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Jumpstart Mplus

9. MIMIC models

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Objectives

- What is MIMIC?
- How to use MIMIC in Mplus?

Measurement Invariance

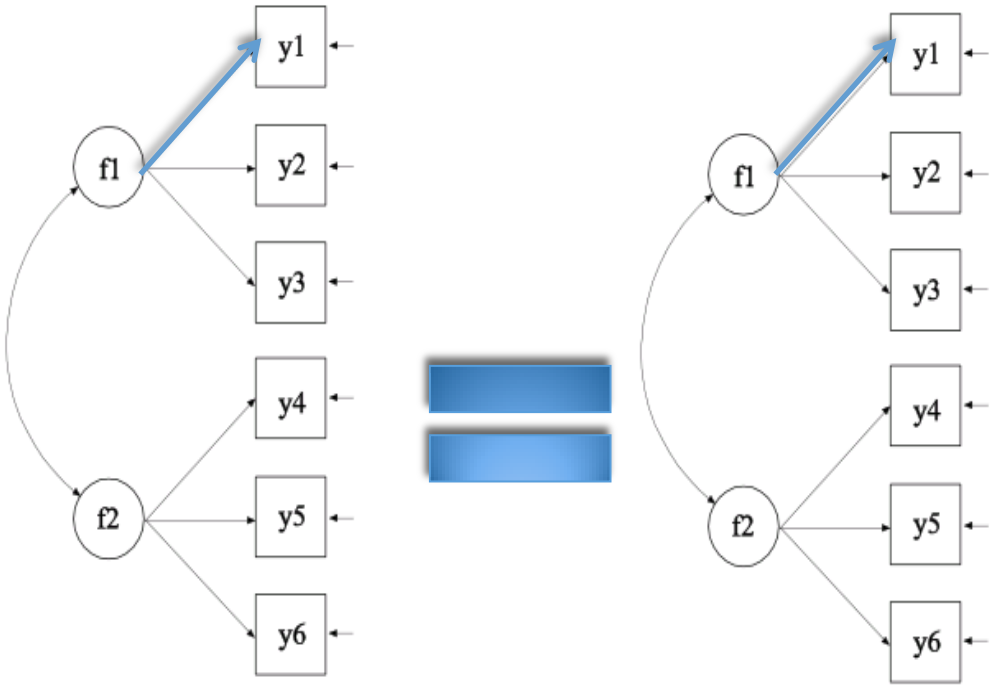
Traditional method

- Confirmatory factor analysis (CFA)

- Covariates must be categorical:
  - Gender, nationality etc…

- Continuous groups must be split in often arbitrary categorical groups:
  - Eg age 12-65: Adolescents- Young adults- Middle-aged Adults

