Suspensions in Homeless and Highly Mobile Students: A Multilevel Longitudinal Study

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Purposes of the Current Study

1. Whether the growth and timing of suspensions were similar to other problem behaviors
2. Whether a risk gradient exists beyond what it is explained by demographic variables and school effects

Problem Behaviors

- Problem behaviors include:
  - Delinquency (e.g. crime)
  - Risky sexual behaviors
  - Substance abuse
- In the classroom problem behaviors may result in detentions, suspensions, and truancy
  - Disrespecting teachers
  - Fighting
  - Vandalism
- Problem behaviors often occur in tandem with one another (Donovan & Jessor, 1985)

Problem Behaviors Growth and Factors

- Problem behaviors emerge in the lower grades of primary school, peak in middle to high school, and decrease in early adulthood (Moffitt, 1993; Elliot, 1994; Valois, MacDonald, Bretous, Fischer, & Drane, 2002; Boyer, 2006)
- Highly associated with poor parent supervision, violent parents, child abuse, low family income, peer delinquency, and academic failure (Farrington, 1998; Valois et. al., 2002)

HHM students: Higher Risk?

- Homeless and highly mobile (HHM) children may be at an especially high risk to be delinquent
- Nationally, there is at least 326,400 homeless children during a calendar year and 51% of these children are under 6 (Samuels, Shinn, & Buckner, 2010)
- They have several risk factors associated with academic and behavioral problems (Rafferty & Shinn, 1991; McChesney, 1993; Masten, 2008; Samuels, Shinn, & Buckner, 2010)
- Myriad of studies showing poor outcomes for these students

Why the Current Study?

- Longitudinal studies of problem behaviors in schools do exist. But . . .
  - Limited by their statistical models - Cross-sectional analyses
  - Inability to track individuals longitudinally
- None of the published studies have focused specifically on HHM students
- This study addresses these shortcomings and focuses on suspension as our measure of problem behaviors

Data

- Data were collected from the 2003-2004 through 2007-2008 school year on 73,493 students in grades 1 through 12 in Minneapolis Public Schools (MPS)
- Students were divided into one of five risk groups
  - Homeless or highly mobile more than one year during the study (HHM>1) - 1,658
  - Homeless or highly mobile only one year during the study (HHM=1) - 6,466
  - Receiving free-priced meals but not HHM (FREE) - 39,209
  - Receiving reduced-priced meals but not HHM (RED) - 3,177
  - Non-low income “advantaged“ group (ADV) - 22,983

Covariates and Outcome

- Ethnicity
  - Non-Hispanic White
  - African American
  - Asian American
  - Hispanic
  - Native American
- Gender
- Special Education status
- School - 127 schools
- Suspensions
  - Yearly total days suspended were calculated for each student in the study

Statistical Modeling Issues

- How to account for count data that is zero-inflated and overdispersed?
  - 79% of all students had no suspensions during the study
- How to account for correlations associated with repeated measurement of individuals, individuals nested within a school, and a partial crossing random effect of repeated measurements of a student in a school vs. repeated measurements of a student across schools?
- Bayesian zero-inflated Poisson (ZIP) multilevel models

Analyses for Risk and School Effects on Suspension Trajectories

- Quadratic multilevel growth model was fit to the data
- Random variable for student and school intercept and school crossing effect
- Risk, Gender, Ethnicity, and Special Education included in Poisson component only
- Compared 4 models
  - Full Model (FM)
  - No School (NS)
  - No Risk Full Model (NRF)
  - No Risk No School (NRNS)

