

SEM 1: Confirmatory Factor Analysis

Week 3 - Introduction

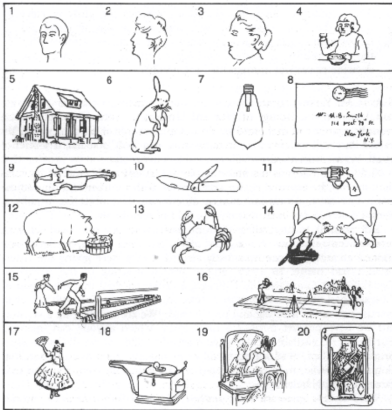
Sacha Epskamp

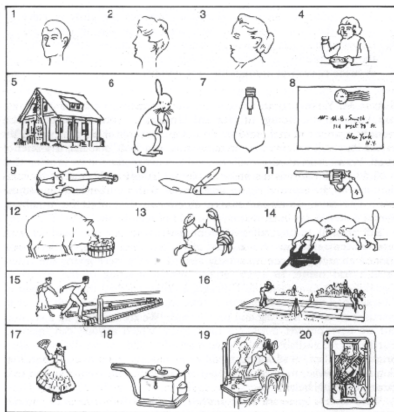
2020

Some main applications of CFA / SEM

- ▶ Scale formation (week 1 & 2)
- ▶ Test an hypothesized factor structure (week 2)
- ▶ Investigate correlations at latent level (week 2)
- ▶ Test if a scale is fair/biased between groups (week 3)
- ▶ Compare groups on means and variance–covariance structure (week 3)
- ▶ Test causal hypotheses between observed and latent variables (SEM 2)

What's missing from these pictures?





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Yerkes argued that his tests measured "native intellectual ability", in other words, innate intelligence which was unaffected by culture and educational opportunities.

<http://www.holah.karoo.net/gouldstudy.htm>

In response to research studying IQ differences between dutch majority and minority groups:

Again, the subtest with the largest cultural component (Learning Names) shows the largest between-group difference. That is, the Learning Names subtest contains several Dutch names from various fairy tales, which may be unfamiliar to children of Moroccan or Turkish descent.

Wicherts, J. M., & Dolan, C. V. (2010). Measurement invariance in confirmatory factor analysis: An illustration using IQ test performance of minorities. *Educational Measurement: Issues and Practice*, 29(3), 39-47.

- ▶ Plenty of research investigating group differences in sum-scores, without taking measurement into account
 - ▶ Sometimes even followed up by e.g., evolutionary theories on why groups differ
- ▶ Many pressing research questions can be answered with measurement invariance testing
 - ▶ E.g., should students with dyslexia get more time on exams?
- ▶ CFA allow for fine-grained and fair group comparison, without requiring estimated latent variable scores (e.g., sum-scores)!
- ▶ Before we can do this, we need to extend CFA with **meanstructure** and **multi-group analysis**.