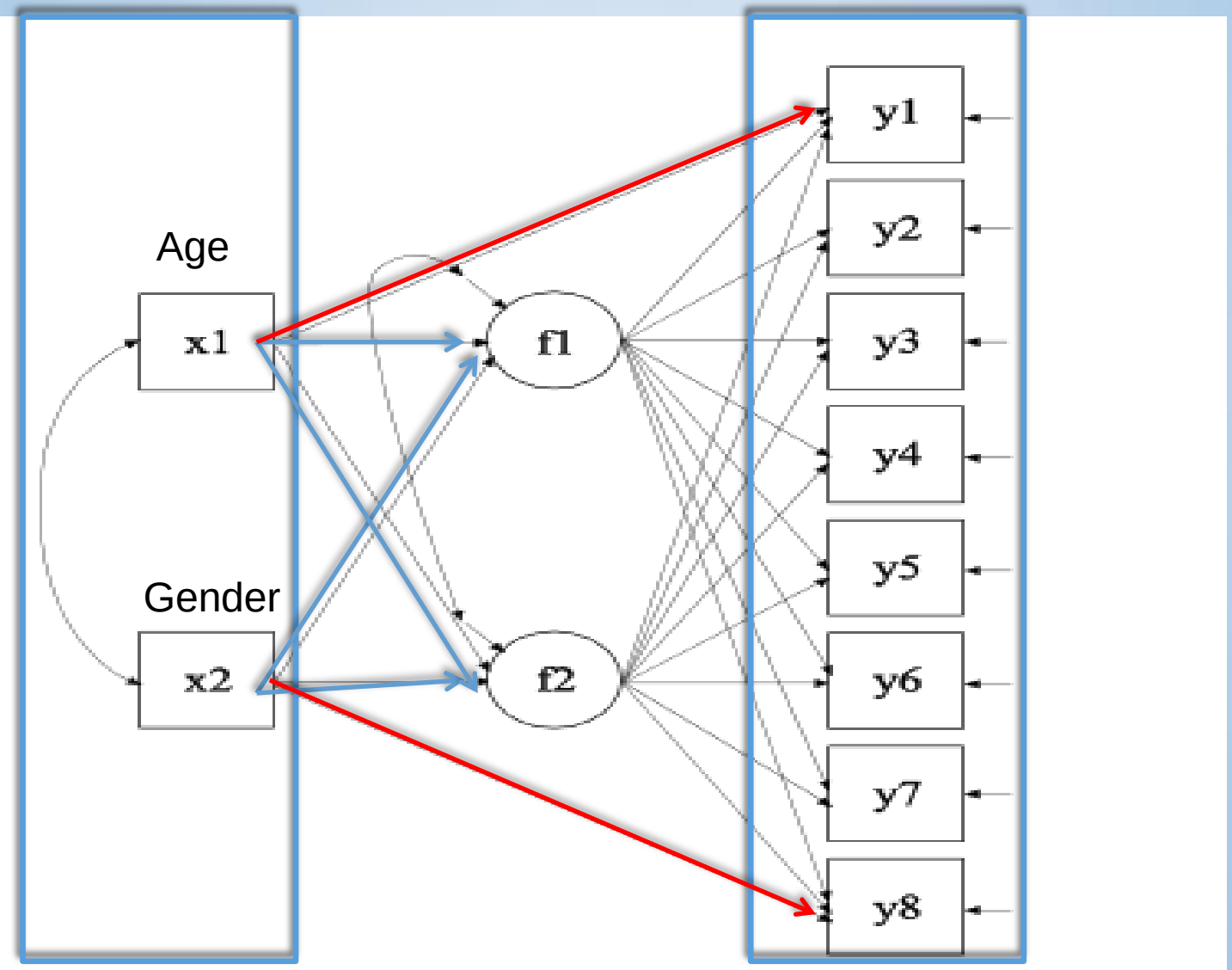
Multigroup CFA



Measurement Invariance MIMIC

- Multiple Indicators MultIple Causes
- Special case of SEM
- Aim: to test the impact of a covariate on a measurement model
  - Regression model: latent variables and observed indicators are regressed on continuous (or categorical) covariates (e.g. age, level of education, gender...).

