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Methodological Approaches to Community-Based Research

Chapter 6/Web Appendix guide

Web Appendix Guide for Chapter 6/Latent Class Analysis

The person-oriented statistical technique we used in Chapter 6 is latent class analysis (LCA). LCA uses multivariate categorical data to determine the number of latent classes within a sample. As implied by the name, latent classes are unobservable subgroups; each class is defined by its homogeneity on several variables. That is, within each class the cases will have similar scores on specific variables, whereas cases in different classes will differ from one another.

LCA differs from traditional clustering techniques in that it is model-based rather than algorithm-based. LCA creates classes such that the observed covariation among variables is explained by the classes. Various studies have indicated that LCA is better able than cluster analysis to determine the underlying group structure of the data. There are many statistical programs that the researcher might use to conduct LCA. Like most LCA programs, LEM uses an EM algorithm to estimate the clusters.

The command code in Lem for the 3 latent classes model is as follows:

* LCA with Data from Person-Oriented Chapter.sav

* Variables used: A, B, C, D

lat 1

man 4

dim 3 3 3 2 2

mod X A|X B|X C|X D|X

dat [9, 14, 12, 8, 18, 16, 8, 2, 10, 27, 13, 3, 48, 43, 52, 6, 45, 30, 35, 8,
47, 37, 34, 11, 36, 14, 71, 8, 29, 11, 16, 2, 19, 17, 21, 4]

Where

lat = number of latent variables: An explanation of why we predicted only one latent variable is discussed in the chapter.

man = number of manifest variables: These are Variable A (contextual support) and Variable B (youth motivation), each of which had three categories (1 = low, 2 = medium, 3 = high), and Variable C (positive activity involvement) and Variable D (college attendance), each of which had two categories (1 = no, 2 = yes).

dim = “dimensions”: In this case, we are talking about a 5-dimensional space with 3 x 3 x 3 x 2 x 2 sectors (cells; patterns; configurations ...).

mod = model: One latent factor, X, and 4 variables (A, B, C, D).

dat = data: In this case, the data line contains the frequencies for each possible pattern of the 4 variables

As noted in the chapter, we ran the model several times. Each time, the number of classes was increased by one (see Table 6.1 in the chapter). Both the goodness-of-fit significance tests (which we do not want to suggest significant model-data discrepancies) and the AIC (a goodness-of-fit statistic that we want to be comparatively low) suggest that the model with three latent classes was the best among the four considered.

Data:

Var A	Var B	Var C	Var D	Freq
1.00	1.00	1.00	1.00	9.00
1.00	1.00	1.00	2.00	14.00
1.00	1.00	2.00	1.00	12.00
1.00	1.00	2.00	2.00	8.00
1.00	2.00	1.00	1.00	18.00
1.00	2.00	1.00	2.00	16.00
1.00	2.00	2.00	1.00	8.00
1.00	2.00	2.00	2.00	2.00
1.00	3.00	1.00	1.00	10.00
1.00	3.00	1.00	2.00	27.00
1.00	3.00	2.00	1.00	13.00
1.00	3.00	2.00	2.00	3.00
2.00	1.00	1.00	1.00	48.00
2.00	1.00	1.00	2.00	43.00
2.00	1.00	2.00	1.00	52.00
2.00	1.00	2.00	2.00	6.00
2.00	2.00	1.00	1.00	45.00
2.00	2.00	1.00	2.00	30.00
2.00	2.00	2.00	1.00	35.00
2.00	2.00	2.00	2.00	8.00
2.00	3.00	1.00	1.00	47.00
2.00	3.00	1.00	2.00	37.00
2.00	3.00	2.00	1.00	34.00
2.00	3.00	2.00	2.00	11.00
3.00	1.00	1.00	1.00	36.00
3.00	1.00	1.00	2.00	14.00
3.00	1.00	2.00	1.00	71.00
3.00	1.00	2.00	2.00	8.00
3.00	2.00	1.00	1.00	29.00
3.00	2.00	1.00	2.00	11.00
3.00	2.00	2.00	1.00	16.00
3.00	2.00	2.00	2.00	2.00
3.00	3.00	1.00	1.00	19.00
3.00	3.00	1.00	2.00	17.00
3.00	3.00	2.00	1.00	21.00
3.00	3.00	2.00	2.00	4.00