Prior and Selection Criteria

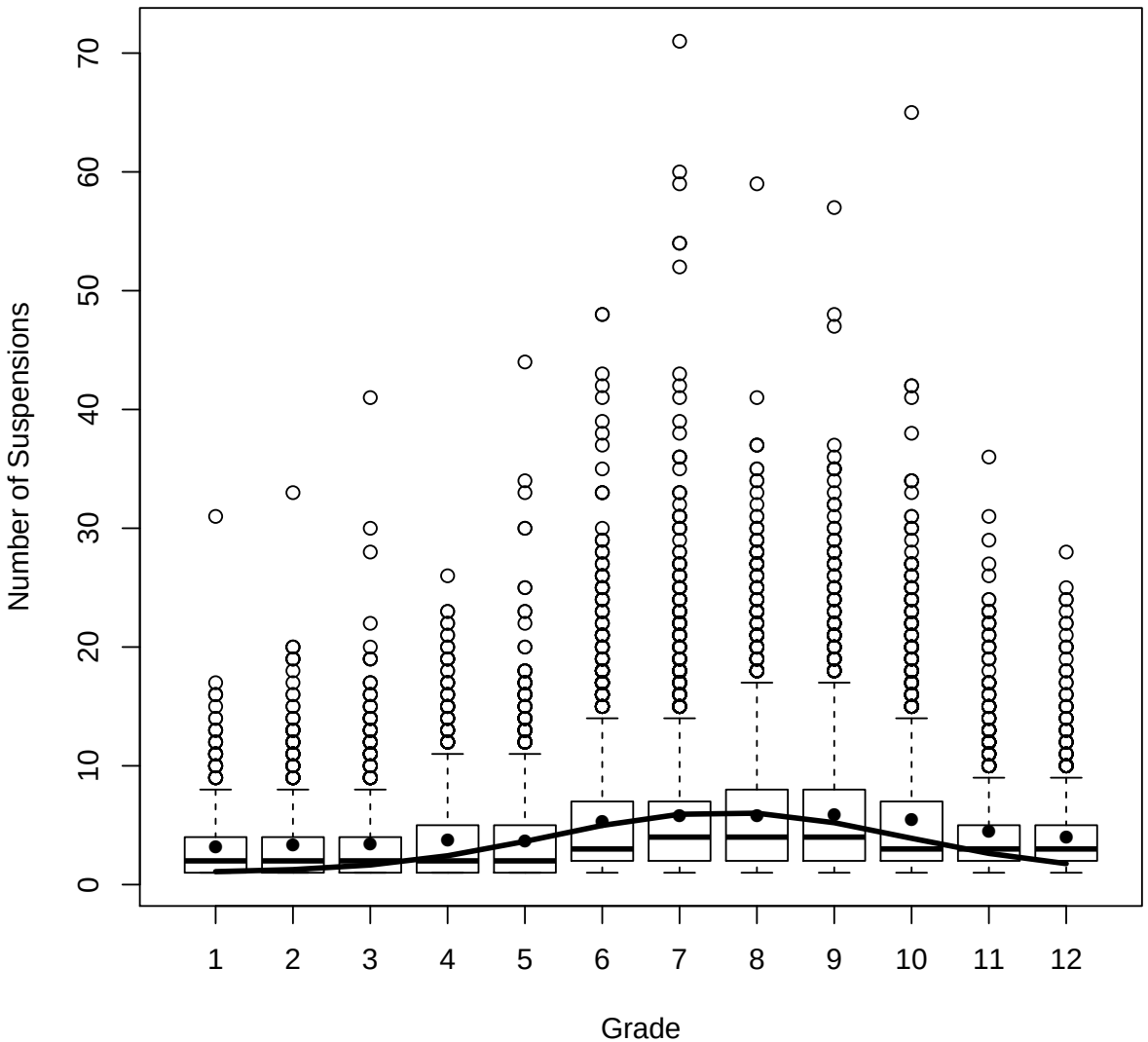
- Priors
  - Fixed Effects: Non-informative multivariate normal
  - Random Effects: Half Cauchy distributions with a scale parameter set to 2 (Gelman, 2006)
  - Residuals: Fixed as they can not be estimated in ZIP models
- The best model was selected using the Deviance Information Criterion (DIC) (Spiegelhalter, Best, Carlin, & van der Linke, 2002)