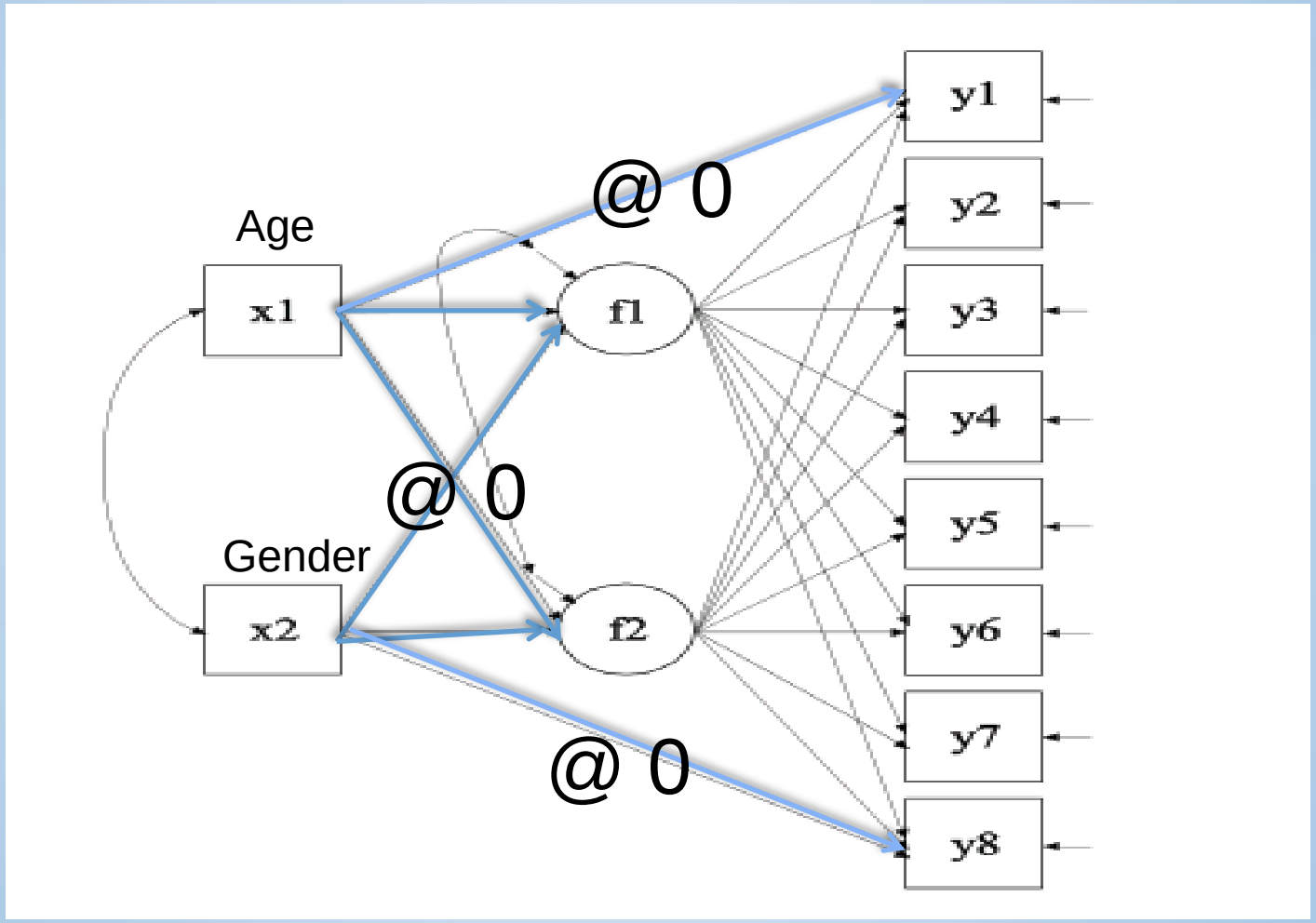
Measurement Invariance MIMIC



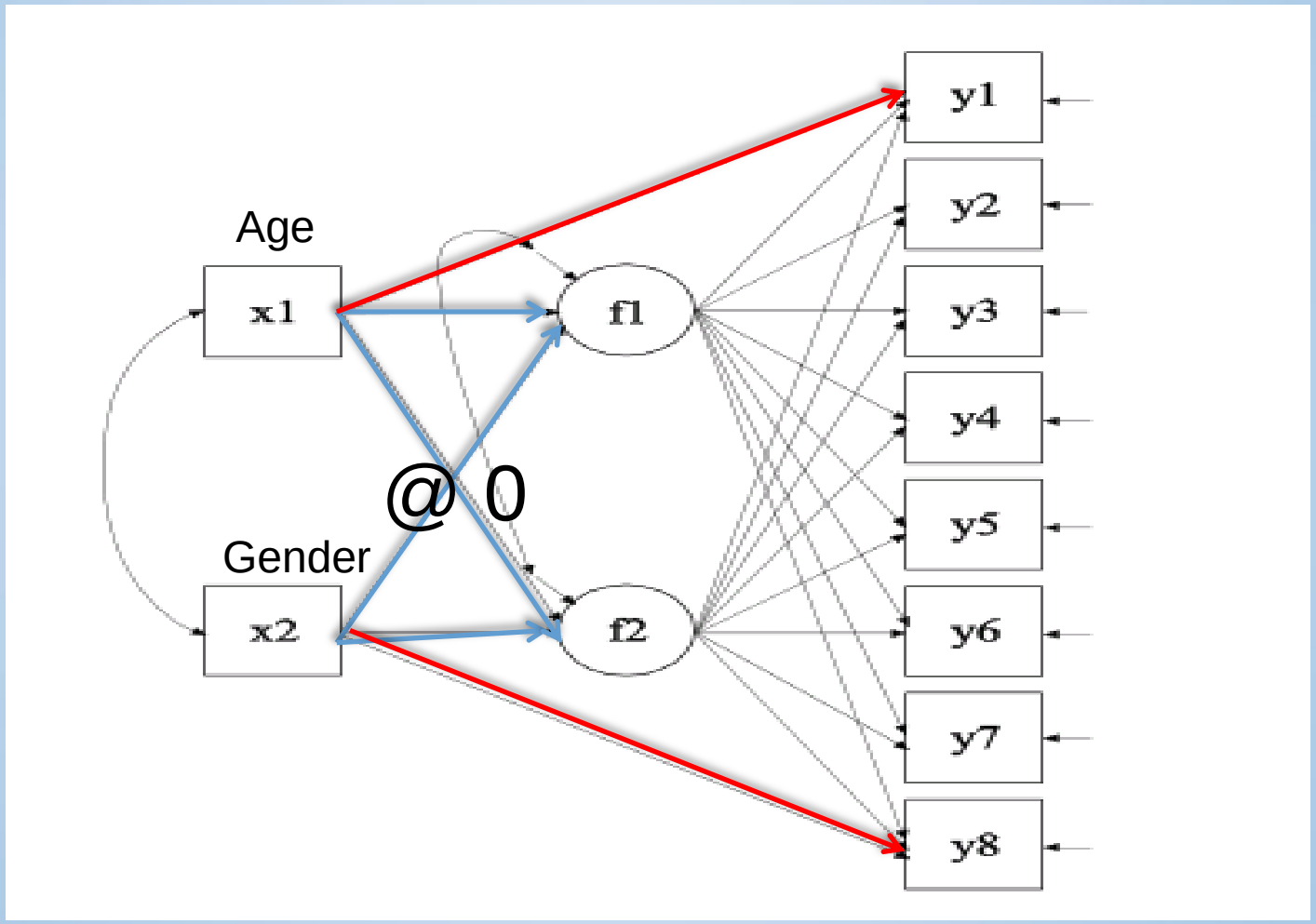
Measurement Invariance MIMIC

- Advantages:
  - Allow continuous and categorical predictors
  - Explore linear relationships between confounding variables and a measurement model
  - Avoid subjective categorisation of a continuous variable (e.g. age, weight, height).
  - Can be combined with multigroup (hybrid model).

