

# **SEM Application**

# Outline

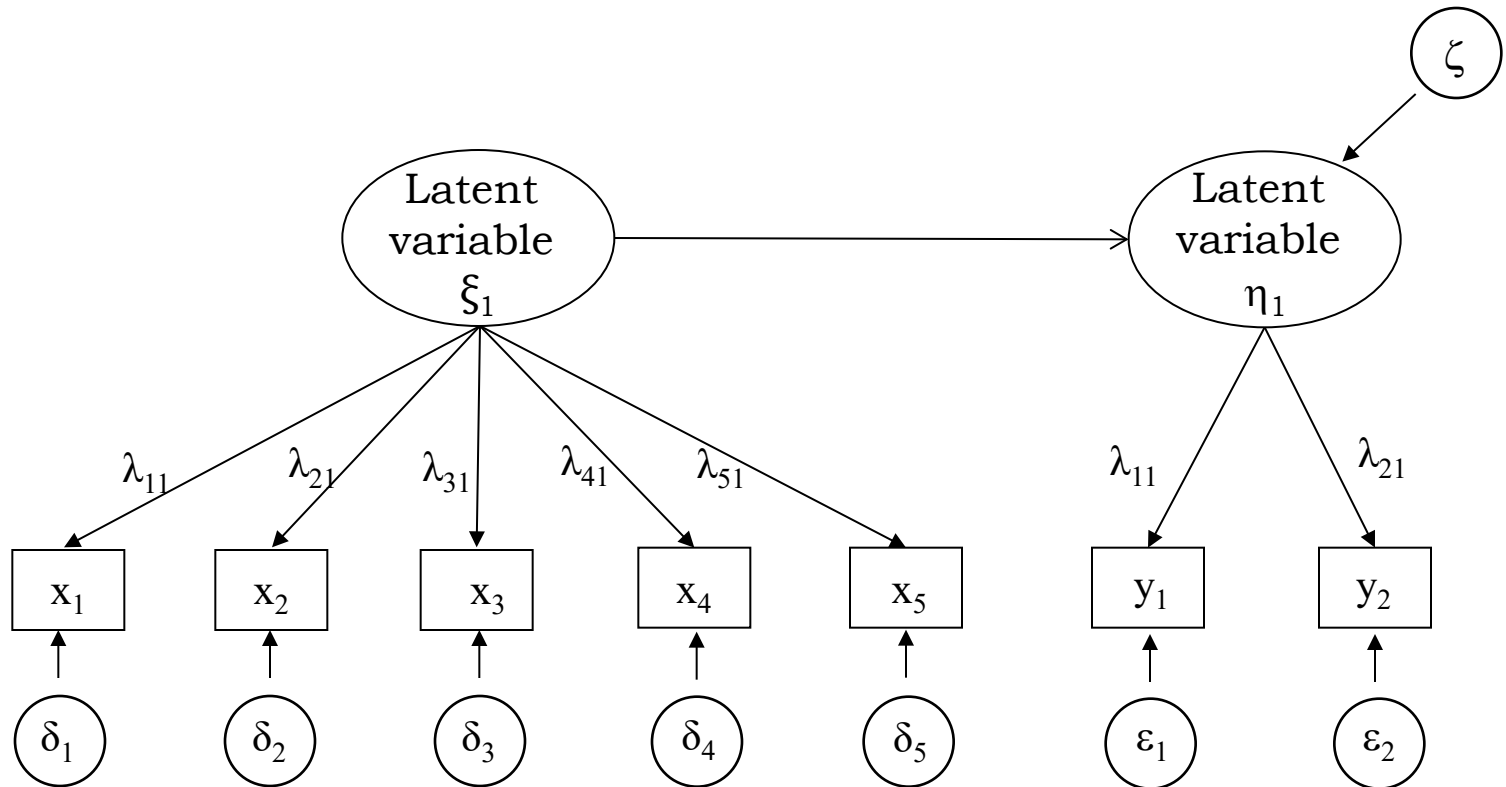
**1. The model**

**2. Check of measurement model 1**

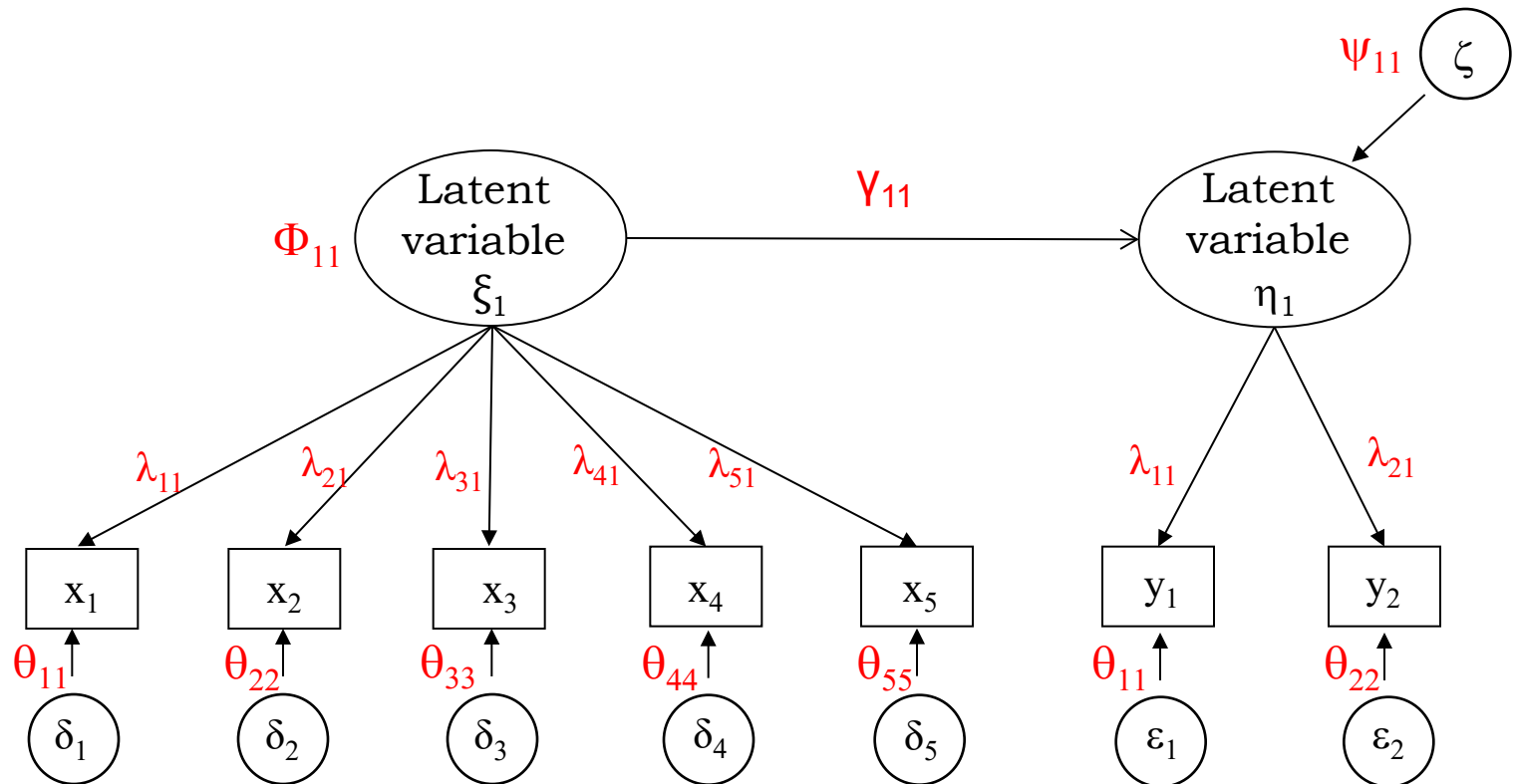
**3. Check of measurement model 2**

