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# Comparative study of PISA and Polish State Exams

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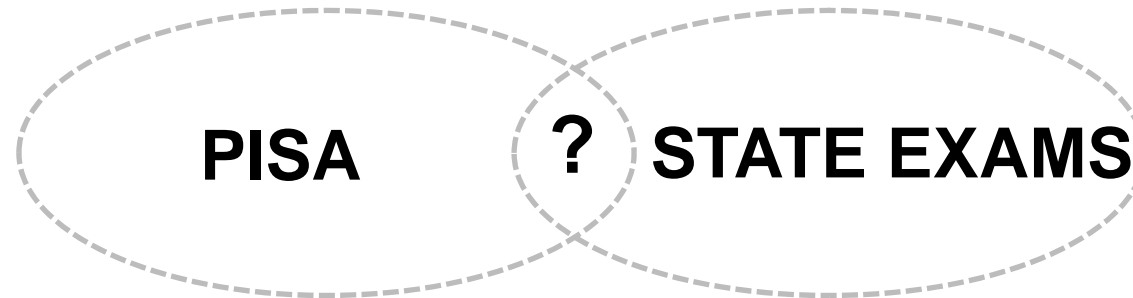
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# OUTLINE

## Research issue:

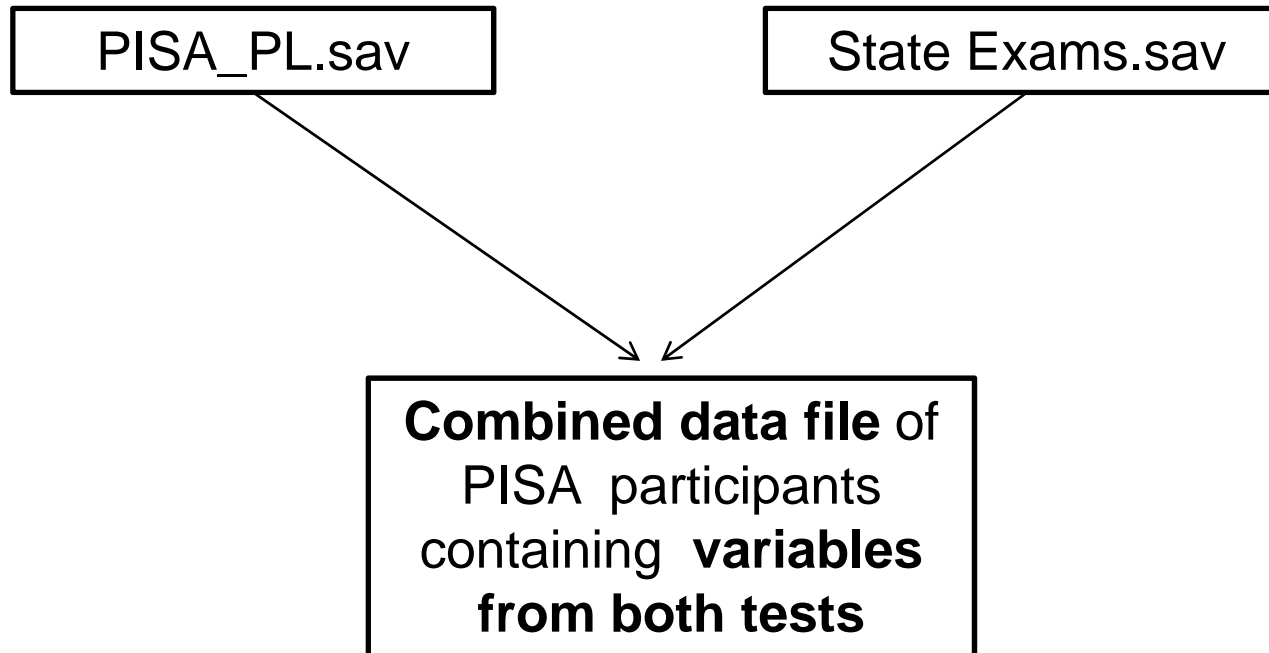


### Detailed steps:

- Merging datasets
- What are the **crucial dimensions** of knowledge and competencies measured through the current system of obligatory **state exams** taken by students emerging from lower secondary school ? (factor analysis)
- Are they related to what PISA measures ?

