Designing and Evaluating a Likelihood-Ratio Test for IRT models

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Abstract

Abstract text.

Keywords

IRT, Goodness-of-fit test, fit indices

Introduction

Introduction text (Zhao and Hambleton, 2017).

Methods

$$\frac{\max(L_0)}{\prod_{j=1}^g \max(L_j)}$$

Results

Discussion

References

- Barton, M. A. and Lord, F. M. (1981). An upper asymptote for the three-parameter logistic item-response model. *ETS Research Report Series*, 1981(1):i–8.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological bulletin*, 107(2):238.
- Cai, L., Chung, S. W., and Lee, T. (2021). Incremental model fit assessment in the case of categorical data: Tucker–lewis index for item response theory modeling. *Prevention Science*, pages 1–12.
- Crişan, D. R., Tendeiro, J. N., and Meijer, R. R. (2017). Investigating the practical consequences of model misfit in unidimensional irt models. *Applied Psychological Measurement*, 41(6):439–455. PMID: 28804181.
- Curran, P., West, S., and Finch, J. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, 1(1):16–29.
- Darrell Bock, R. and Lieberman, M. (1970). Fitting a response model forn dichotomously scored items. *Psychometrika*, 35(2):179–197.

- Jiao, H. and Lau, A. C. (2003). The effects of model misfit in computerized classification test. In Annual meeting of the National Council of Educational Measurement, Chicago, IL.
- Kang, T. and Cohen, A. S. (2007). Irt model selection methods for dichotomous items. Applied Psychological Measurement, 31(4):331–358.
- Krammer, G. (2018). The andersen likelihood ratio test with a random split criterion lacks power. *Journal of modern applied statistical methods: JMASM*, 17:eP2685.
- Loken, E. and Rulison, K. L. (2010). Estimation of a four-parameter item response theory model. *British Journal of Mathematical and Statistical Psychology*, 63(3):509–525.
- Maydeu-Olivares, A. (2013). Goodness-of-fit assessment of item response theory models. *Measurement Interdisciplinary Research and Perspectives*, 11:71–101.
- Maydeu-Olivares, A. and Joe, H. (2014). Assessing approximate fit in categorical data analysis. *Multivariate Behavioral Research*, 49.
- Nye, C. D., Joo, S.-H., Zhang, B., and Stark, S. (2020). Advancing and evaluating irt model data fit indices in organizational research. *Organizational Research Methods*, 23(3):457–486.
- Orlando, M. and Thissen, D. (2000). Likelihood-based itemfit indices for dichotomous item response theory models.

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- Applied Psychological Measurement, 24(1):50-64.
- Rizopoulos, D. (2006). ltm: An r package for latent variable modelling and item response theory analyses. *Journal of Statistical Software*, 17(5):1–25.
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2):1–36.
- Team, R. (2020). RStudio: Integrated Development Environment for R. RStudio, PBC., Boston, MA.
- Team, R. C. (2021). *R: A Language and Environmental for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria.
- Tucker, L. R. and Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38(1):1–10.
- Venables, W. N. and Ripley, B. D. (2002). *Modern Applied Statistics with S.* Springer, New York, fourth edition. ISBN 0-387-95457-0.
- Wilks, S. S. (1938). The Large-Sample Distribution of the Likelihood Ratio for Testing Composite Hypotheses. *The Annals of Mathematical Statistics*, 9(1):60 – 62.
- Yang, X. (2020). Comparing Global Model-Data Fit Indices in Item Response Theory Applications. PhD dissertation, Florida State University, College of Education.
- Zhao, Y. and Hambleton, R. (2017). Practical consequences of item response theory model misfit in the context of test equating with mixed-format test data. *Frontiers in Psychology*, 8.