**4. Check of the complete model**

# The to-be-investigated model

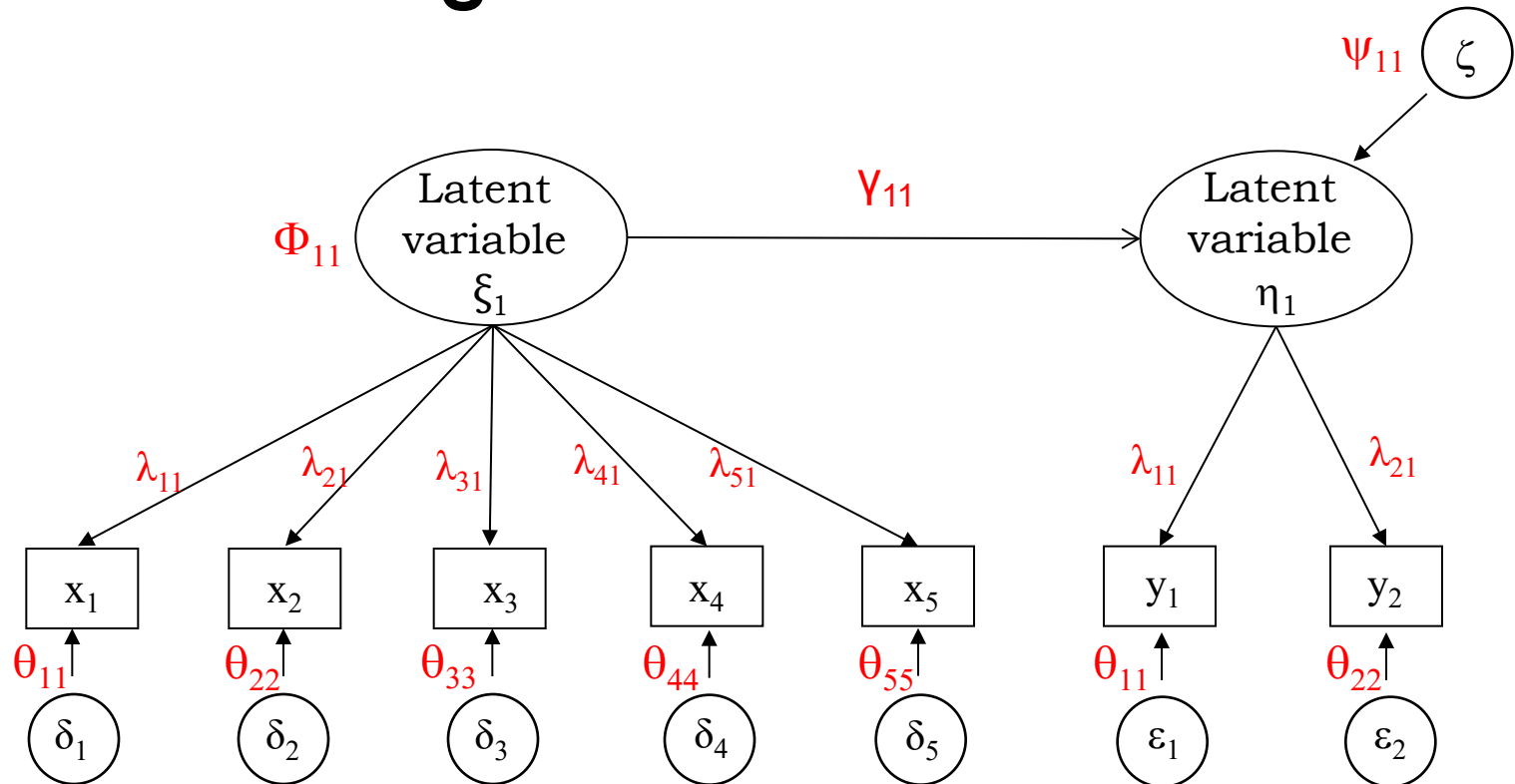


# The to-be-investigated model



# The to-be-investigated model

What are the degrees of freedom ?



