A Multilevel Approach to Identifying Criterion-Related Profile Patterns

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8 March 2012

Research Interests

- Unusual Count Models
  - Ph.D. and M.S. projects
    - School suspensions - vast majority of students never suspended, some students suspended a few times, and some students suspended a lot!
- Longitudinal Analyses
  - The development of the domain of work competence
  - Educational trajectories in MPS
  - The development of thought problems in bipolar offspring
- Profile Analysis
  - R software development
  - Multilevel profile analysis

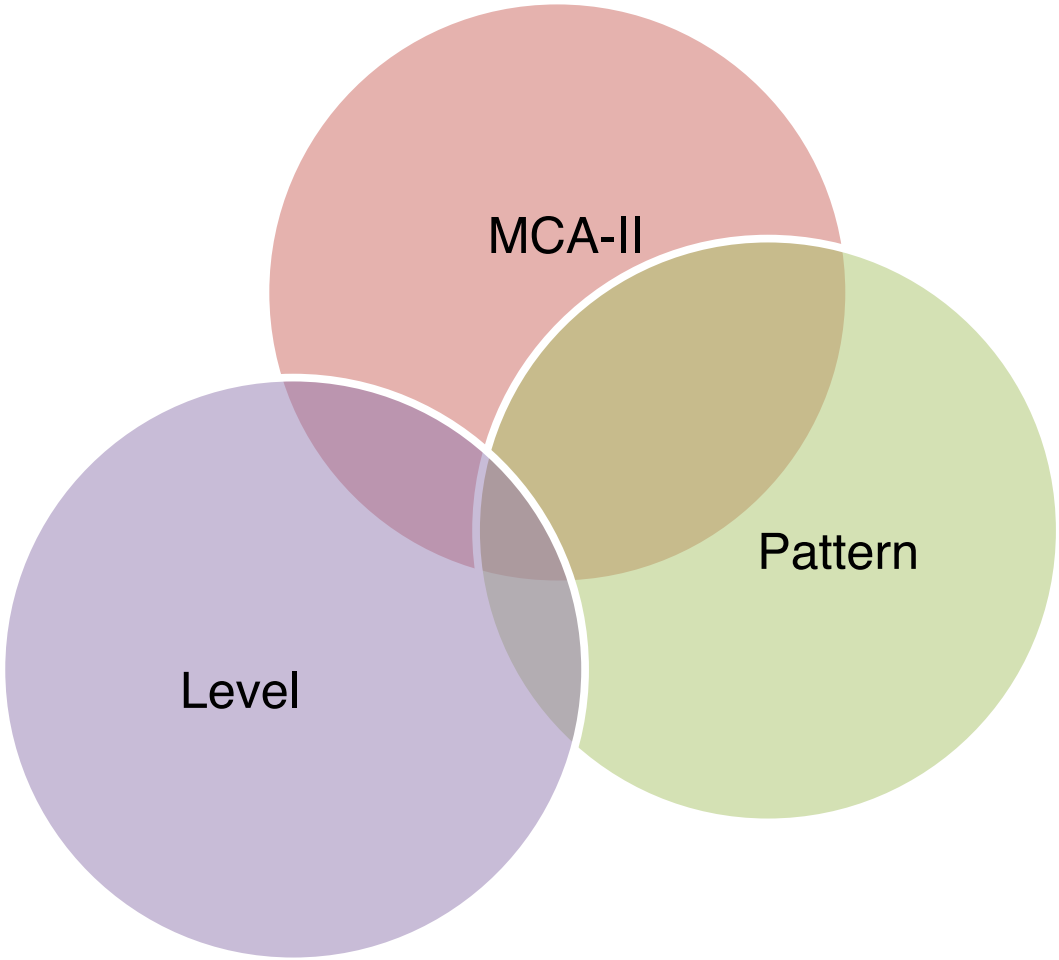
Purposes of the Current Study

To expand profile analysis to a multilevel framework

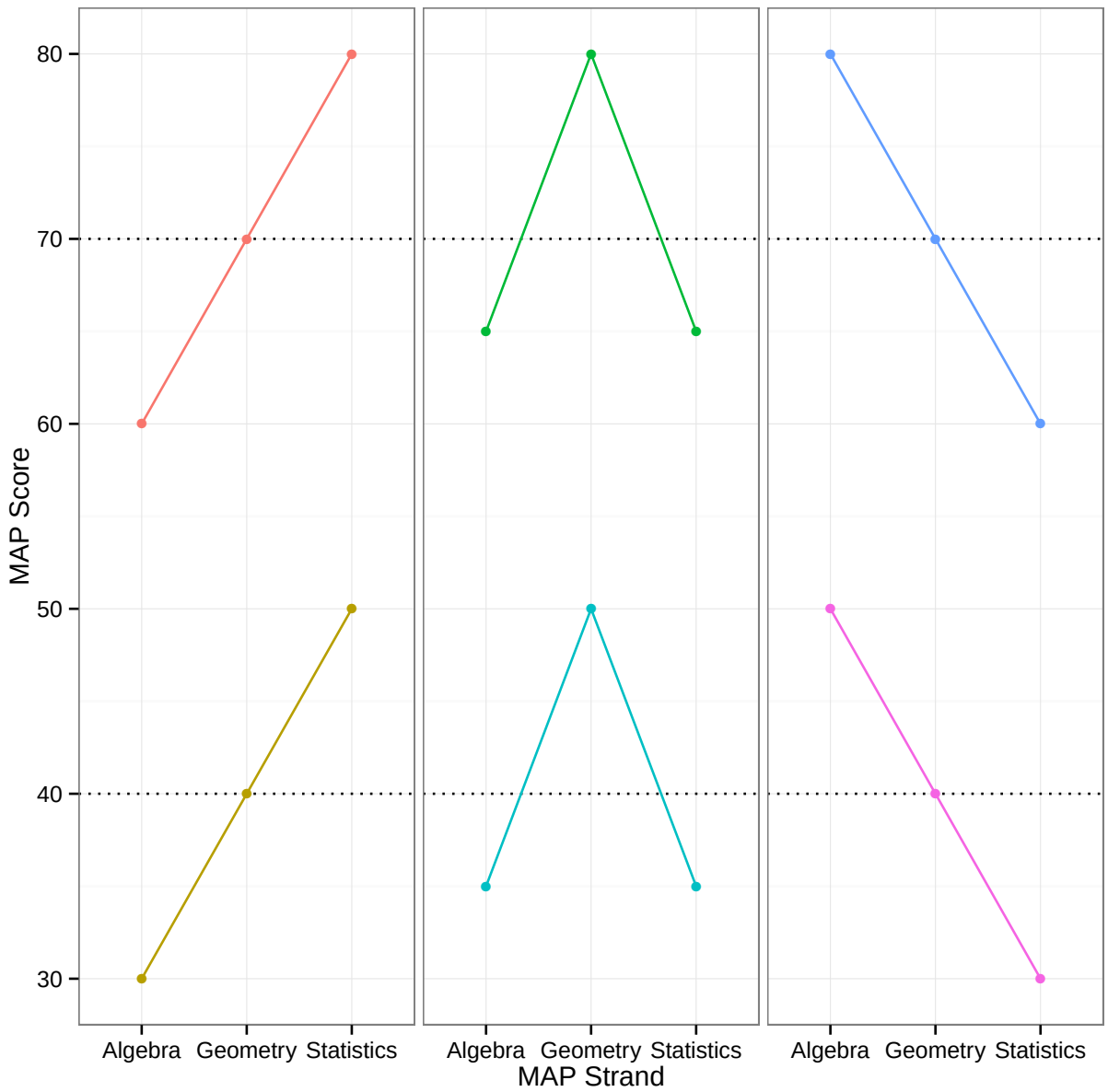
What is Profile Analysis

- We are interested in predicting MCA-II math scores from the profile of a student's MAP math strand scores
- Decomposes the MAP scores into two components
  - Level component is the mean of their strand scores of the MAP
  - Pattern component is the arrangement of the MAP strand scores
- This allows us to understand how much variability in MCA-II math scores are a function of a student's general math knowledge (level) or specific content knowledge (pattern)
- Pattern has important diagnostic implications
