# Scenario 2. Algebra Test

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Test Score and Construct

- Algebra Test
  - 5 separate parts Alg1 to Alg5 (items or subscores)
  - Scaling: integers between 0 to 6

- Single attribute/construct → Algebra performance

Interpretations and uses of the algebra test

- Measuring algebra ability of Norwegian grade 7 students

- Used as a diagnostic tool to identify whether students need extra help

- Sample: 210 grade 6 to 8 students in Oslo region

# Single Factor model (unidimensional?)
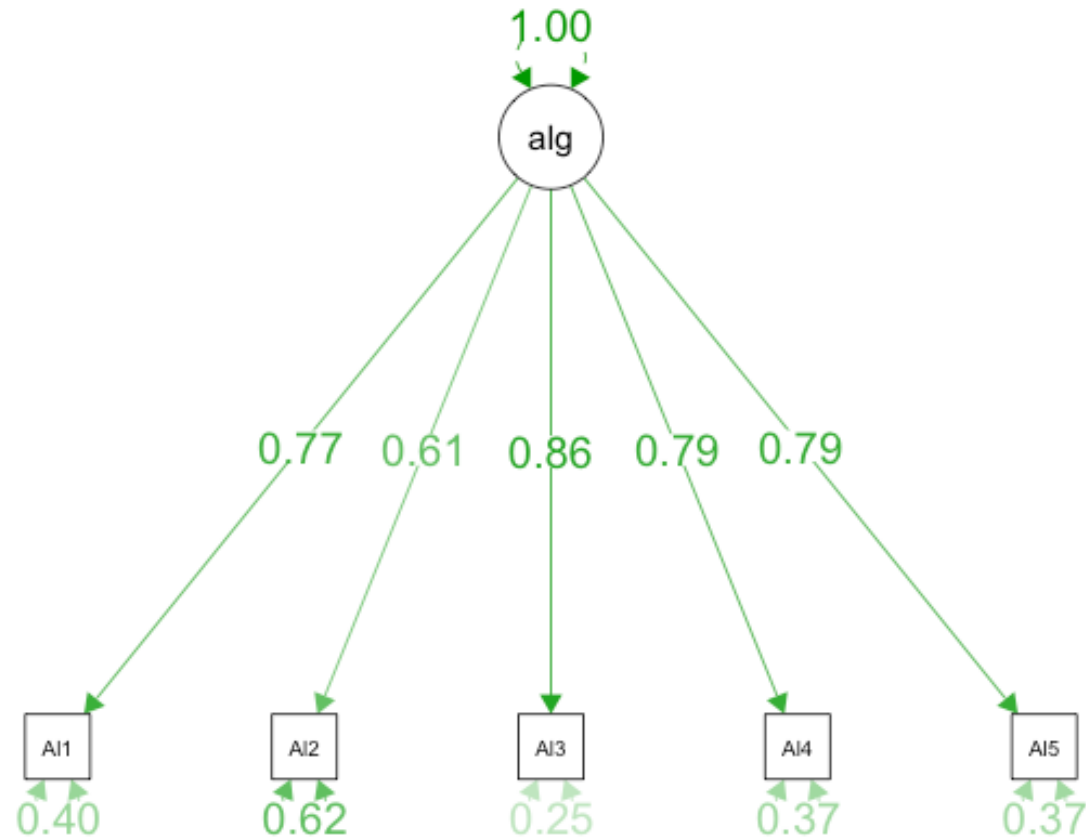
Model evaluation

- Model-estimated covariance is not a very good fit (RMSEA =0.08 and SRMR = 0.03)

- Chi-square: significant (p-value=0.039) → there is difference between model-implied covariance and observed covariance (data)

Reliability

- Coefficient omega = 0.879 (covariance matrix)

- The sum score of the algebra test is highly reliable.

