Conceptual Issues in Latent Class Latent Trait Modeling

Kelderman, Henk
Vrije Universiteit, Amsterdam,
Faculty of Psychology and Education, van den Boechorststraat 1, 1081 BT Amsterdam,
H.Kelderman@psy.vu.nl

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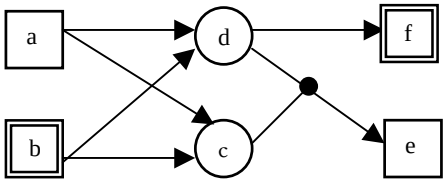
Abstract

Latent Class Latent Trait (LTLC) analysis becomes increasingly popular in research fields where qualitative differences in measurement properties of test are to be expected. An important field is selection psychology where increasing cultural heterogeneity of the population seriously impairs measurement in invariance of personality scales. Cultural differences in self-disclosure and self-presentation strategies may have a differential effect on item functioning. An example of a directed acyclic graphical (DAG) model for measurement in culturally heterogeneous populations is

DAG



blocks of variables
a: ethnic background.
b: other exogenous variables
c: latent classes
d: latent trait
e: item responses
f: endogenous variables

types of variables
: observed variables
: treatment variables
: latent variables

edges
: causal effect
: moderator effect,

where the sub graph {c,d,e} an LCLT model. Although the model is statistically sound there are some conceptual problems that deserve attention.
Firstly, the meaning of the probability experiment is indeterminate. If all variables are random two probability experiments may be involved in drawing e: A, drawing a sample from the populations of individuals and, B, the drawing of an item response vector from an individual. As a result the probabilistic interpretation of the latent class variable (c) becomes indeterminate. In sociology c is usually interpreted as a r.v. of type A, in psychology as sometimes as type B, e.g. a solution strategy.
Secondly, in LCLT models the meaning of the latent trait is indeterminate because it is unclear whether the moderator effect of c is just on the operational level or the conceptual level. In this paper we discuss both problems and propose some solutions based different types of endogenous (b) and endogenous (f) variables in the nomological net.

References

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