... for the whole model ? 11

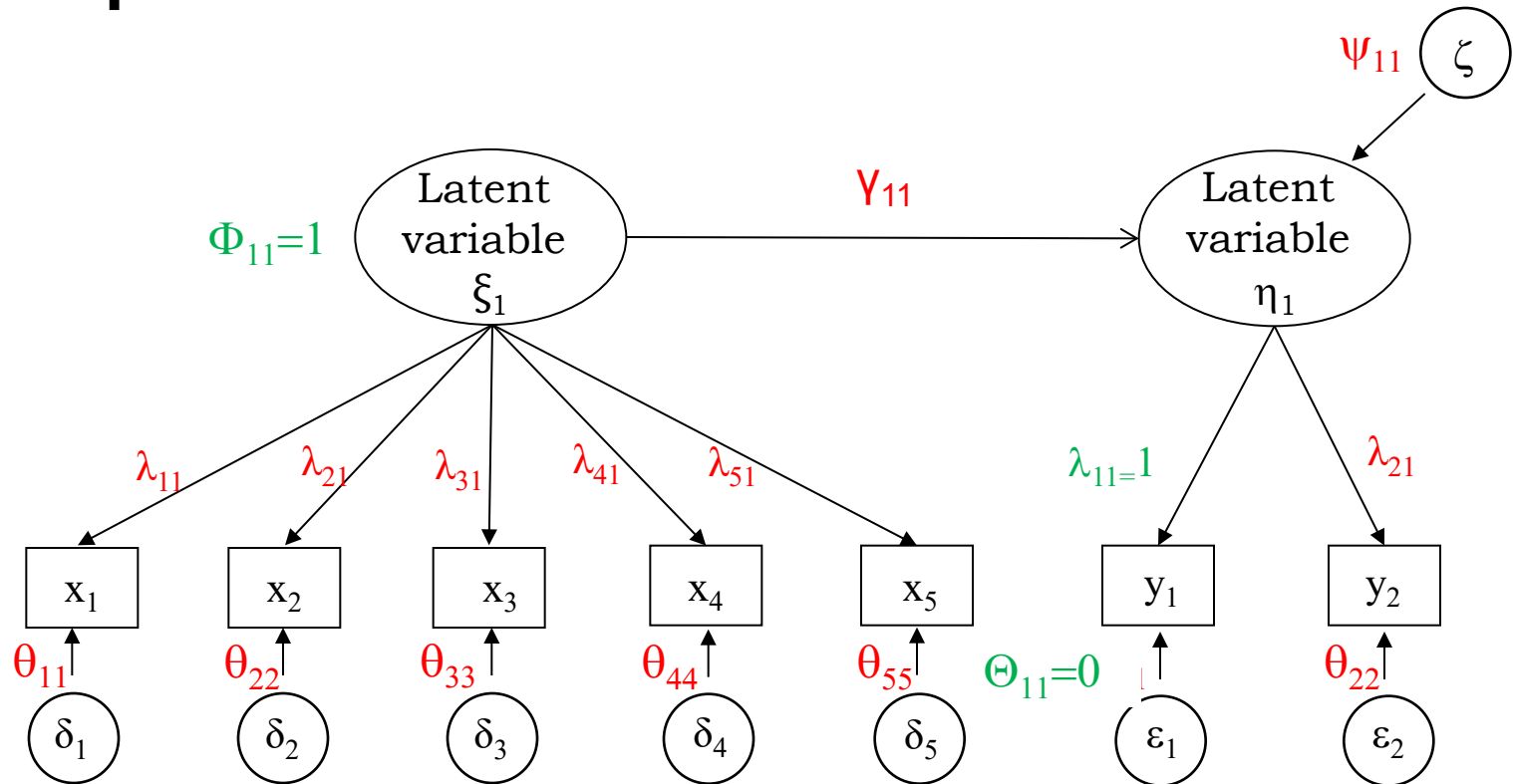
... for the *first* model of measurement ? 4

... for the *second* model of measurement ?