The reader is encouraged to consult these additional references for further reading:

- Bergman, L. R., & Andersson, H. (2010). The person and the variable in developmental psychology. *Zeitschrift für Psychologie / Journal of Psychology*, 218, 155-165.
- Bergman, L. R., Eklund, G., & Magnusson, D. (1991). Studying individual development: Problems and methods. In D. Magnusson, L. R. Bergman, G. Rudinger, & B. Törestad (Eds.), *Problems and methods in longitudinal research* (pp. 1-27). Cambridge, NY: Cambridge University Press.
- Bergman, L. R., & Magnusson, D., & El-Khoury, B. M. (2003). *Studying individual development in an interindividual context*. Mahwah, NJ: Erlbaum.
- Ialongo, N. (2010). Steps substantive researchers can take to build a scientifically strong case for the existence of trajectory groups. *Development and Psychopathology*, 22, 273-275.
- Magnusson, D. (1988). *Individual development from an interactional perspective*. Hillsdale, NJ: Erlbaum.
- Magnusson, D., & Bergman, L. R. (1985). A pattern approach to the study of pathways from childhood to adulthood. In L. Robins & M. Rutter (Eds.), *Straight and devious pathways from childhood to adulthood*, (pp. 101-115). New York: Cambridge University Press.
- Molenaar, P. C. M. (2004). A manifesto on psychology as ideographic science: Bringing the person back into scientific psychology, this time forever. *Measurement*, 2, 201-218.
- Molenaar, P. C. M. (2010). Testing all six person-oriented principles in dynamic factor analysis. *Development and Psychopathology*, 22, 255-259.
- Molenaar, P. C. M., & Campbell, C. G. (2009). The new person-specific paradigm in psychology. *Current Directions in Psychological Science*, 18, 112-117.
- Mun, E. Y., Bates, M. E., Vaschillo, E. (2010). Closing the gap between person-oriented theory and methods. *Development and Psychopathology*, 22, 261-271.
- Mutz, R., & Seeling, U. (2010). A nomothetic version of the Brunswikian Lens Model: A variable and person oriented approach. *Zeitschrift für Psychologie / Journal of Psychology*, 218, 175-184.
- Peck, S. C., & Roeser, R. W. (Vol. Eds.). (2003). Person-centered approaches to studying development in context. In W. Damon (Series Ed.), *New directions for child and adolescent development: Vol. 101*. San Francisco: Jossey-Bass.
- Schmidt, M., Perels, F., & Schmitz, B. (2010). How to perform idiographic and a combination of idiographic and nomothetic approaches: A comparison of time series analyses and hierarchical linear modeling. *Zeitschrift für Psychologie / Journal of Psychology*, 218, 166-174.
- Sterba, S. K., & Bauer, D. J. (Eds.). (2010). Match between person-oriented methods and theory [Special issue]. *Development and Psychopathology*, 22(2).
- Sterba, S. K., & Bauer, D. J. (2010). Matching method with theory in person-oriented developmental psychopathology research. *Development and Psychopathology*, 22, 239-254.
- Sterba, S. K., & Bauer, D. J. (2010). Statistically evaluating person-oriented principles revisited. *Development and Psychopathology*, 22, 287-294.
- Strohmeier, D., Wagner, P., Spiel, C., & von Eye, A. (2010). Stability and constancy of bully-victim behavior: Looking at variables and individuals. *Zeitschrift für Psychologie / Journal of Psychology*, 218, 185-193.

- Vermunt, J. K. (1997). Lem: A general program for the analysis of categorical data. Tilburg University: unpublished program manual.
- von Eye, A. (2010). Developing the person-oriented approach: Theory and methods of analysis. *Development and Psychopathology*, 22, 277-285.
- von Eye, A., Indurkha, A., & Kreppner, K. (2000). CFA as a tool for person-oriented research—Unidimensional and within-individual analyses of nominal level and ordinal data. *Psychologische Beiträge*, 42, 383-401.
- von Eye, A., & Spiel, C. (2010). Conducting person-oriented research. *Zeitschrift für Psychologie / Journal of Psychology*, 218, 151-154.
- Von Eye, A. & Spiel, C. (Eds.). (2010). Person-oriented research methods [Special issue]. *Zeitschrift für Psychologie / Journal of Psychology*, 218(3).