# The dataset

- RECORD = student who took part in PISA and in state exam in year 2006



- About 75% of PISA records were matched up (N of combined file=4,123 of 5,547 PISA 2006 participants)

# Testing areas in both tests

## PISA

- Reading
- Mathematics
- Science

## Polish State Exams

- Humanities
  - Polish literature
  - History
  - Knowledge about society
- Maths&Science
  - Mathematics
  - Chemistry
  - Biology
  - Physics

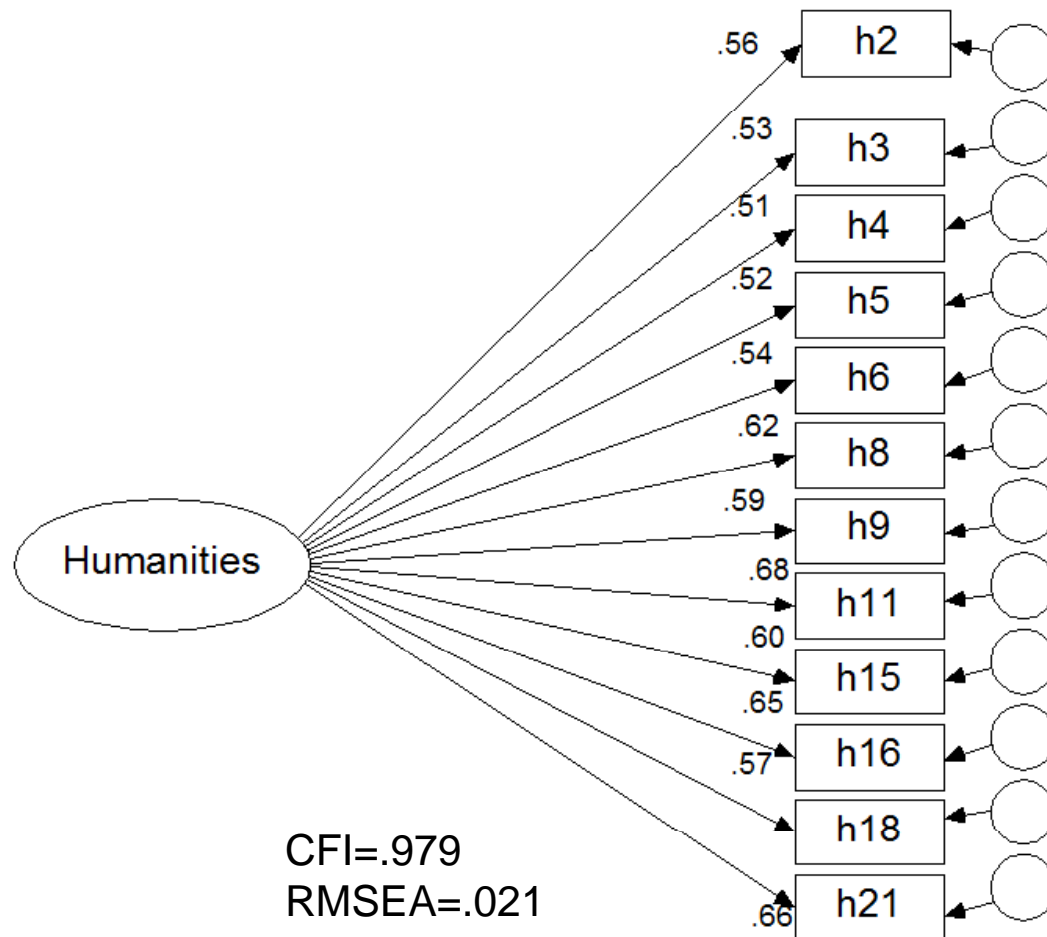


# RESULTS

# Outcomes of factor analyses on humanistic part of the exam

- Humanities

- Exploratory factor analysis suggested 1 factor with 12 substantive indicators/items
- Model was endorsed in confirmatory factor analysis