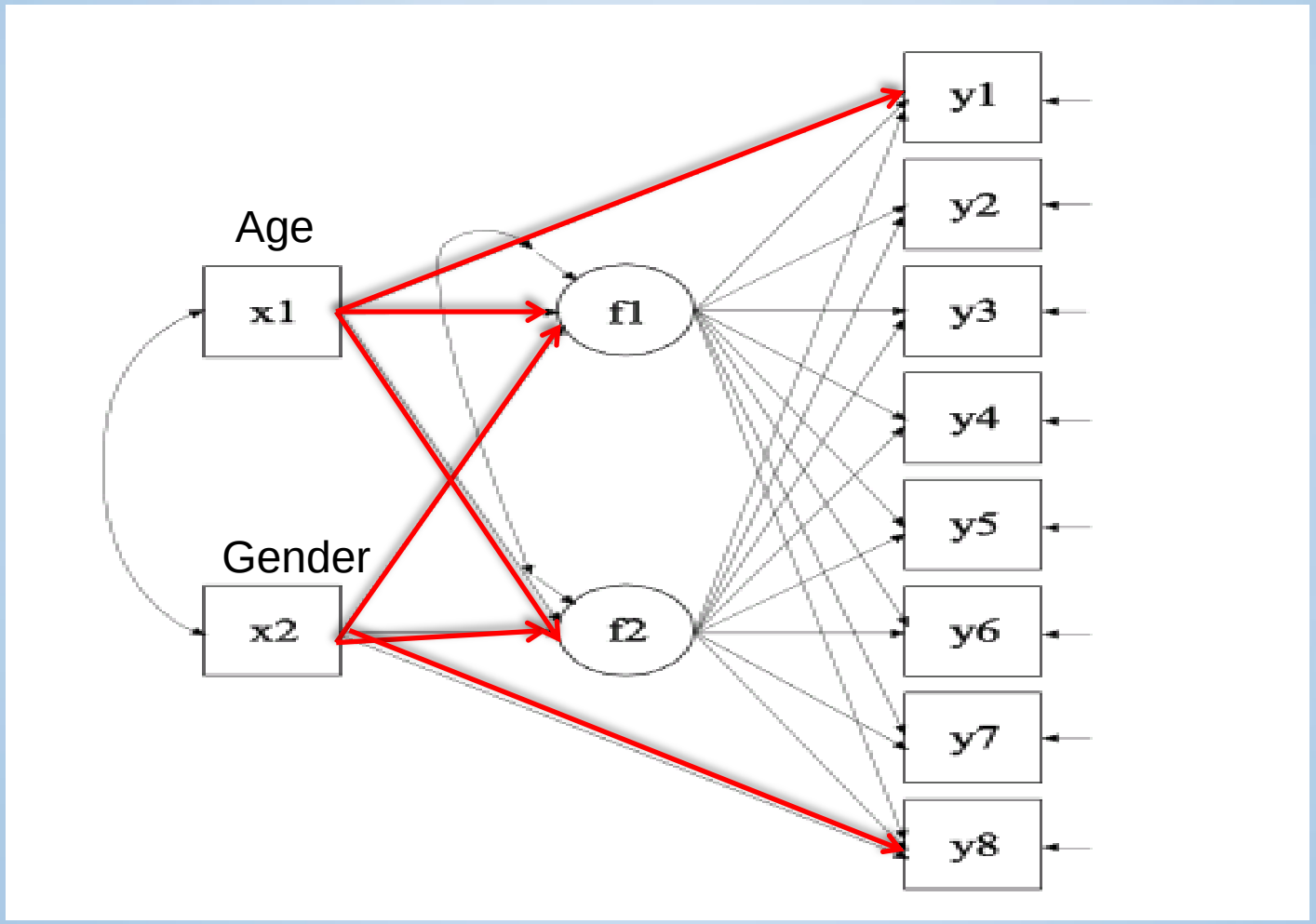
MIMIC



MIMIC



MIMIC



Mplus

Example

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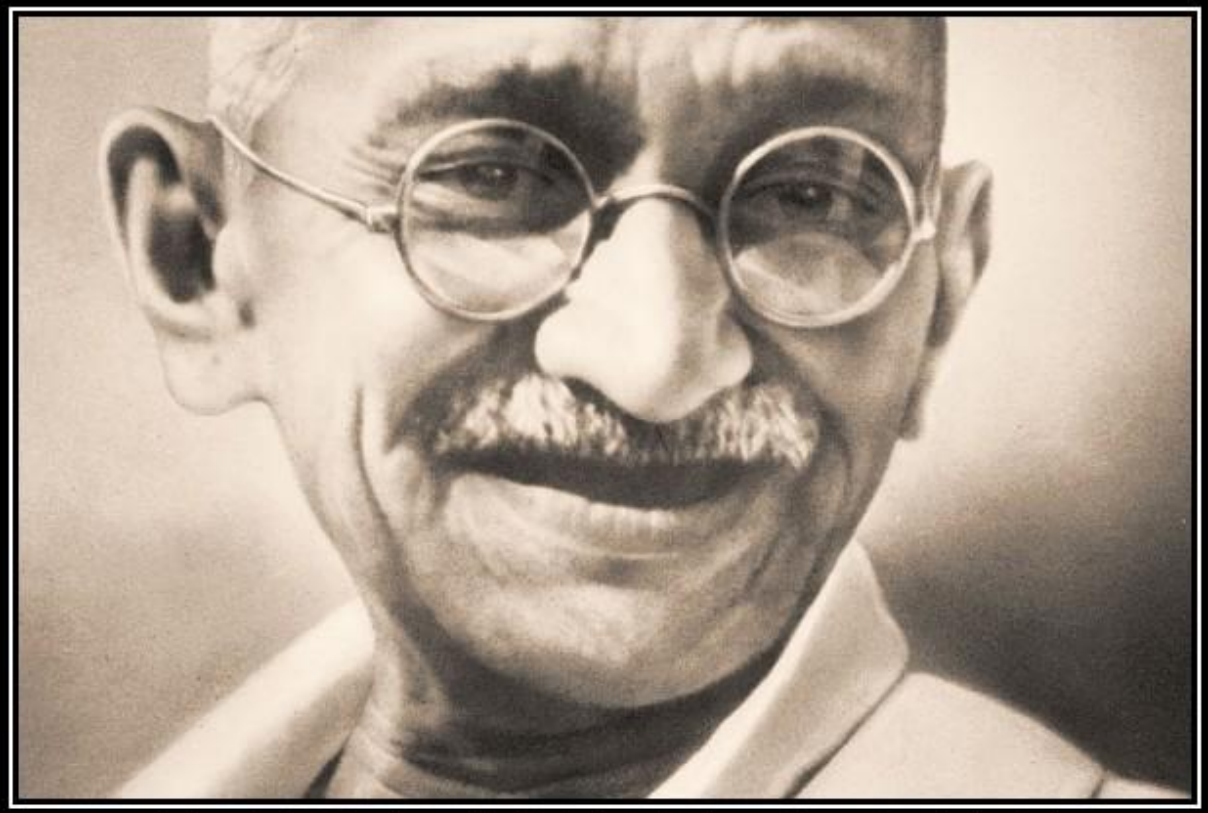

MOTIVATION

"Whatever you do will be insignificant, but it is very important that you do it."

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4. Confirmatory Factor Analysis

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Questions of the day:

1. How do we get the Mplus data file if our data are in SPSS?
2. How do we get information from Mplus into SPSS?
3. How do we change the “reference group” in measurement invariance models?

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1. How do we get the Mplus data file if our data are in SPSS?

Questions of the day:

1. How do we get the data file if our data are in SPSS?

- Let's open the following file:
  - User_File_JumpstartMplus
  - Mplus_files
  - CFA
  - data2.sav

Questions of the day:

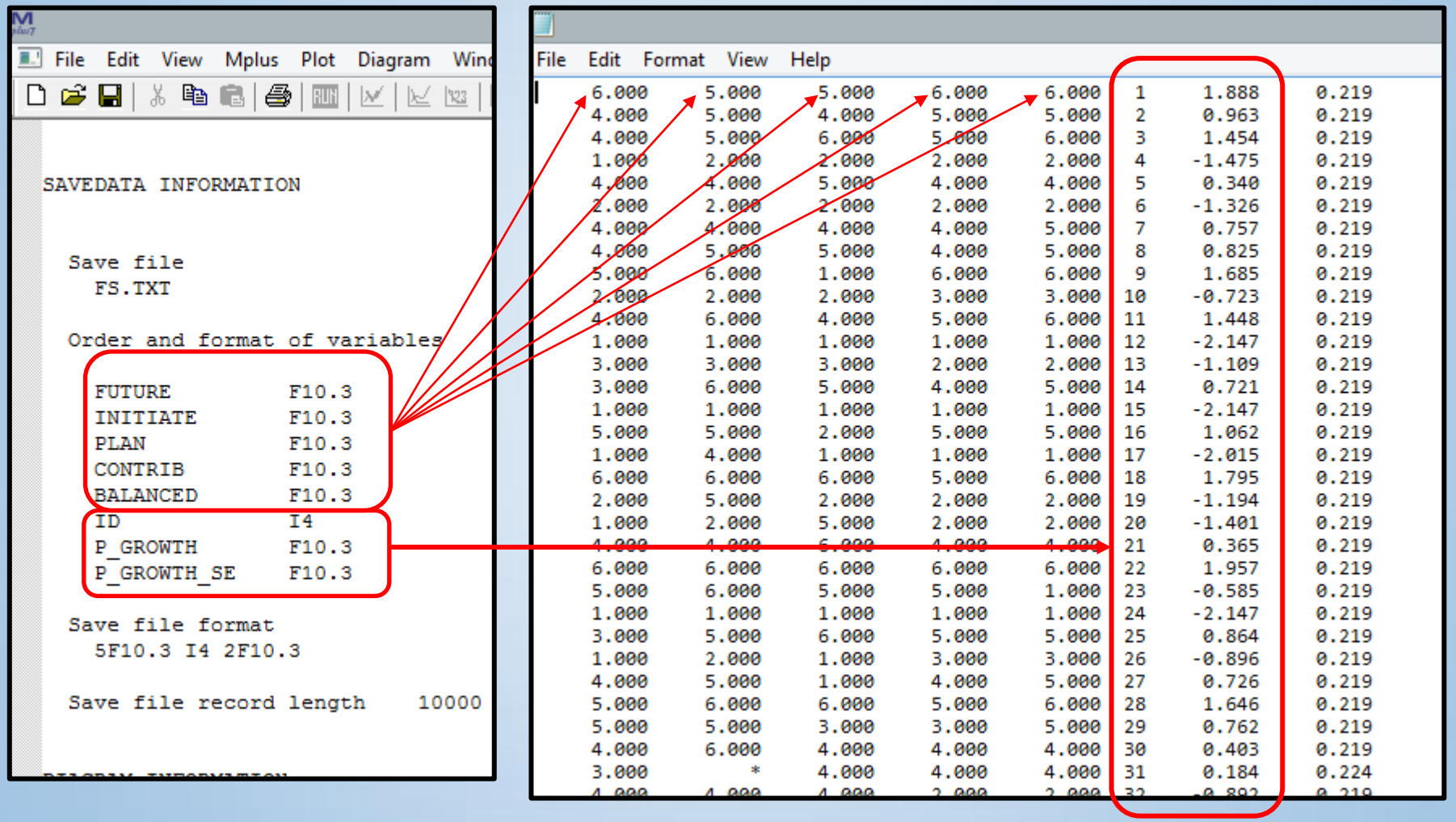
2. How do we get information from Mplus into SPSS?

Questions of the day:

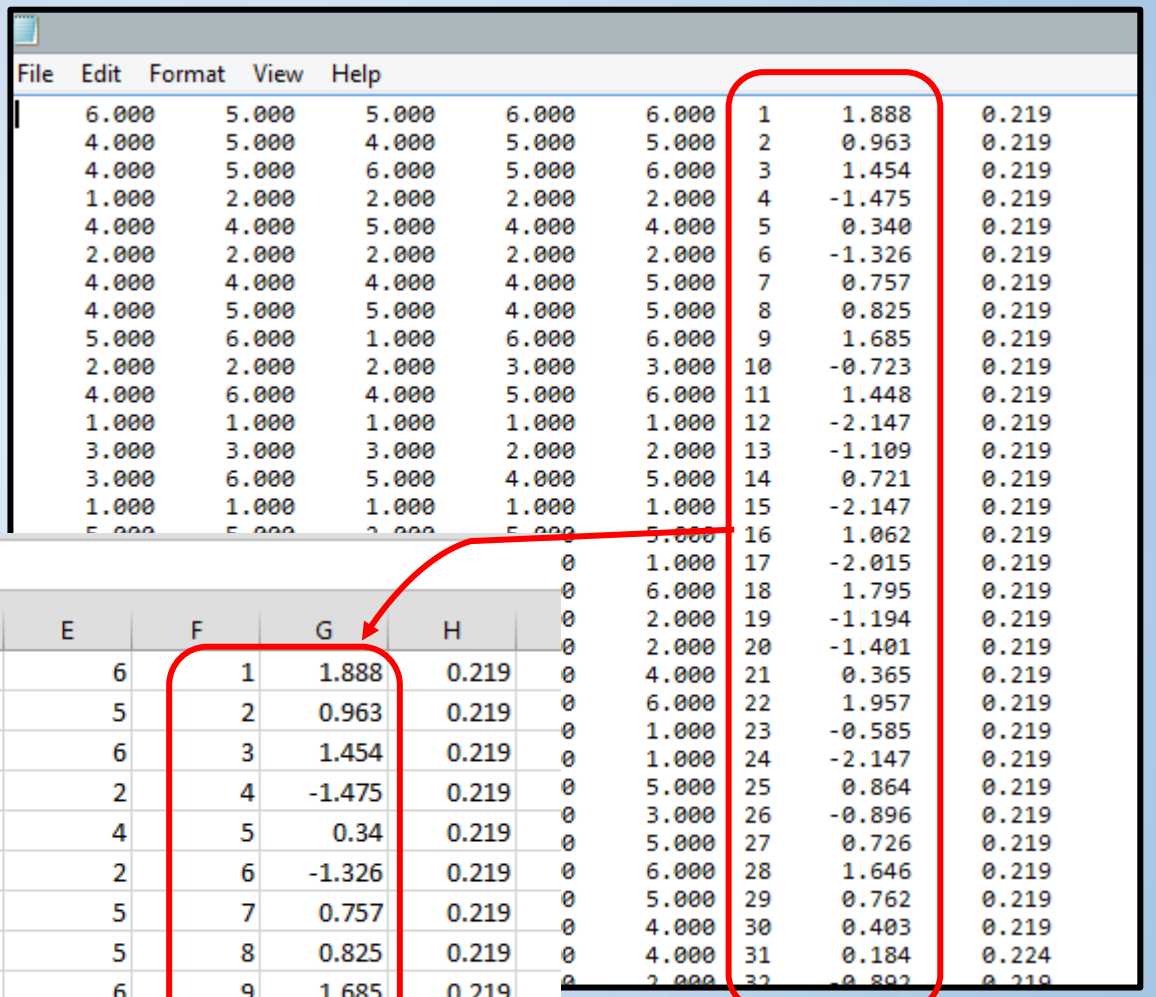
2. How do we get information from Mplus into SPSS?

- Let's use Mplus to open the following file:
  - User_File_JumpstartMplus
  - Mplus_files
  - CFA
  - 2-personal-growth.inp

Factor scores



Factor scores



A1 | 6

	A	B	C	D	E	F	G	H
1	6	5	5	6	6	1	1.888	0.219
2	4	5	4	5	5	2	0.963	0.219
3	4	5	6	5	6	3	1.454	0.219
4	1	2	2	2	2	4	-1.475	0.219
5	4	4	5	4	4	5	0.34	0.219
6	2	2	2	2	2	6	-1.326	0.219
7	4	4	4	4	5	7	0.757	0.219
8	4	5	5	4	5	8	0.825	0.219
9	5	6	1	6	6	9	1.685	0.219
10	2	2	2	3	3	10	-0.723	0.219
11	4	6	4	5	6	11	1.448	0.219
12	1	1	1	1	1	12	-2.147	0.219

Factor scores

	id	p_growth
1	1.00	1.89
2	2.00	.96
3	3.00	1.45
4	4.00	-1.48
5	5.00	.34
6	6.00	-1.33
7	7.00	.76
8	8.00	.83
9	9.00	1.69
10	10.00	-.72
11	11.00	1.45
12	12.00	-2.15
13	13.00	-1.11

A1 | 6

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Questions of the day:

3. How do we change the “reference group” in measurement invariance models?

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3. How do we change the “reference group” in measurement invariance models?