**-2**  
Confirmatory factor analysis

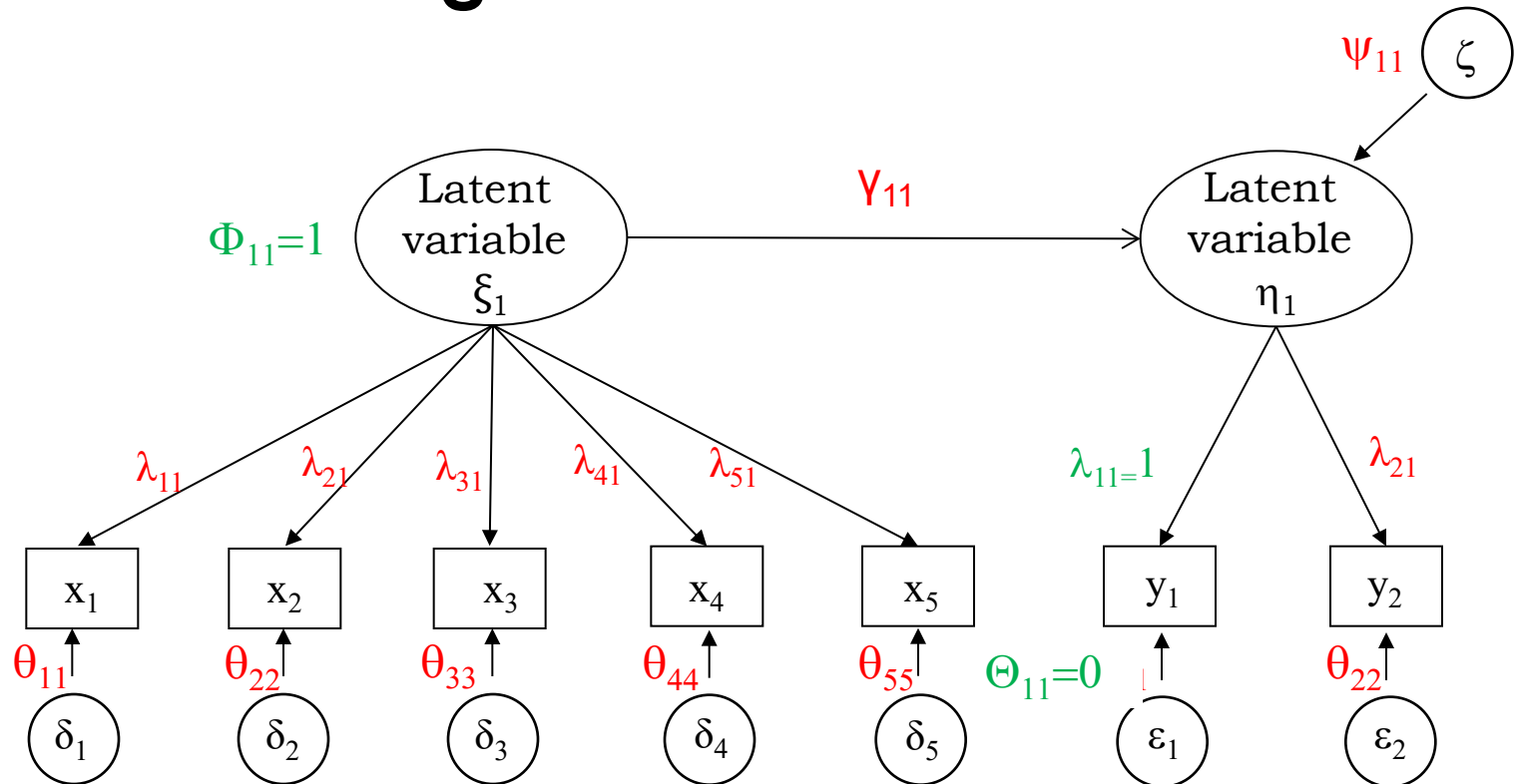
# The to-be-investigated model

Which parameters need to be fixed?



# The to-be-investigated model

What are the degrees of freedom ?



