A Person-Centered Approach
to Modeling Complex Interactions

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Motivation

• Developmental systems theory posits a high degree of interaction between factors both within the person and between person and context in the prediction of outcomes.

• Magnusson, Cairns, & Bergman argue that linear models are
  • insensitive to interactions
  • require unrealistic assumptions (e.g., linearity, bilinearity)
  • do not facilitate holistic interpretations in terms of the actual patterns of functioning that characterize individuals

• They argue that "person-centered methodology" is more consistent with systems theory.

A Case Study

• Simulated N=2000 to resemble CLS data (Cairns et al. 1989).

• Four continuous predictors from 7th grade:

  Aggression, Academics, Popularity, "All-American"

• One dichotomous outcome: Dropout by the 11th grade.

• Hypothesized that the predictors may interact with one another to predict dropout

  (e.g., the effect of aggression may depend on other

  social competencies).

The Person-Centered Approach

• Conducted a Latent Profile/Class Analysis of the four continuous predictors and the binary outcome variable.

• Estimated five latent classes, labeled C1-C5
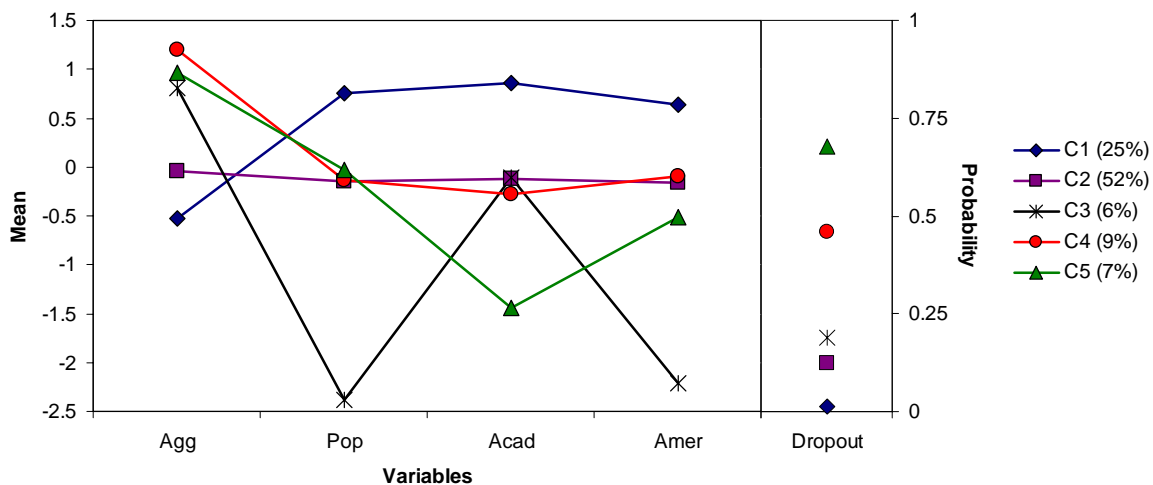
Critique of Person-Centered Approach

- Normally, analysis stops with consideration of profiles.

- Profiles facilitate holistic interpretations, but...
    - Only 5 configurations for predictors.
    - Only 5 predicted probabilities of dropout.
    - Are interactions really being captured?

I now show how these criticisms can be addressed.

Recovering Continua from Categories

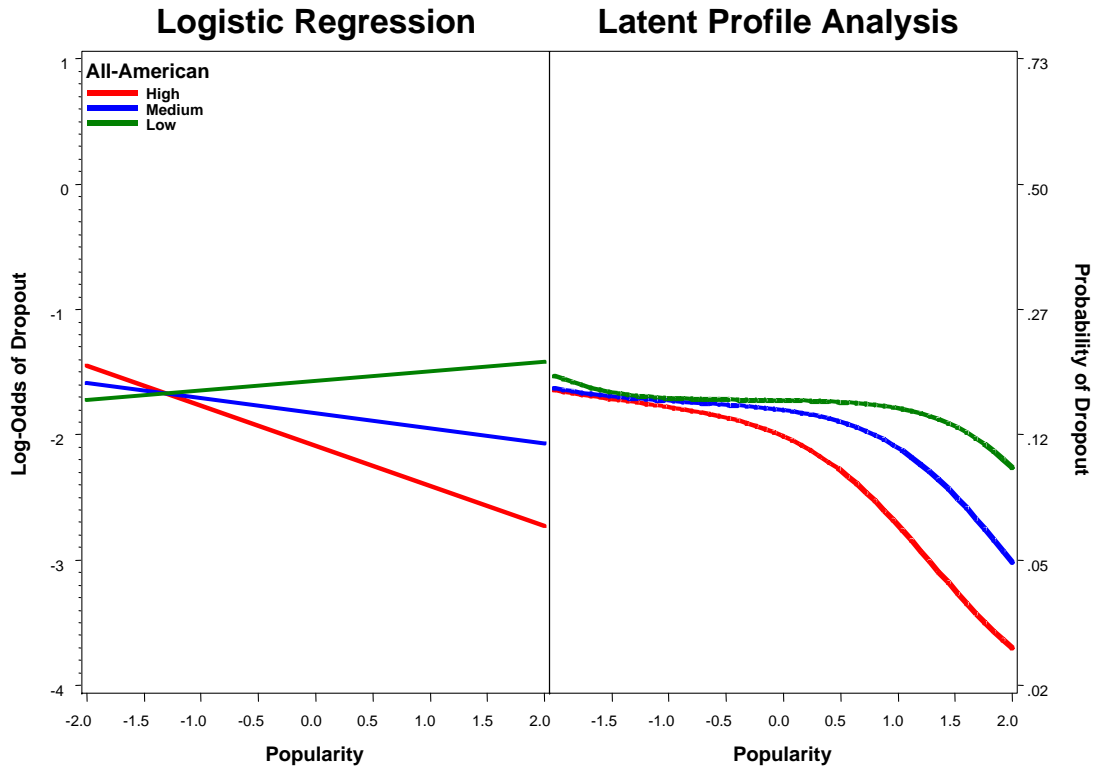- The probability of dropout for each individual i given his/her values on the continuous predictors $\mathbf{x}_i$ is:

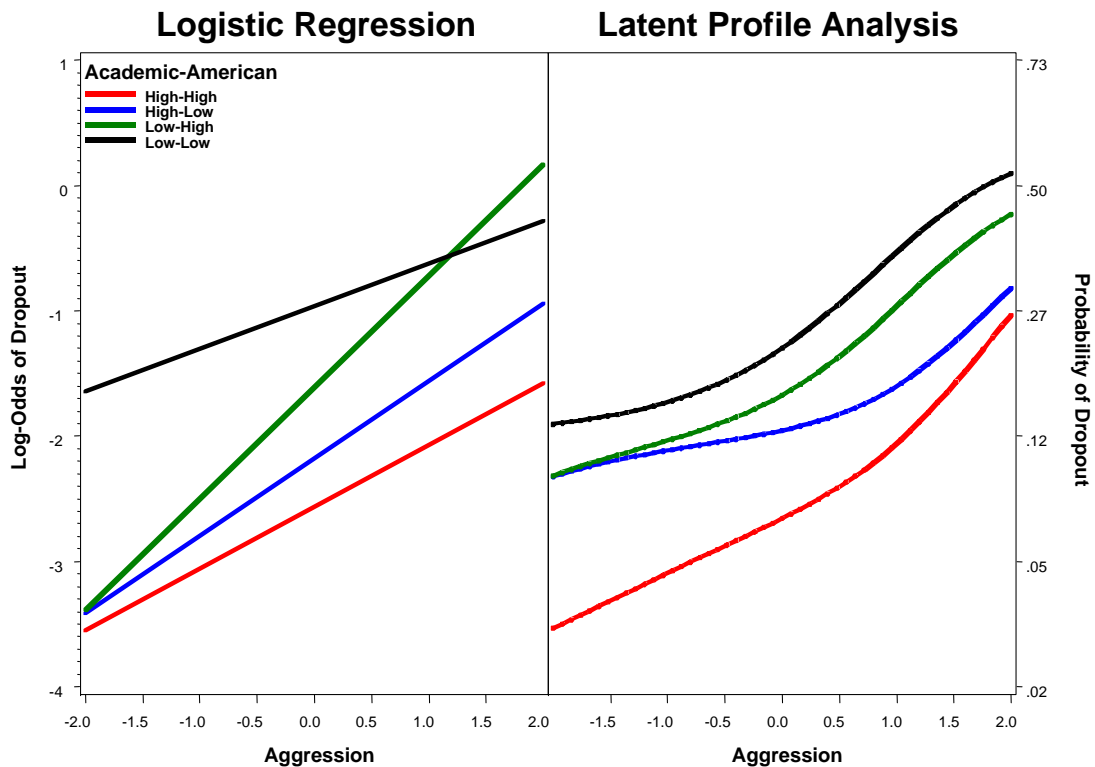$$\tau_i = \sum_{k=1}^{K} p_{ik}(\mathbf{x}_i)\tau_k$$

Where

τ_i is the probability of dropout for person i,

τ_k is the probability of dropout for class k,

$p_{ik}(\mathbf{x}_i)$ is the probability that person i belongs to class k given the data $\mathbf{x}_i$

- We can now generate the predicted probability of dropout for any combination of values on predictors.

Comparison

Logistic Regression

Latent Profile Analysis

All-American
- High
- Medium
- Low

Comparison

Logistic Regression

Latent Profile Analysis

Academic-American
- High-High
- High-Low
- Low-High
- Low-Low

Conclusions and Future Directions

• The use of person-centered methods <u>does not</u> preclude capturing <u>continuous</u> relations / interactions.

• Person-centered methods identify salient configurations – one need not specify ad hoc configurations to probe effects.

• The potential of person-centered methods to capture complex interactions should be explored more deeply:

  • Performance?

  • Where is Development?

  • Where is Context?