- Reliability of the other two constructs: reading proficiency (0.82), interest in mathematics (0.78)

Correlation plot
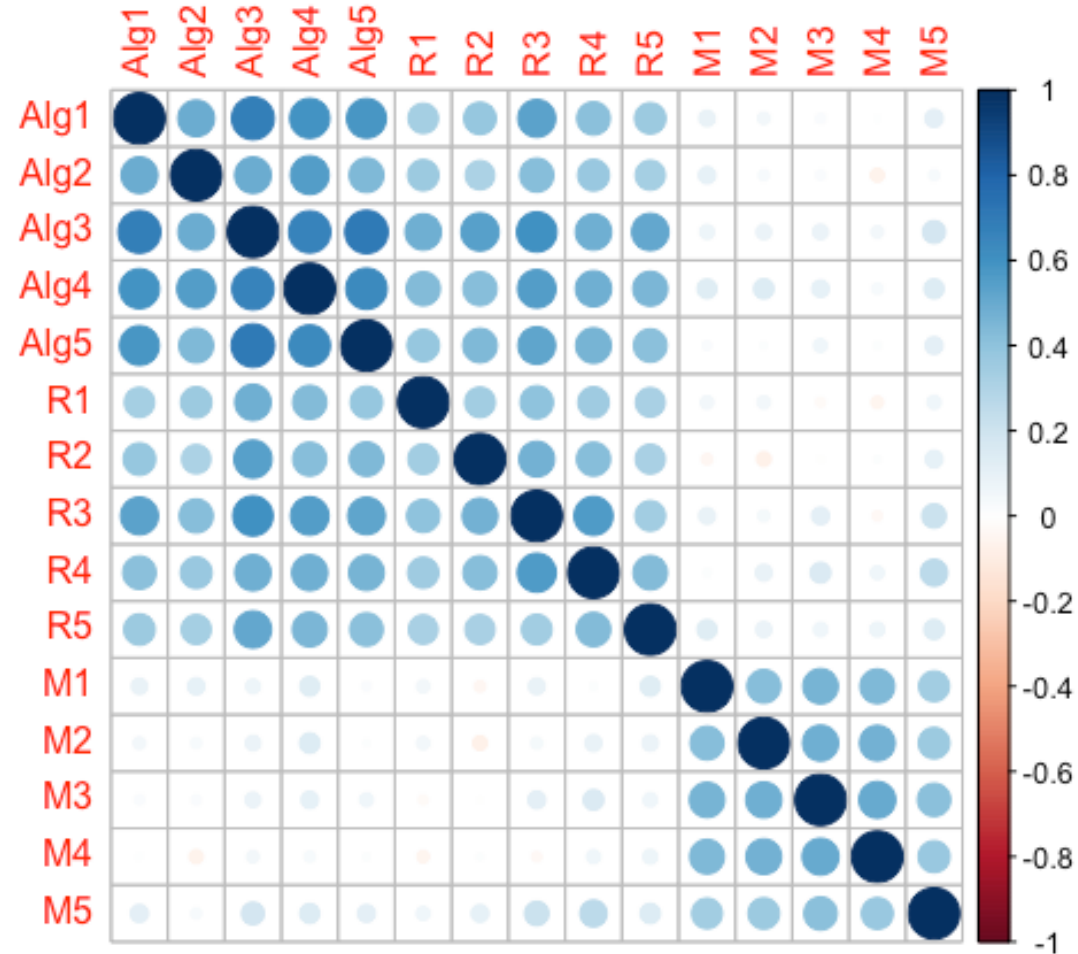
Relations with other variables

- Discriminant evidence:
  - ➢Interest in mathematics
  - ➢r=0.11 → measuring dissimilar constructs, making a distinction between the two underlying constructs

- High correlation with reading proficiency: r=0.75
  - ➢"Disattenuate", r'=0.88
  - ➢Existing of measurement error
  - ➢not helpful to investigate validity evidence for the specific interpretation and use of the algebra test

Research Evaluation

- Not validate the target population (grade 7, Norwegian students)
  - Sample: grade 6-8, Oslo region

- Unidimensional? Algebra test might measure reading proficiency

- Using coefficient omega to estimate reliability (if SFM fits well)

Future Studies

- Clear conceptual framework (hypothesis of factor models)

- Items details in algebra test and reading proficiency test
  - which items have higher information, i.e., which items contribute the most to increasing the reliability

- Score scales, test length