... for the whole model ? 14

... for the *first* model of measurement ? 5

... for the *second* model of measurement ? 0

Confirmatory factor analysis

# Outline

**1. The model**

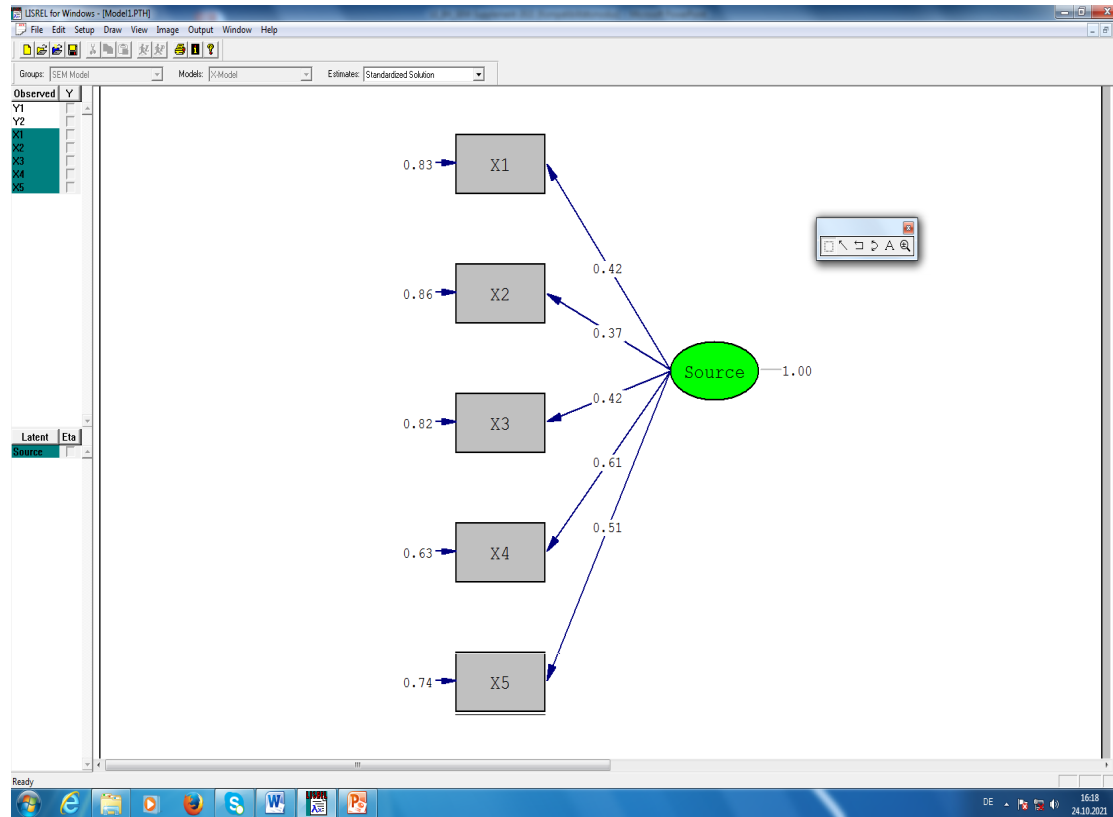
**2. Check of measurement model 1**

**3. Check of measurement model 2**

**4. Check of the complete model**



# Check of measurement model 1



# Check of measurement model 1



# Outline

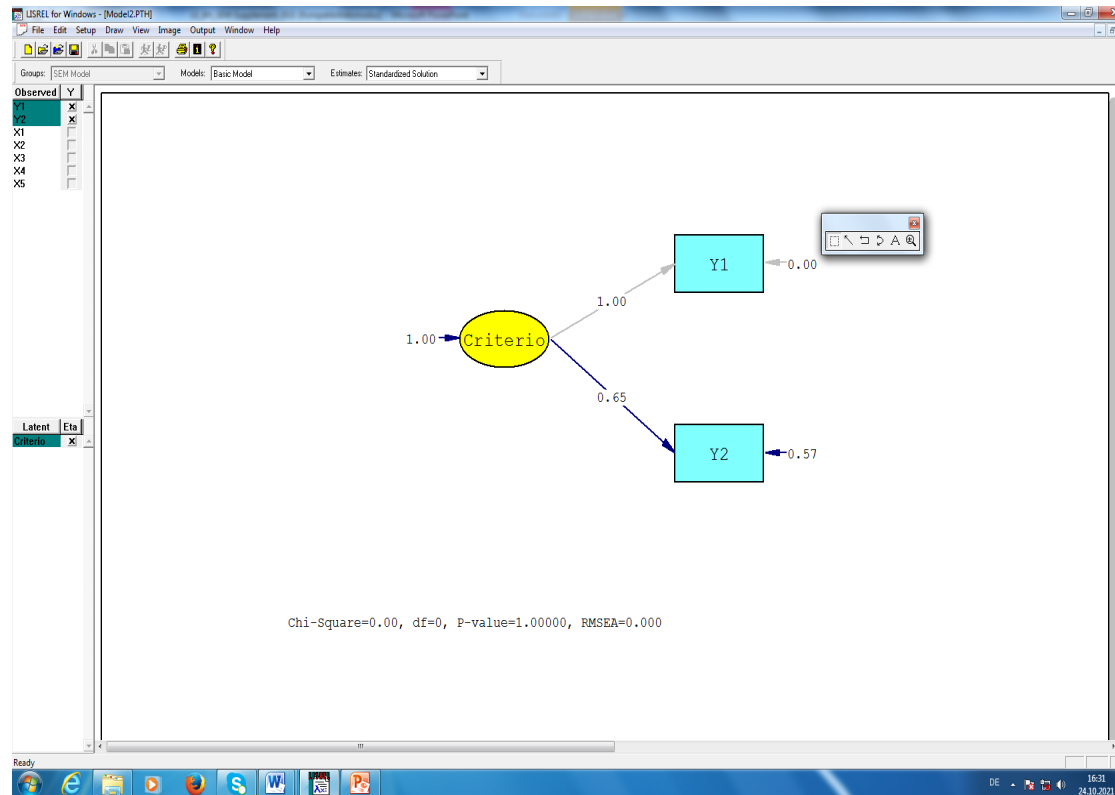
**1. The model**

**2. Check of measurement model 1**

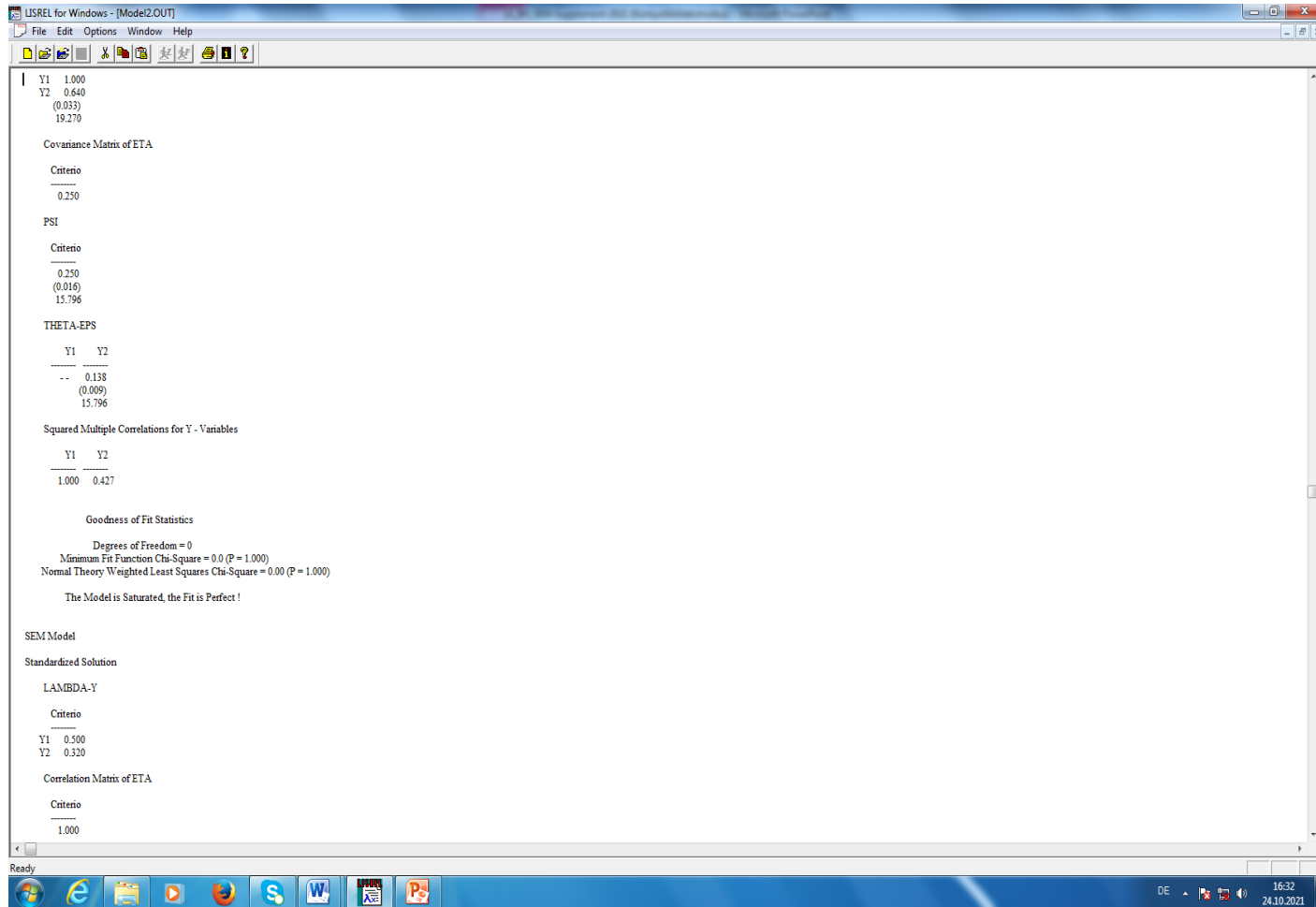