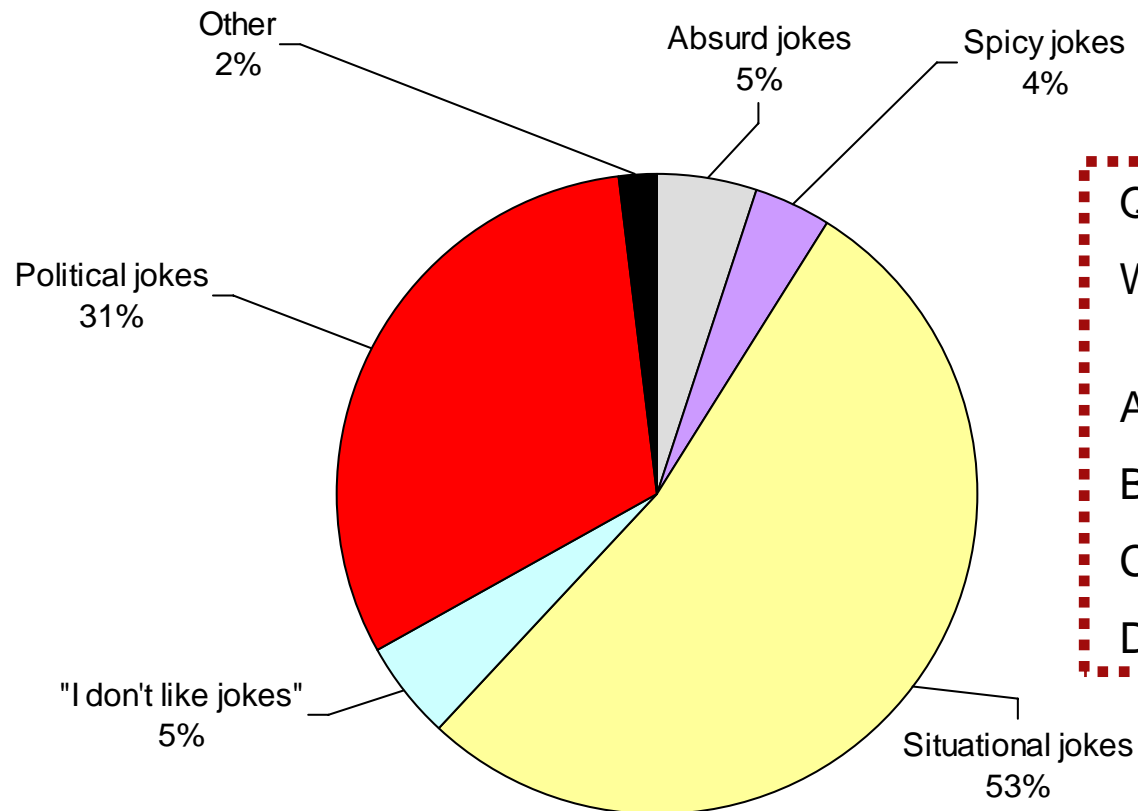
## Meaning of humanistic factor:

- Drawing simple conclusions from information provided
- Finding specific information in text/diagram/table

Completely standardized solution; all coefficients are significant at the .05 level

## Exemplary task from humanistic part of state exam

**Item H6:** *Diagram shows the results of survey research about joke preferences among Polish people. Using the information from the diagram answer the question:*



QUESTION:

What kind of jokes Polish people like the most:

- A. Absurd and situational jokes
- B. Political and spicy jokes
- C. Situational and political jokes
- D. Not classified and situational

