LATENT CLASS STRUCTURE OF CONNERS' PARENT RATING SCALES OPPOSITIONAL SUBSCALE

Ana V. Kuny, B.A., Robert R. Althoff, M.D., Ph.D., William Copeland, Ph.D., Toos C.E.M. Van Beijsterveldt, Ph.D., Dorret Boomsma Ph.D., and James J. Hudziak, M.D.

Vermont Center for Children, Youth and Families at University of Vermont
The Free University, Amsterdam, The Netherlands

Objective

Oppositional defiant disorder (ODD) and oppositional defiant behavior (ODB) are associated with a higher risk of the later development of conduct disorder (CD) and antisocial personality disorder (Burke et al., 2002 & Loeber et al., 2000). The objective of the current analysis was to determine if specific ODB subclasses could be identified using Latent Class Analysis (LCA) of mother's report on the Conners' Parent Rating Scales Revised Short Forms (CPRS-R:S). In addition, distinguishing features between classes were examined using other subscales of the CPRS-R:S (ADHD Index and Hyperactivity subscales).

Introduction

LCA is a form of person-centered categorical data analysis that assumes that it is possible to account for the relations among symptoms by a set of discrete classes of item endorsement probabilities. LCA presupposes the existence of discrete latent categories which distinguish it from factor analysis which assumes continuous latent variables are present. The analysis results in two metrics:

(1) the probability of class membership for each individual and

(2) symptom endorsement probabilities for each class

The advantage to this approach is that it is free of preconceived notions about which items should go together and thus allows for a manner of classifying individuals empirically using a bottom-up approach. The examination of distinct differences between classes may allow for a more accurate and complete understanding of presenting oppositional defiant behaviors.

Sample

Data was obtained using mother's report for 2,010 10-year-old Dutch twins from the Netherlands Twin Registry (Boomsma et al., 2002).

Mothers completed the CPRS-R:S, which consists of 27 items rated on a four-point Likert scale for symptom severity (i.e., 0 = not true at all, 1 = just a little true, 2 = pretty much true, 3 = very much true). Only the 6 items from the Oppositional scale were used for the LCA . For the LCA, items were recoded such that 0 or 1 = 0 and 2 or 3 = 1. Scores from two other symptom scales, the Hyperactivity and the ADHD Index (ADHDi) were compared across resultant latent classes. Individuals who score high on the Oppositional subscale often have problems with authority figures, are more easily annoyed or angered than other same age individuals, and are often more likely to break rules. The ADHDi identifies children with an increased risk for DSM-IV ADHD, and elevated scores on the Hyperactivity scale are associated with general psychopathology (Conners, 2001) .

Measures

Figure 1: Latent Class Structure of Conners' Parent Rating Scales: Oppositional Subscale

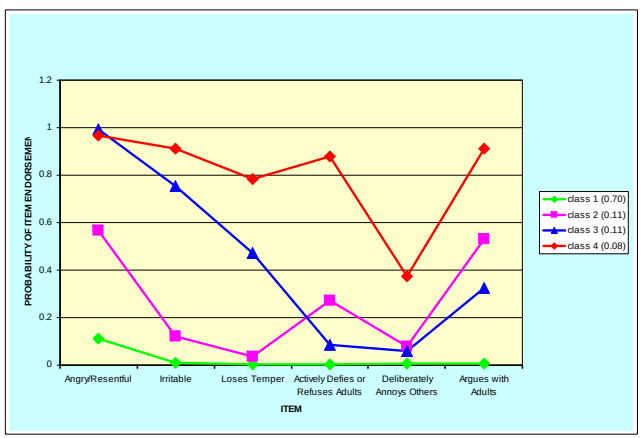

Table 1: Latent Class Analysis Optimal Solution of 4-classes

Class	ADHDi (N, mean, SD)	Hyperactivity (N, mean, SD)
1 No or low symptom	*N* = 1391 *M* = 5.68 *SD* = 5.91	*N* = 1438 *M* = 1.62 *SD* = 2.30
2 Non-reactive defiance	*N* = 163 *M* = 11.43 *SD* = 8.17	*N* = 168 *M* = 4.08 *SD* = 3.65
3 Non-defiant emotional reactivity	*N* = 192 *M* = 12.99 *SD* = 7.93	*N* = 196 *M* = 4.95 *SD* = 3.89
4 Elevated scores on all symptoms	*N* = 141 *M* = 17.21 *SD* = 8.88	*N* = 146 *M* = 7.52 *SD* = 4.60
TOTAL	*N* = 1887 *M* = 7.78 *SD* = 7.58	*N* = 1948 *M* = 2.61 *SD* = 3.38

Analyses

Latent Class Analysis was performed using the program Latent Gold 4.0 (Vermunt and Magidson, 2005). Models were fitted by means of an Expectation Maximization algorithm. Models estimating 1-class through 10-profile solutions were compared. To calculate the best fitting model, we compared the change in the Bayesian Information Criterion (BIC), a goodness-of-fit index that considers the rule of parsimony along with bootstrapping.

Results

•LCA identified an optimal solution of 4-classes (Figure 1)

- Class 1 (70%) no or low symptom endorsement
- Class 2 (11%) non-reactive defiance
- Class 3 (11%) non-defiant emotional reactivity
- Class 4 (8%) elevated scores on all symptoms

•Classes 2-4 were all associated with an increase in the ADHD Index (ADHD-I) and Hyperactivity Index scores (Table 1) with class 3 demonstrating higher HI scores than class 2 in a Bonferroni-corrected contrast.

Conclusions

• There are at least 4 distinct classes of ODB.

• These classes are distinguished by level of emotional reactivity and non-reactive defiance.

• Further research should investigate differences between the classes in terms of:
  - Life Course
  - Genetics/Heritability
  - Co-occurring Disorders

• An understanding of distinct differences between classes may allow for a more accurate and complete picture of presenting oppositional defiant behaviors in both research and clinical settings.

References

Boomsma DI, Vink JM, van Beijsterveldt TC, de Geus EJ, Beem AL, Mulder EJ, Derks EM, Riese H, Willemsen GA, Bartels M, van den Berg M, Kupper NH, Polderman TJ, Posthuma D, Rietveld MJ, Stubbe JH, Knol LI, Stroet T, van Baal GC (2002). Netherlands Twin Register: a focus on longitudinal research. *Twin Res* 5:401-406.

Burke JD, Loeber R, Birmaher B (2002). Oppositional defiant disorder and conduct disorder: a review of the past 10 years, part II. *J Am Acad Child Adolesc Psychiatry* 41:1275-1293.

Conners CK (2001). *Conners Rating Scales-Revised*. New York/Toronto: Multi-Health Systems.

Loeber R, Burke JD, Lahey BB, Winters A, Zera M (2000). Oppositional defiant and conduct disorder: a review of the past 10 years, part I. *J Am Acad Child Adolesc Psychiatry* 39:1468–1484.

Vermunt JK, Magidson J. Latent Gold 4.0 user's guide. Belmont, MA: Statistical Innovations Inc, 2005.