y3t3@0 ];
[ y4t3@0 ];
!! t = 4
[ y1t4@0 ];
[ y2t4@0 ];
[ y3t4@0 ];
[ y4t4@0 ];
!! t = 5
[ y1t5@0 ];
[ y2t5@0 ];
[ y3t5@0 ];
[ y4t5@0 ];

! lta -----

!! initial profile membership
[ c0#1 ] (nu0);
c0#1 ON x (kappa0);

```

```

!! profile transitions
[ c1#1 ] (alpha0);
[ c2#1 ] (alpha0);
[ c3#1 ] (alpha0);
[ c4#1 ] (alpha0);
[ c5#1 ] (alpha0);
c1#1 ON c0#1 (beta00);
c2#1 ON c1#1 (beta00);
c3#1 ON c2#1 (beta00);
c4#1 ON c3#1 (beta00);
c5#1 ON c4#1 (beta00);

MODEL c0:
%c0#1%
! profile specific means
[ y1t0 ] (mu10);
[ y2t0 ] (mu20);
[ y3t0 ] (mu30);
[ y4t0 ] (mu40);

! covariate
c1 ON x (gamma00);

%c0#2%
! profile specific means
[ y1t0 ] (mu11);
[ y2t0 ] (mu21);
[ y3t0 ] (mu31);
[ y4t0 ] (mu41);

! covariate
c1 ON x (gamma10);

```



```
MODEL c1:
```

```
%c1#1%
```

```
! profile specific means
```

```
[ y1t1 ] (mu10);
```

```
[ y2t1 ] (mu20);
```

```
[ y3t1 ] (mu30);
```

```
[ y4t1 ] (mu40);
```

```
! covariate
```

```
c2 ON x (gamma00);
```

```
! inertia
```

```
s1 ON s0@0 (phi0);
```

```
%c1#2%
```

```
! profile specific means
```

```
[ y1t1 ] (mu11);
```

```
[ y2t1 ] (mu21);
```

```
[ y3t1 ] (mu31);
```

```
[ y4t1 ] (mu41);
```

```
! covariate
```

```
c2 ON x (gamma10);
```

```
! inertia
```

```
s1 ON s0 (phi1);
```

```
MODEL c2:
```

```
%c2#1%
```

```
! profile specific means
```

```
[ y1t2 ] (mu10);
```

```
[ y2t2 ] (mu20);
```

```

[ y3t2 ] (mu30);
[ y4t2 ] (mu40);

! covariate
c3 ON x (gamma00);

! inertia
s2 ON s1@0 (phi0);

%c2#2%

! profile specific means
[ y1t2 ] (mu11);
[ y2t2 ] (mu21);
[ y3t2 ] (mu31);
[ y4t2 ] (mu41);

! covariate
c3 ON x (gamma10);

! inertia
s2 ON s1 (phi1);

MODEL c3:

%c3#1%

! profile specific means
[ y1t3 ] (mu10);
[ y2t3 ] (mu20);
[ y3t3 ] (mu30);
[ y4t3 ] (mu40);

! covariate
c4 ON x (gamma00);

```

```

! inertia
s3 ON s2@0 (phi0);

%c3#2%

! profile specific means
[ y1t3 ] (mu11);
[ y2t3 ] (mu21);
[ y3t3 ] (mu31);
[ y4t3 ] (mu41);

! covariate
c4 ON x (gamma10);

! inertia
s3 ON s2 (phi1);

MODEL c4:

%c4#1%

! profile specific means
[ y1t4 ] (mu10);
[ y2t4 ] (mu20);
[ y3t4 ] (mu30);
[ y4t4 ] (mu40);

! covariate
c5 ON x (gamma00);

! inertia
s4 ON s3@0 (phi0);

%c4#2%

! profile specific means

```

```

[ y1t4 ] (mu11);
[ y2t4 ] (mu21);
[ y3t4 ] (mu31);
[ y4t4 ] (mu41);

! covariate
c5 ON x (gamma10);

! inertia
s4 ON s3 (phi1);

MODEL c5:

%c5#1%

! profile specific means
[ y1t5 ] (mu10);
[ y2t5 ] (mu20);
[ y3t5 ] (mu30);
[ y4t5 ] (mu40);

! inertia
s5 ON s4@0 (phi0);

%c5#2%

! profile specific means
[ y1t5 ] (mu11);
[ y2t5 ] (mu21);
[ y3t5 ] (mu31);
[ y4t5 ] (mu41);

! inertia
s5 ON s4 (phi1);

```

## MODEL CONSTRAINT:

```
! means for the first profile are higher than the second
```

```
mu10 > mu11;
```

```
mu20 > mu21;
```

```
mu30 > mu31;
```

```
mu40 > mu41;
```

```
! make sure variances are greater than zero
```

```
psip3 > 0;
```

```
psip4 > 0;
```

```
psis0 > 0;
```

```
psis > 0;
```

```
theta11 > 0;
```

```
theta22 > 0;
```

```
theta33 > 0;
```

```
theta44 > 0;
```

## OUTPUT:

```
TECH1 TECH3 TECH4 TECH7 TECH8 TECH12 TECH15 ENTROPY;
```

## SAVEDATA:

```
ESTIMATES = __ESTIMATES__;
```

```
RESULTS = __RESULTS__;
```

```
TECH3 = __TECH3__;
```

```
TECH4 = __TECH4__;
```

```
FILE = __CPROB__;
```

```
SAVE = CPROBABILITIES;
```

## Links

### Research Compendium

The data and materials for this study are available on OSF (<https://osf.io/gtdmr>) and GitHub (<https://github.com/jeksterslab/manCULTA>, <https://jeksterslab.github.io/manCULTA/index.html>).

**Data Simulation and Model Fitting**

<https://jeksterslab.github.io/manCULTA/articles/sim-culta-2-profiles.html>

**Comparison of Misspecified and Correctly Specified Models**

- One-Profile CULTA vs. Two-Profile CULTA:

<https://jeksterslab.github.io/manCULTA/articles/sim-culta-1-profile.html>

- Two-Profile LTA vs. Two-Profile CULTA:

<https://jeksterslab.github.io/manCULTA/articles/sim-lta-2-profiles.html>

- Two-Profile RI-LTA vs. Two-Profile CULTA:

<https://jeksterslab.github.io/manCULTA/articles/sim-ri-lta-2-profiles.html>

**Generating Mplus Input Files**

<https://jeksterslab.github.io/manCULTA/articles/sim-input.html>

**Containers for Reproducibility**

<https://jeksterslab.github.io/manCULTA/articles/containers.html>