# Outcomes of factor analyses – Maths&Sciences

## • Maths&Sciences

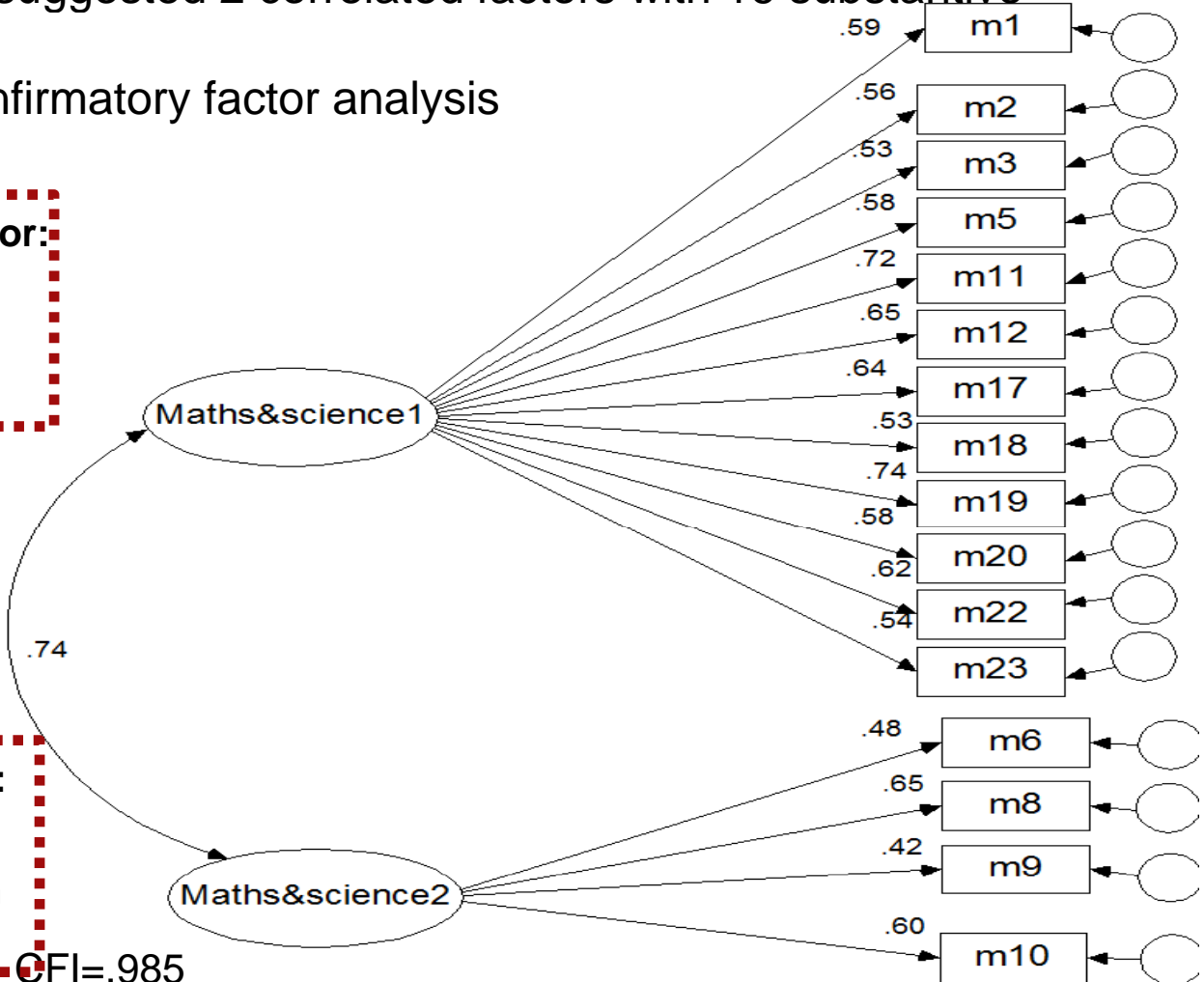
- Exploratory factor analysis suggested 2 correlated factors with 16 substantive indicators/items
- Model was confirmed in confirmatory factor analysis