- Let’s use Mplus to open the following file:
  - User_File_JumpstartMplus
  - Mplus_files
  - invariance
  - m-inv-template.inp

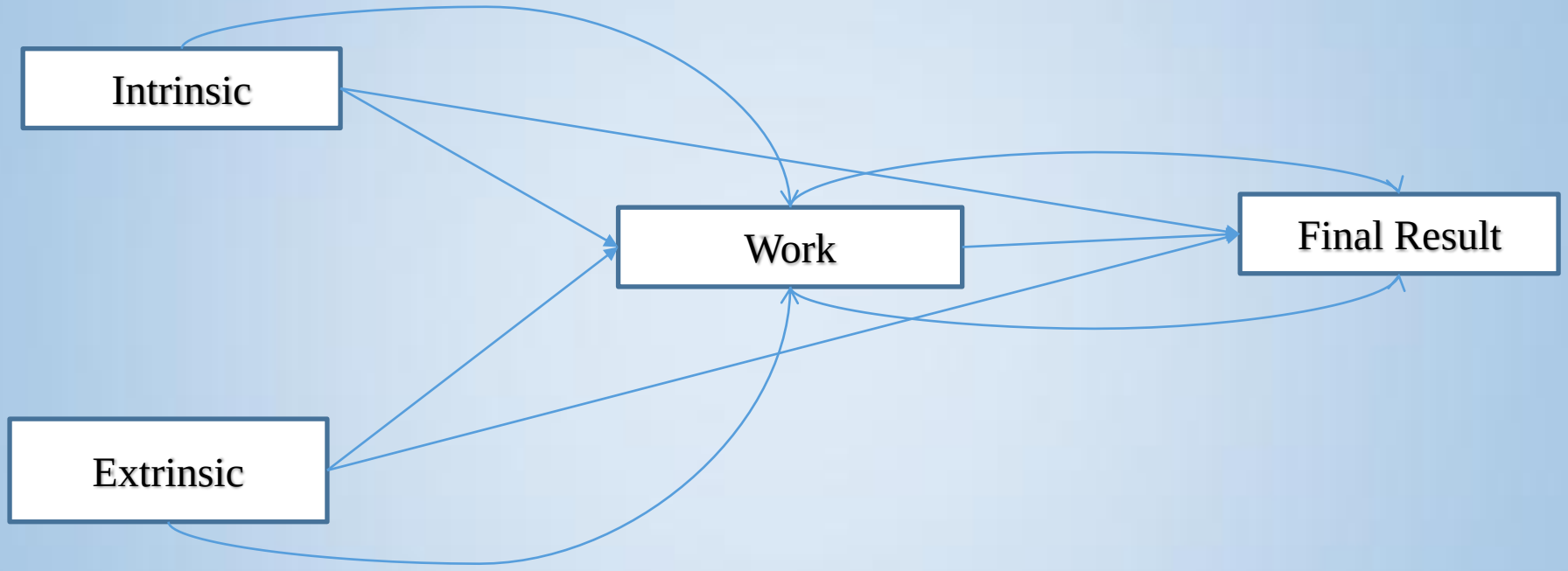
Other interesting things you may like to know…

1. Mediation effects

3. How do we test mediation effects in Mplus?

- Let's use Mplus to open the following file:
  - User_File_JumpstartMplus
  - Mplus_files
  - …
  - PATHgroup

Mediation effects



2. Regression in multiple groups

3. How do we test regression paths in multiple groups?

- Let's use Mplus to open the following file:

  - User_File_JumpstartMplus
  - Mplus_files
  - regression-groups
  - PATHgroup

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12. Summary Quiz

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Objectives

To integrate the concepts acquired in this course

Psychobiological Effects of Laughter

https://www.youtube.com/watch?v=RP4abiHdQpc

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Laughter

Amusement

To show emotion (as mirth or joy) with a chuckle or explosive vocal sound (Merriam-Webster Dictionary)

- Has positive effects on individuals:
  - Hormonal (Berk, 2001):
    - Endorphins
    - Oxygen level in respiration
    - Cortisol
  - Psychological (Tse & al., 2010):
    - Life Satisfaction
    - Resilience
    - Positive emotions

The challenge

- The team of researchers would like your help to uncover the effects of laughter on these variables.
- A study was conducted to evaluate the psychobiological impact of laughter
- 308 individuals aged between 18 and 65 years of age were assessed on psychological variables and several biological markers

The Challenge

1. Variables are:
    - Gender. Gender, Males = 0
    - Age. Age
    - Laughter. Laughter, Likert 1-7
    - Life Satisfaction. LifeS, Likert 1-7
    - Resilience. Resil, Likert 1-7
    - Positive Emotion. PoEmo, Likert 1-7
    - Oxytocin. Oxy, Standardised variable
    - Dopamine. Dopa, Standardised variable
    - Cortisol. Corti, Standardised variable
2. Some data are missing

The Challenge

Questions:

1. What is the optimal number of factors that can explain the relationships between the psychobiological variables?
2. Is it possible to confirm the validity of a 1-factor structure, or a 2-factor structure?
3. Is the latent factor of the psychobiological variables gender-invariant (choose a 1-factor structure)?
4. Is the latent factor of the psychobiological variables age-invariant (choose a 1-factor structure)?
5. Which of the biological or psychological set of variables seems to be affected the most by Age and Laughter simultaneously?

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