Fit Indices for Latent Class Analysis: Preliminary Findings From A Systematic Review

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Research question

Latent Class Analysis (LCA) is a statistical procedure used to identify qualitatively **different subgroups** of respondents who share the same **patterns of scores** across survey questions. This statistical technique is widely used in psychology.

However, **standards about the fit indices** to decide upon the number of sub-groups (class enumeration) and evaluate the quality of the selected solution (quality of the classification) **are still missing**.

Method

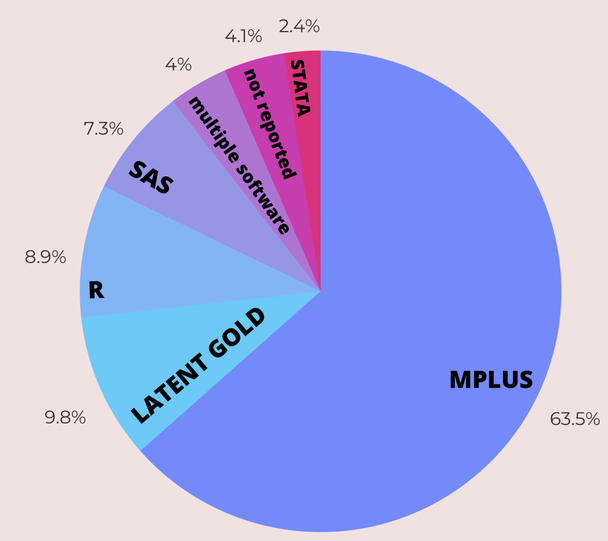
We searched for peer-reviewed articles presenting LCA studies in Psychology across **different databases** (Scopus, WOS, PsycInfo, Jstor, Psychology Database). We obtained a list of **7580 records**. After removing duplicates, we **randomly selected 10%** of the eligible records to obtain a representative sample of the articles (Egger et al., 1998; Diaz et al., 2021). From the final list of 377 articles, we have **excluded** non-empirical studies (4), papers written in a language different from English (3) and those who cited but did not perform any LCA or similar analysis (n = 4). The final list included **366 records**.

Results

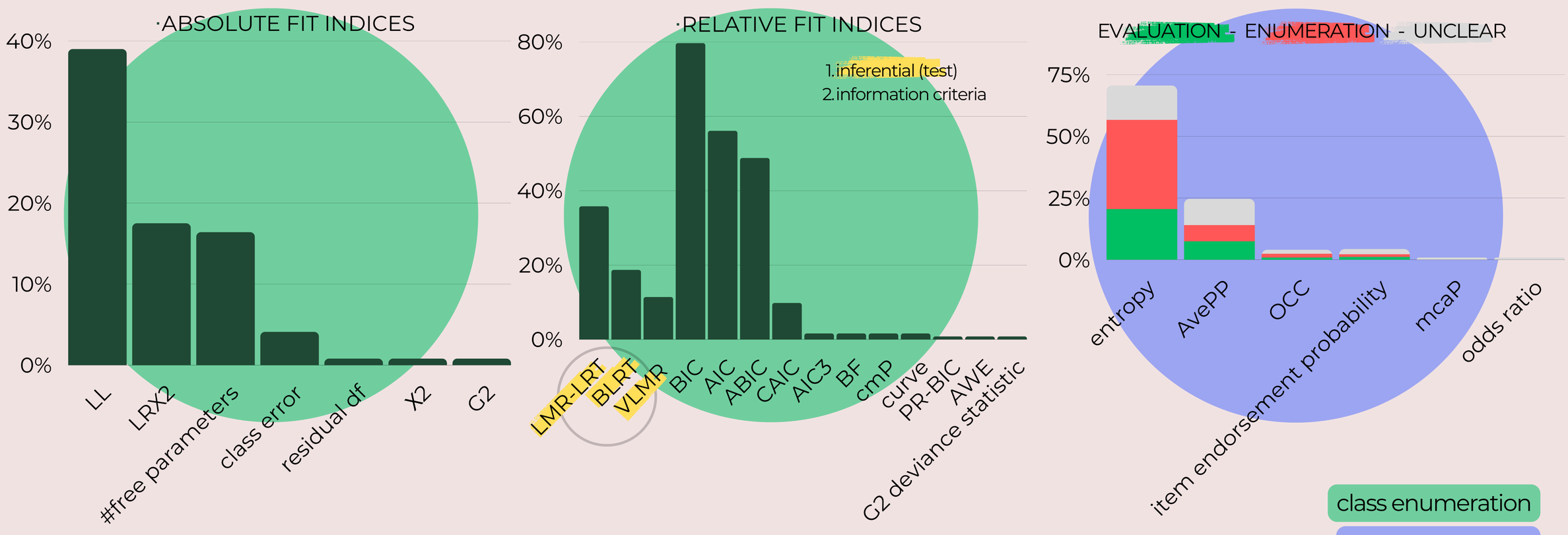
1. SAMPLE DESCRIPTION

- **Currently we have coded the first 100 articles.**
  - They are distributed across various **databases** as follows: PsycInfo (77%), Scopus (68%), Psychology Database (57%), Web of Science (31%), and JSTOR (0%).
  - The 100 coded articles are published in 54 different **journals**, the most frequently occurring ones are "AIDS and Behavior", "Child Abuse & Neglect", "Journal of Adolescence", and "Journal of Youth and Adolescence", each accounting for 6% of the total.
  - Articles have been published from **2013 to 2023**, with the higest frequence in 2019 (13%) and 2020 (13%).

- **Out of 123 statistical analyses conducted across the 100 articles,**
  - only 69.1% can actually be categorized as **Latent Class Analysis** (LCA), while 21.1% should be classified as LPA, 4.1% as LLCA, 2.4% as LLPA, 0.8% as MLCA, and in 2.4% of cases not sufficient information was reported to identify the type of analysis.
  - Regarding the **software**, the most used is Mplus (63.5%).
  - The average **sample size** was 11,069.61 participants (SD = 86,345.63; range = 70 to 954,848).
  - Studies included in the analysis 10.26 (SD = 5.41; range = 3 to 28) **indicators** on average. Studies usually adopt indicators that are: dichotomous (62.3%), ordered categorical and likert scales (28%), continuous (14.7%), and unordered categorical indicators (6.6%). A majority (86.1%) of cases adopted the same type of indicators.
  - In terms of **goal** of the analyses, 95.1% was exploratory, while 4.9% was confirmatory. Furthermore, 86.2% of the studies also investigated covariates of the latent classes.



2. FIT INDEX



3. FINDINGS

- Usually, the selected model has an average of 3.76 **classes** (SD = 1.34; range 2 to 10);
- On average, this solution has an **entropy** of 0.81 (SD = 0,1; range 0.36 to 0.99);
- The classes have a **frequency** ranging from 0.20% to 95.91%;
- Results are usually presented in figures (64.2%), tables (18.7%), both (9.8%) or are not reported in any of these **formats** (7.3%).

Discussion and conclusion

- There is still no consensus on which **fit indices** to use (e.g., no index is used in all papers);
- Fit indices for **quality evaluation** are not yet widespread;
- In general, the problem is not limited to fit indices, but also includes:
  - how **results** are reported: there is little standardization across different papers, and often limited information is provided to the reader (in particular about covariates);
  - how adopted **statistical procedures** are described: authors often do not explicit them or invent their own procedures without sharing enough information about them.

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