### Meaning of Maths&science1 factor:

- Finding specific information
- Basic computings

### Meaning of Maths&science2 factor:

- Drawing logical conclusions
- Application of abstract information



CFI=.985

RMSEA=.020

Completely standardized solution; all coefficients are significant at the .05 level

## Exemplary task from math&sc. part of state exam

***Item m19: Mary and Jack were observing the traffic at the bridge for 3 hours. They counted the vehicles crossing the bridge and recorded the results of their observation in the table below.***

Type of vehicle	7.00-8.00	8.00-9.00	9.00-10.00	<b>Altogether</b>
Cars	6	9	3	<b>17</b>
Lorries	2	3	0	<b>5</b>
Buses	1	1	1	<b>3</b>
<b>Altogether</b>	<b>9</b>	<b>13</b>	<b>3</b>	<b>25</b>

*Question: How many per cent of all vehicles crossing the bridge from 7.00 to 10.00 represents the number of cars?*

- A. 68%                      B. 17%                      C. 20%                      D. 12%*

## Exemplary task from math&sc. part of state exam

Information for item m9.

*\*The term „Geostationary satellite” is that type of satellite that for the observer from the Earth all the time is keeping the same point in the sky.*

Question: *How much time does the Geostationary satellite need for the full move around the Earth?*

