What is Structural Equation Modeling?

Basic Introduction to PLS-SEM in SEMinR

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Welcome

- Structural equation modeling using **SEMinR**

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- Basic course: 7 videos

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- Basic course: 7 videos
- Focus on **partial least squares** structural equation modeling (PLS-SEM) - as opposed to **covariance-based** structural equation modeling (CB-SEM)

What is Structural Equation Modeling?

1. Why use structural equation modeling, anyway?
2. Properties
3. Components
4. Process of estimating a model

Why structural equation modeling?

As social scientists, we study human properties (operationalized as **variables**) and **how** they are related.

- Human variables: Often impossible to measure directly.
- How: Ideally, what causes what?

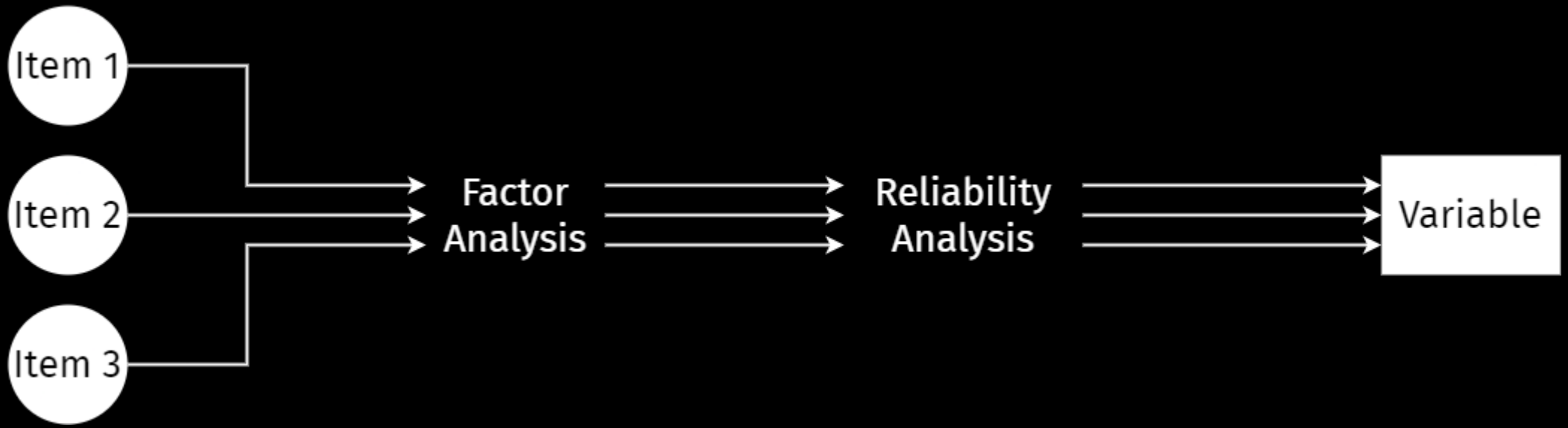
Why structural equation modeling?

From properties to **variables**...

Why structural equation modeling?

From properties to **variables**...

... using survey items:



Why structural equation modeling?

From association between **variables**...

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From association between **variables**...

... to causation?

Why structural equation modeling?

Regression equations can be reversed.

DV is height

$$height = b \times attitude_{smoking} + c$$

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Regression equations can be reversed.

DV is height

$$height = b \times attitude_{smoking} + c$$

DV is attitude towards smoking

$$attitude_{smoking} = \frac{height - c}{b}$$

Both sides are mathematically equivalent. There is no causation in math.

Why structural equation modeling?

Gold standard of causal statistics: Randomized control trial

(put graphic in here)

What are the advantages of SEM?

Combines

- factor analysis
- regression equation

Allows for

- mediation analysis
- causal interpretation

Types of SEM

- CB-SEM
- VB-SEM / PLS-SEM

Components of a SEM

- latent variables (constructs)
- manifest variables (indicators)

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- manifest variables (indicators)

Relationships between those components form

- structural model: relationships between constructs (unidirectional in PLS-SEM)
- measurement model: relationships between constructs and their indicators

Graphical representation of SEM - example with mobi data set

Underlying math

Process of estimating a SEM - sequence of our videos

SeminR Model

Review