**3. Check of measurement model 2**

**4. Check of the complete model**

# Check of measurement model 2



# Check of measurement model 2



# Outline

**1. The model**

**2. Check of measurement model 1**

**3. Check of measurement model 2**

**4. Check of the complete model**

Observed Y

Y1 X

Y2 X

X1

X2

X3

X4

X5

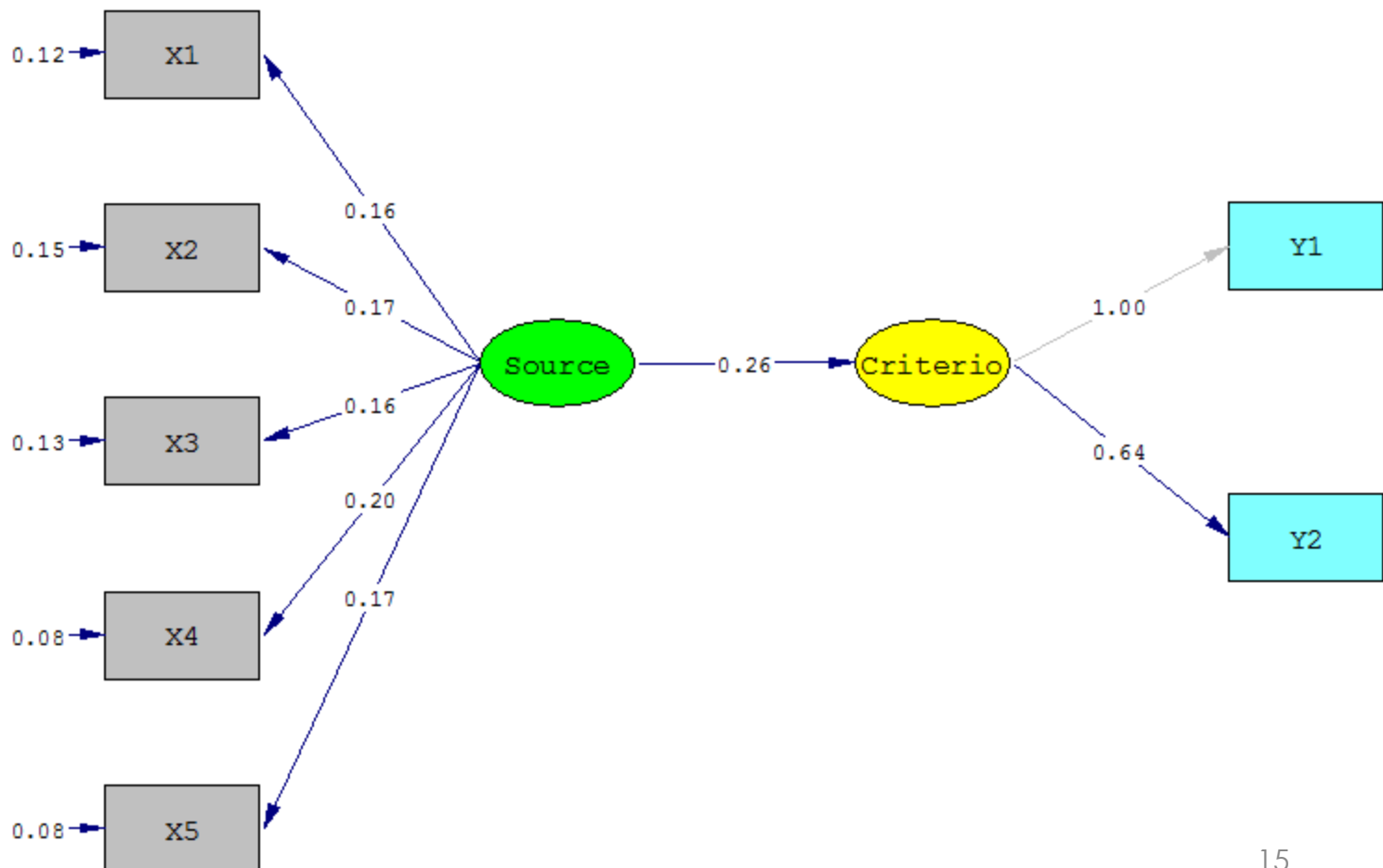
Latent Eta

Criterio X

Source

# Check of complete model

Do not start with this output!