A. 12hours

B. 28days

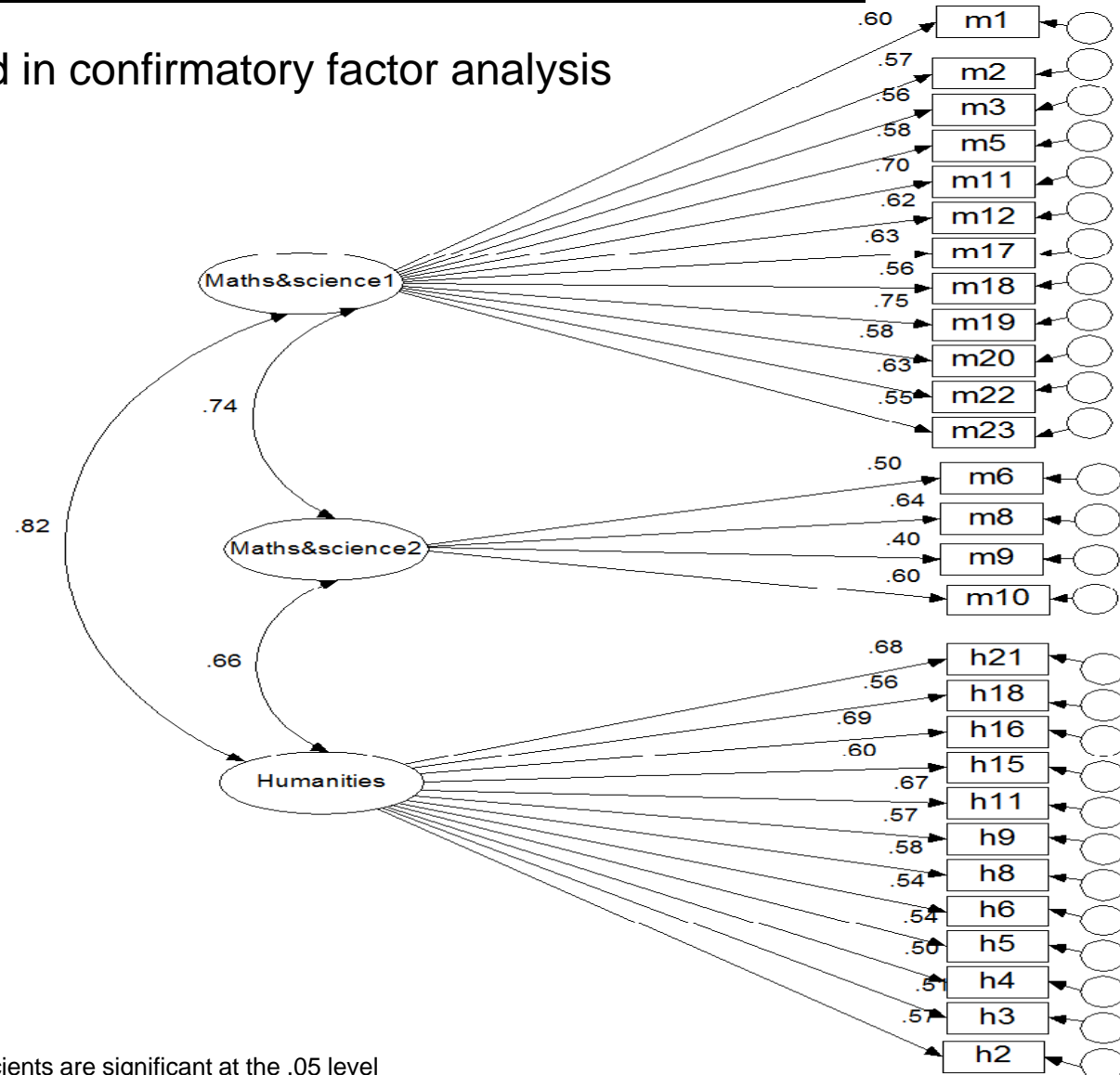
C. 24hours

D. 1year

# Joint structure of State Exams

- Humanities and Maths&Sciences

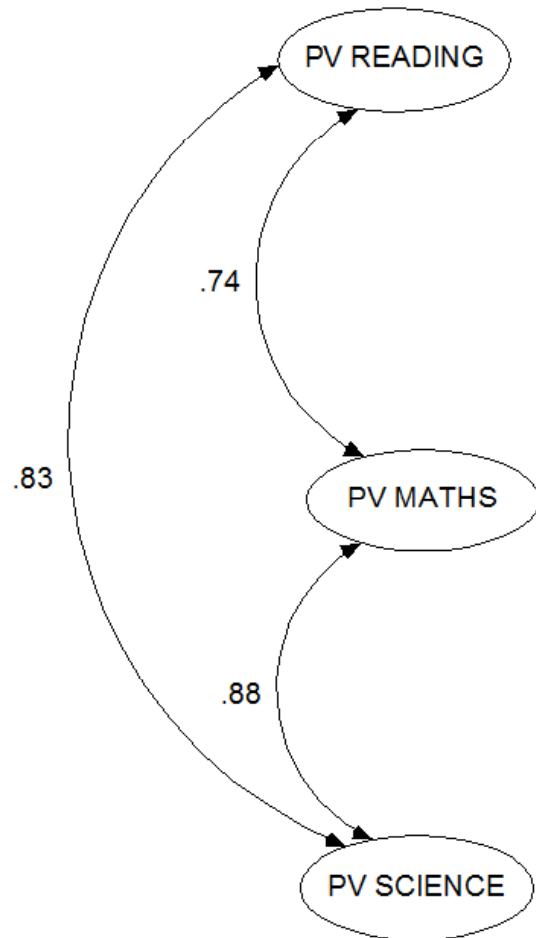
- Model was endorsed in confirmatory factor analysis



