

Conceptual frameworks and measurement theories



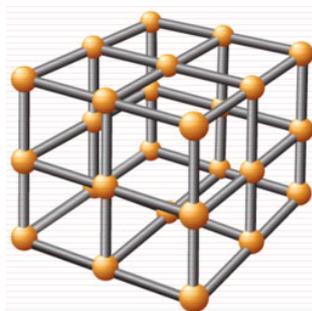
Henrik Hein Lauridsen



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Conceptual framework

'A model representing the relationship between the items and the construct to be measured'

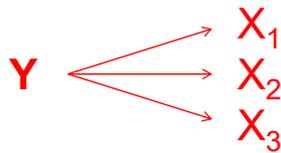


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Reflective vs. formative models

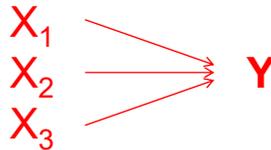
Reflective model

If the concept Y is changed, then *all* items will change too



Formative model

If the concept Y is changed, then *all* items will not necessarily change

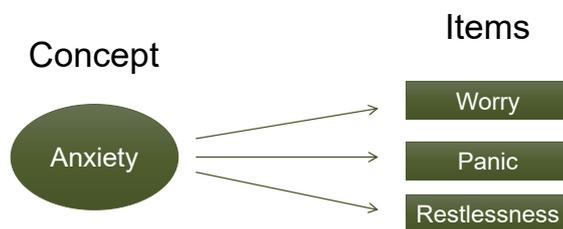


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Reflective model

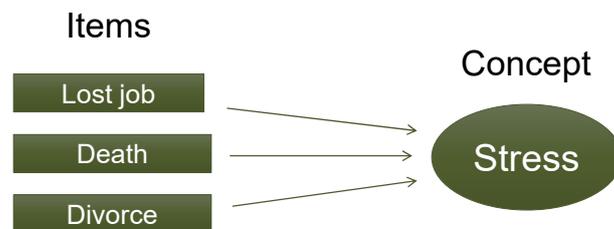


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Formative model

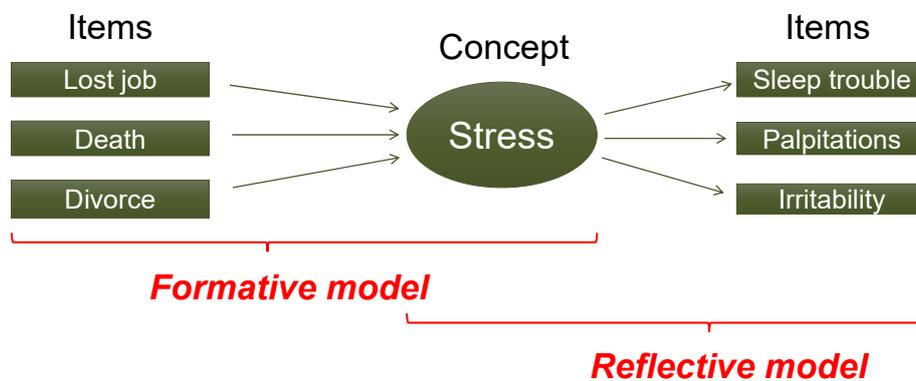


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Reflective vs. formative models



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How to decide?

Thought test

"Do we expect the items to change when the construct changes?"

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Measurement theory

Definition

"A theory about how the scores generated by items represent the construct to be measured"

Is a requirement for latent (unobservable) constructs measured by multiple items

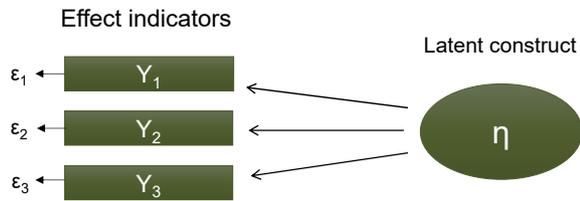
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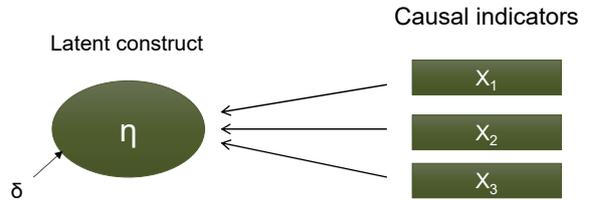
Measurement theory

Reflective model



- Items are manifestations (indicators) of the construct
- Therefore, items are correlated and may replace each other
- Development phase: not crucial to miss certain items
- Measurement theory: CTT or IRT

Formative model



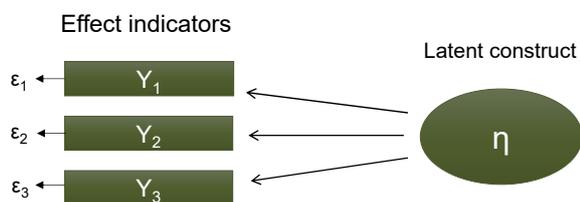
- Items are causal (formative) of the construct
- Items may/may not be correlated, therefore cannot be replaced by each other
- Development phase: crucial not to miss items
- Measurement theory: None developed (common sense)

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Item reduction

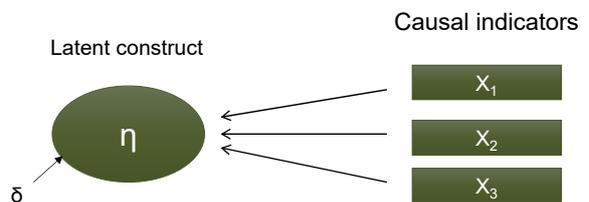
Reflective model



Field test:

- Item characteristics
- Dimensionality (factor analysis)
- Reproducibility

Formative model



Field test:

- Item importance

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Item importance

Structured interviews

- Asthma QoL Questionnaire (impairment with asthma)¹
 - Symptoms, emotional problems, troublesome environmental stimuli, avoidance etc.
- Two extra questions:
 - Has 'item' been troublesome in the past year? (yes/no)
 - How important is the 'item'? (1 = not very important... 5 = extremely important)
- Impact score

$$\text{Impact} = \% \text{ endorsing item} \times \text{importance (range 1 - 5)}$$

E.g. Shortness of breath: Troublesome = 92%, importance avg. = 3.60

$$\text{Impact} = 0.92 \times 3.60 = 3.31$$

¹Juniper et al. Evaluation of impairment of health related quality of life in asthma: development of a questionnaire for use in clinical trials, 1992

Scale, index or profile?

Term for multi-item questionnaire	Uni- or multidimensional	Score
Scale	Unidimensional: Items measuring one dimension	Sum-score based on a reflective model
Index	Multi-dimensional: Each question measures a different dimension	Sum-score based on a formative model (+/- weights)
Profile	Multi-dimensional: Each dimension consists of several items measuring the same construct	One score per dimension