## Goodness of Fit Statistics

Degrees of Freedom = 14

Minimum Fit Function Chi-Square = 19.389 (P = 0.151)

Normal Theory Weighted Least Squares Chi-Square = 19.464 (P = 0.148)

Estimated Non-centrality Parameter (NCP) = 5.464

90 Percent Confidence Interval for NCP = (0.0 ; 21.242)

Minimum Fit Function Value = 0.0389

Population Discrepancy Function Value (F0) = 0.0110

90 Percent Confidence Interval for F0 = (0.0 ; 0.0426)

Root Mean Square Error of Approximation (RMSEA) = 0.0280

90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0551)

P-Value for Test of Close Fit (RMSEA &lt; 0.05) = 0.901

Expected Cross-Validation Index (ECVI) = 0.0951

90 Percent Confidence Interval for ECVI = (0.0842 ; 0.127)

ECVI for Saturated Model = 0.112

ECVI for Independence Model = 1.466

Chi-Square for Independence Model with 21 Degrees of Freedom = 717.733

Independence AIC = 731.733

Model AIC = 47.464

Saturated AIC = 56.000

Independence CAIC = 768.236

Model CAIC = 120.469

Saturated CAIC = 202.009

Normed Fit Index (NFI) = 0.973

Non-Normed Fit Index (NNFI) = 0.988

Parsimony Normed Fit Index (PNFI) = 0.649

Comparative Fit Index (CFI) = 0.992

Incremental Fit Index (IFI) = 0.992

Relative Fit Index (RFI) = 0.959

Critical N (CN) = 751.071