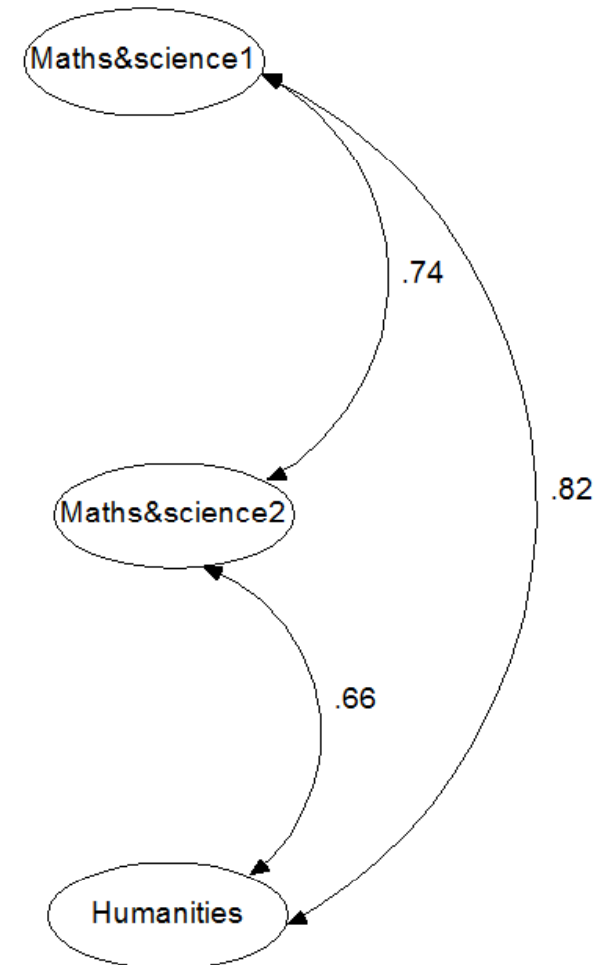
CFI=.987  
RMSEA=.016

# Introducing PISA variables to the model

## PISA

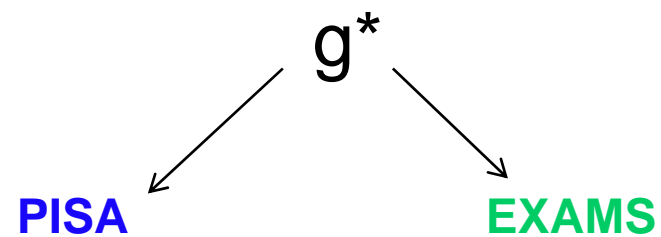
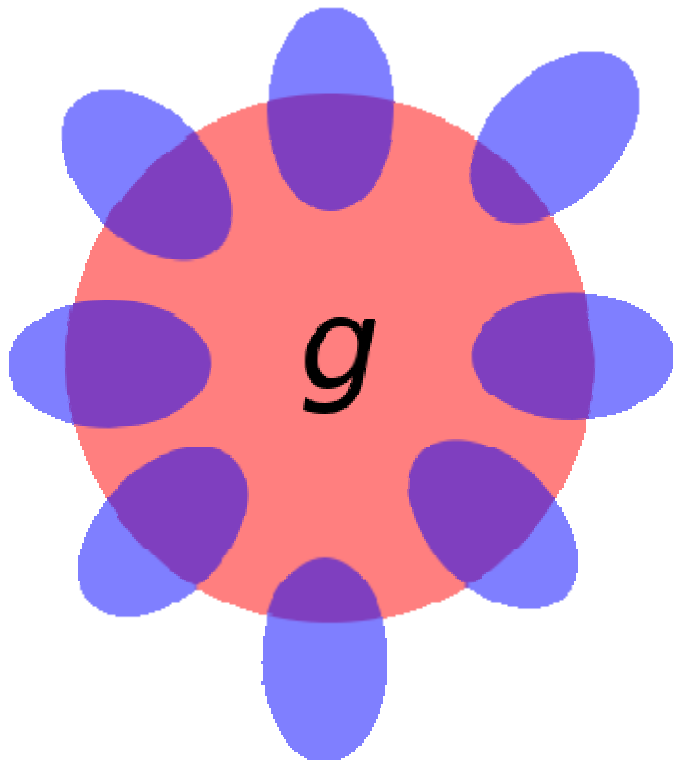