- Reliability evidence and decision-making
- Extendible to IRT and the bifactor model

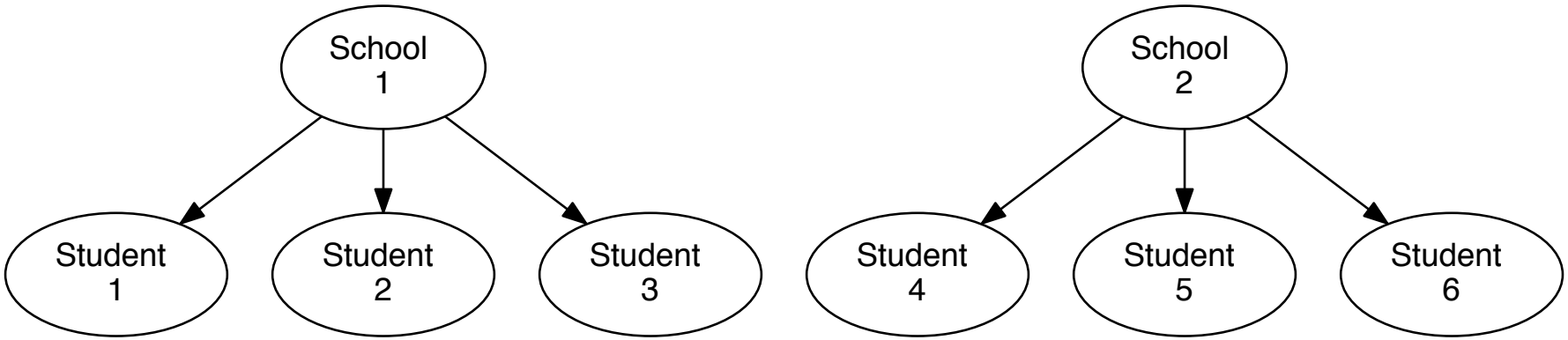
Profile Analysis



Level and Pattern Components



Multilevel Profile Analysis



Data Example

- Participants
  - 1,971 4th grade students from 41 schools in Minneapolis Public Schools
- Tests
  - Predictors: the four strands in the MAP math assessment
    - Number Sense and Computation
    - Functions and Algebra
    - Statistics and Probability
    - Geometry and Measurement
  - Outcome: MCA-II math test

Results

Model	R^2	BIC	AIC
No Pattern or Level	0.3214	5637	5620
Pattern Only	0.3216	5645	5622
Level Only	0.7544	3604	3582
Pattern & Level	0.7545	3613	3585

Discussion

- Multilevel profile analysis can be used for decomposing strand scores into both level and pattern component while controlling for school
- The use of a multilevel approach ensures validity in inferences about the importance of the pattern and level
- The benefit of profile analysis is the emphasis on the pattern component

What Next?

- Could be expanded to breakdown predictors into school and student pattern and level components
- Useful for identifying schools that have patterns related to success and for understanding how much of a student's pattern and level effects matter after modeling school pattern and level effects