Root Mean Square Residual (RMR) = 0.00540

Standardized RMR = 0.0300

Goodness of Fit Index (GFI) = 0.989

# Check ...



Observed Y

Y1 X

Y2 X

X1

X2

X3

X4

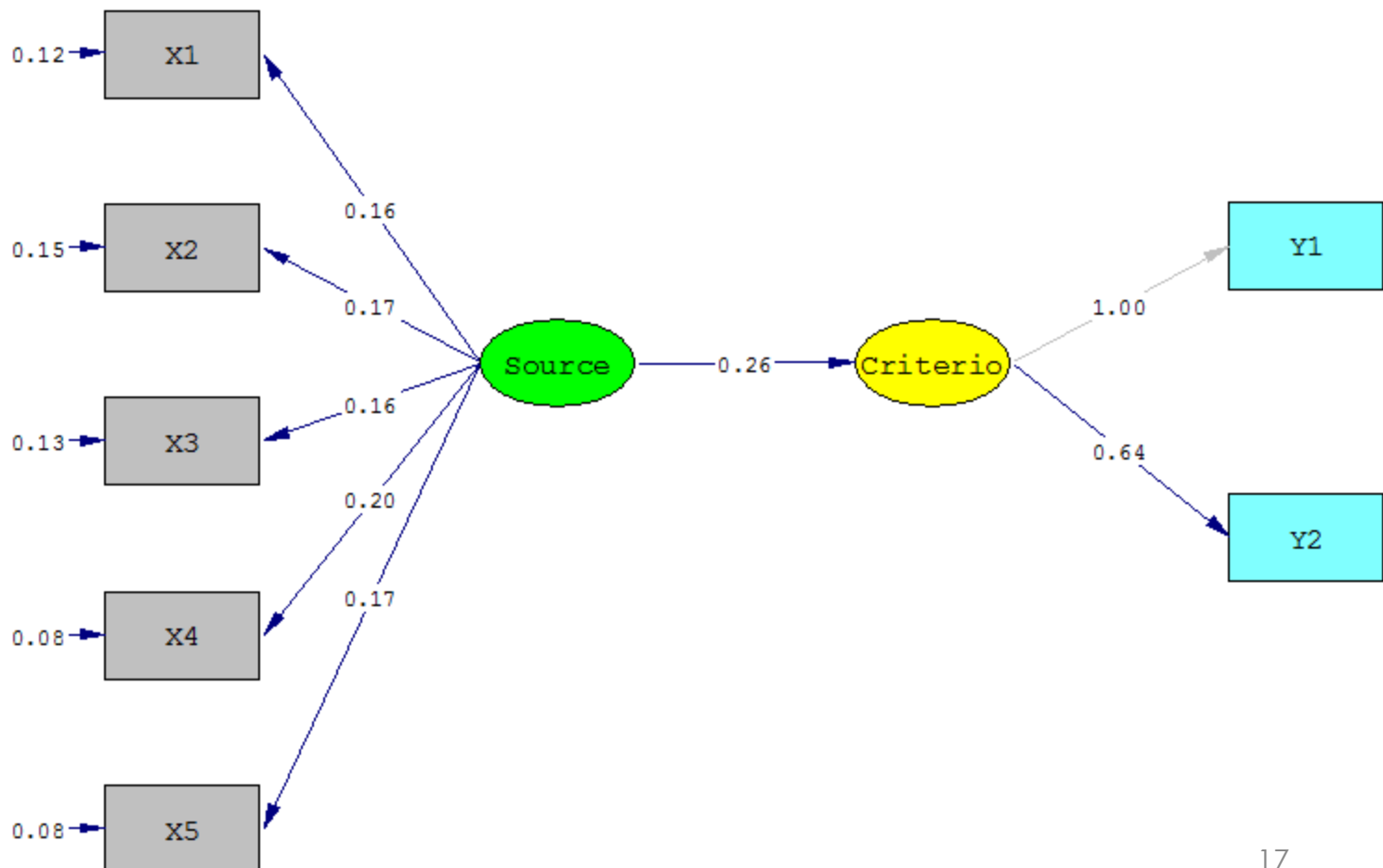
X5

Latent Eta

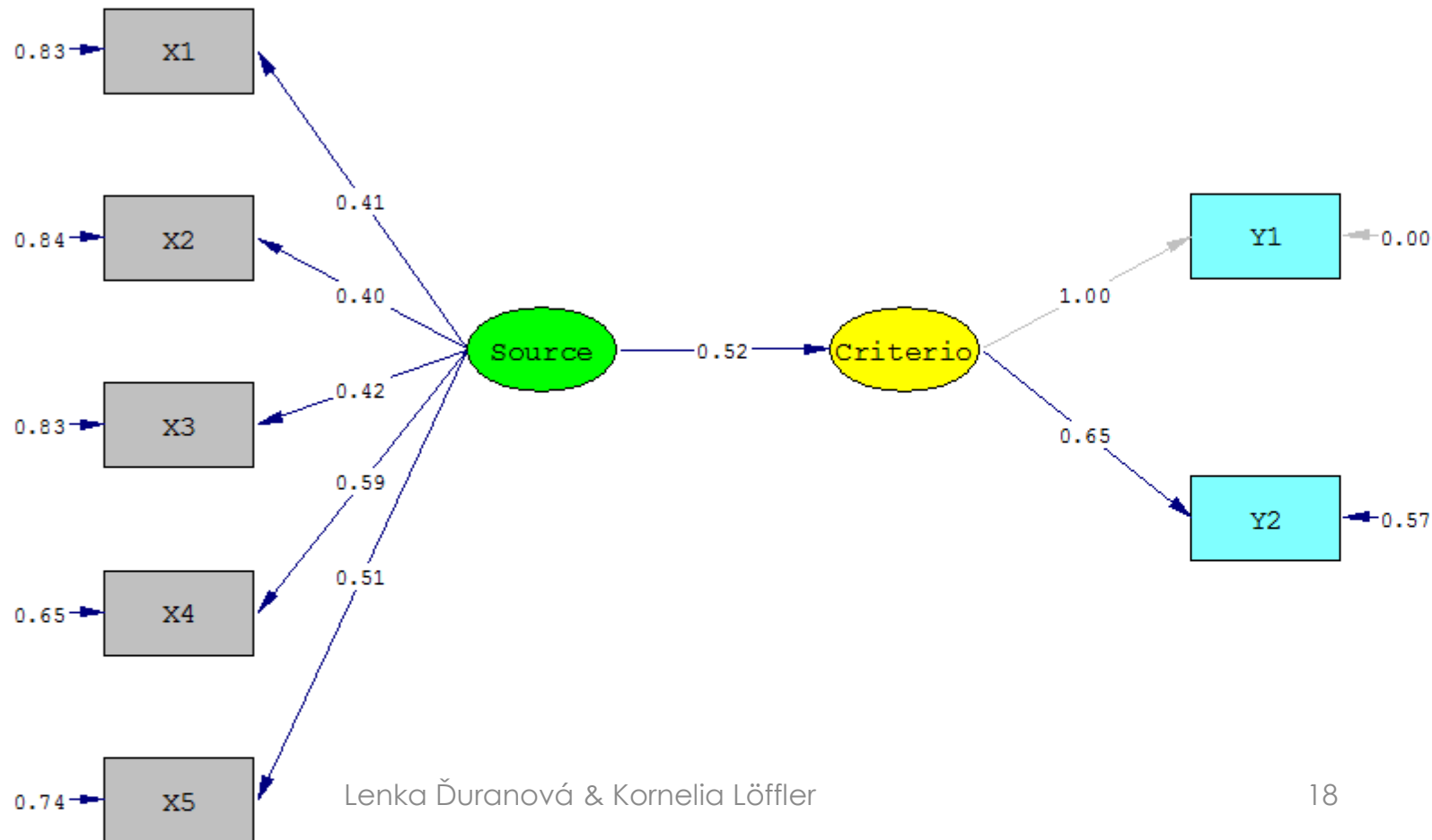
Criterio X

Source

# Check of complete model



# Check of complete model



Number of Iterations = 11

LISREL Estimates (Maximum

## LAMBDA-Y

## EffectLV

Y1	1.000
Y2	0.640
	(0.033)
	19.270

# Check of complete model

Factor loadings on endogenous latent variable

## LAMBDA-X

## SourceLV

X1	0.159
	(0.021)
	7.657
X2	0.167
	(0.023)
	7.303
X3	0.163
	(0.021)
	7.729
X4	0.202
	(0.018)
	10.961
X5	0.168
	(0.017)
	9.592

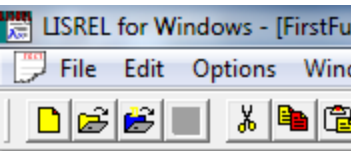
Factor loadings on exogenous latent variable

## GAMMA

## SourceLV

EffectLV	0.259
	(0.027)
	9.672

Gamma coefficient



# Check of complete model

## SEM Model

### Completely Standardized Solution

#### LAMBDA-Y

##### Criterion

Y1	1.000
Y2	0.653

#### LAMBDA-X

##### Source

X1	0.414
X2	0.395
X3	0.417
X4	0.589
X5	0.515

#### GAMMA

##### Source

Criterion	0.519
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### Correlation Matrix of ETA and KSI

##### Criterion      Source

Criterion	1.000	
Source	0.519	1.000

#### PSI

##### Criterion

0.731

**The end**