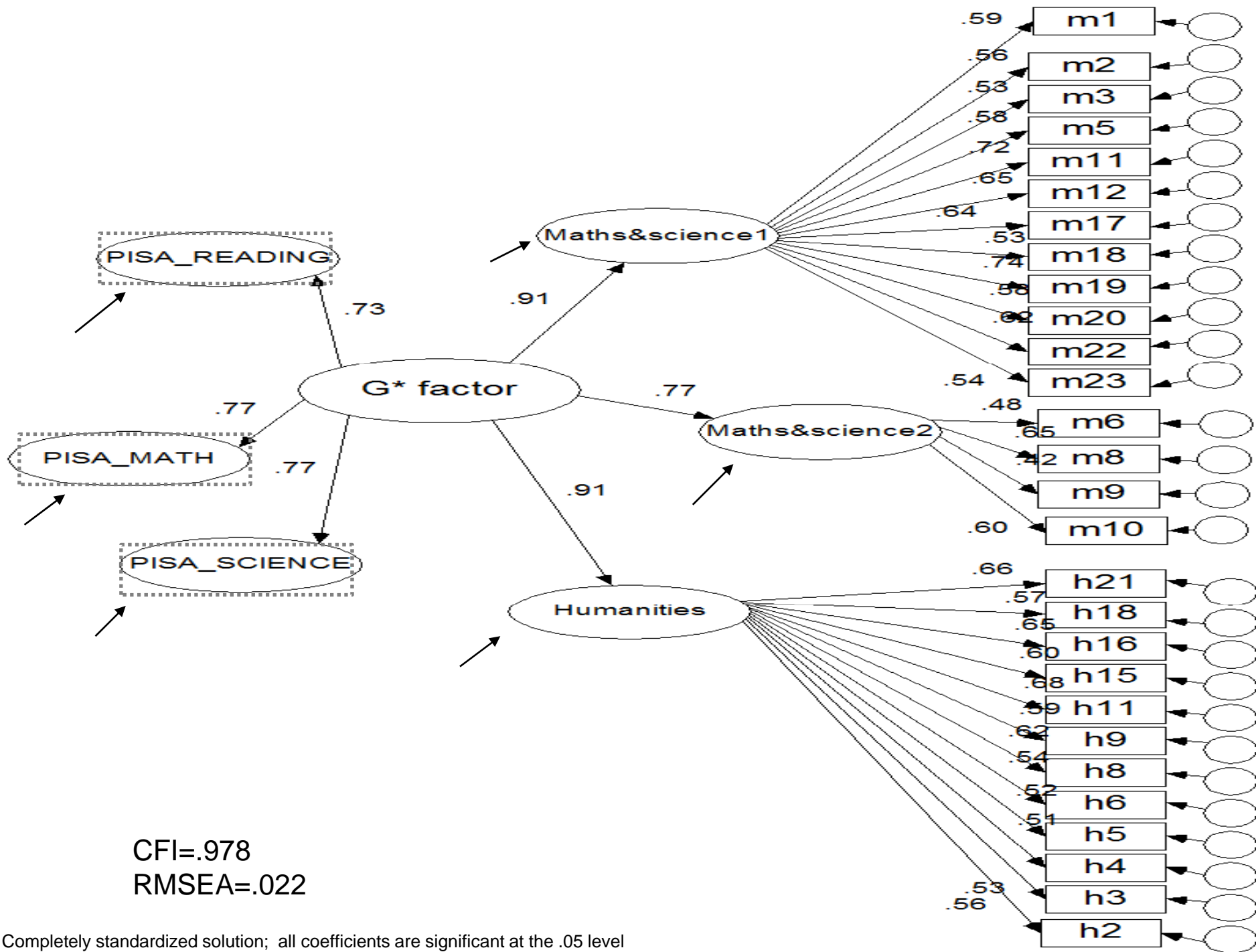
## State Exams



# Comparison of PISA and State Exams

## Hypothesis of factor $g^*$





CFI=.978  
RMSEA=.022

Completely standardized solution; all coefficients are significant at the .05 level

**THANK YOU**