Results

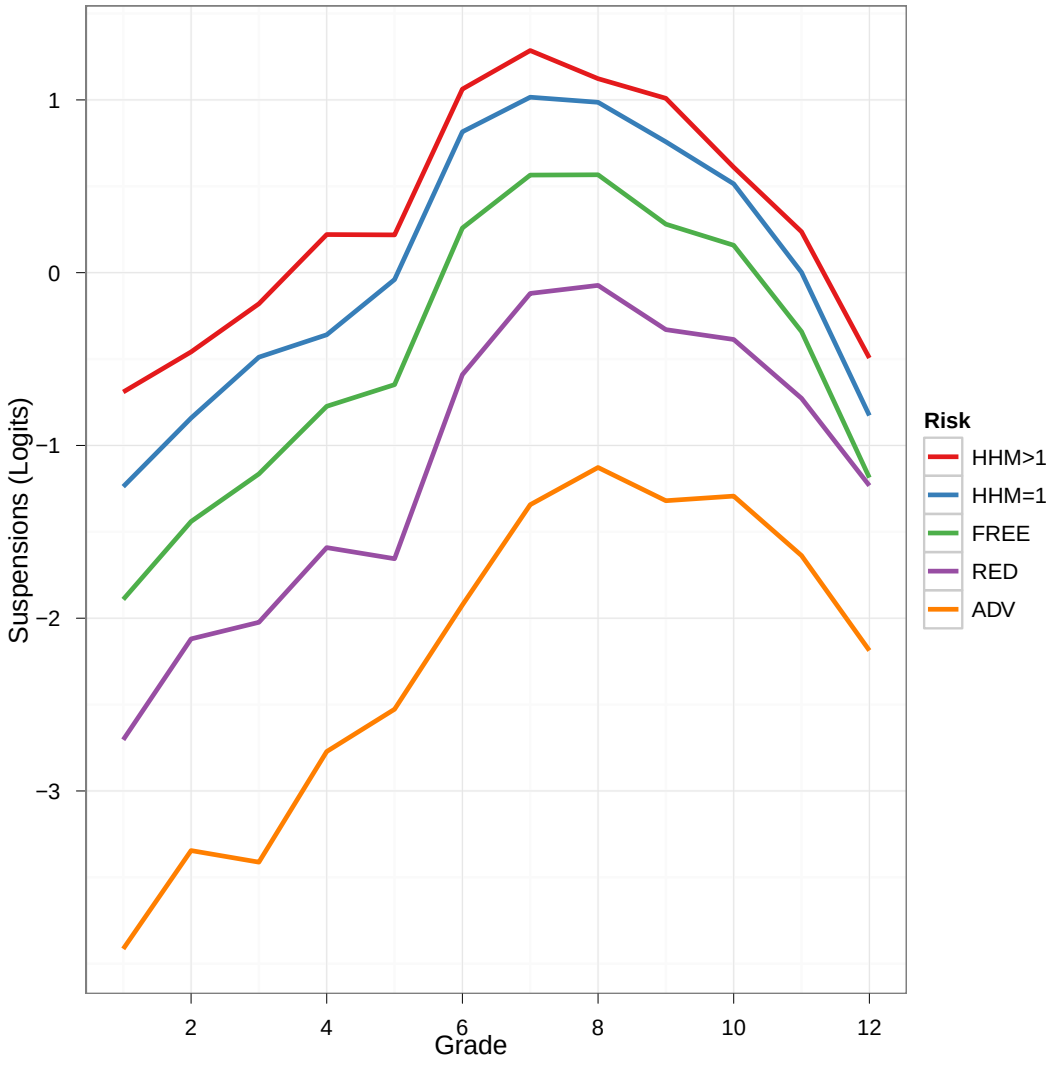
Model	DIC	ΔDIC
FM	199371	0
NS	202879	3508
NRF	200312	941
NRNS	203921	4550

Recall that FM is the full model with risk interactions and all school level effects

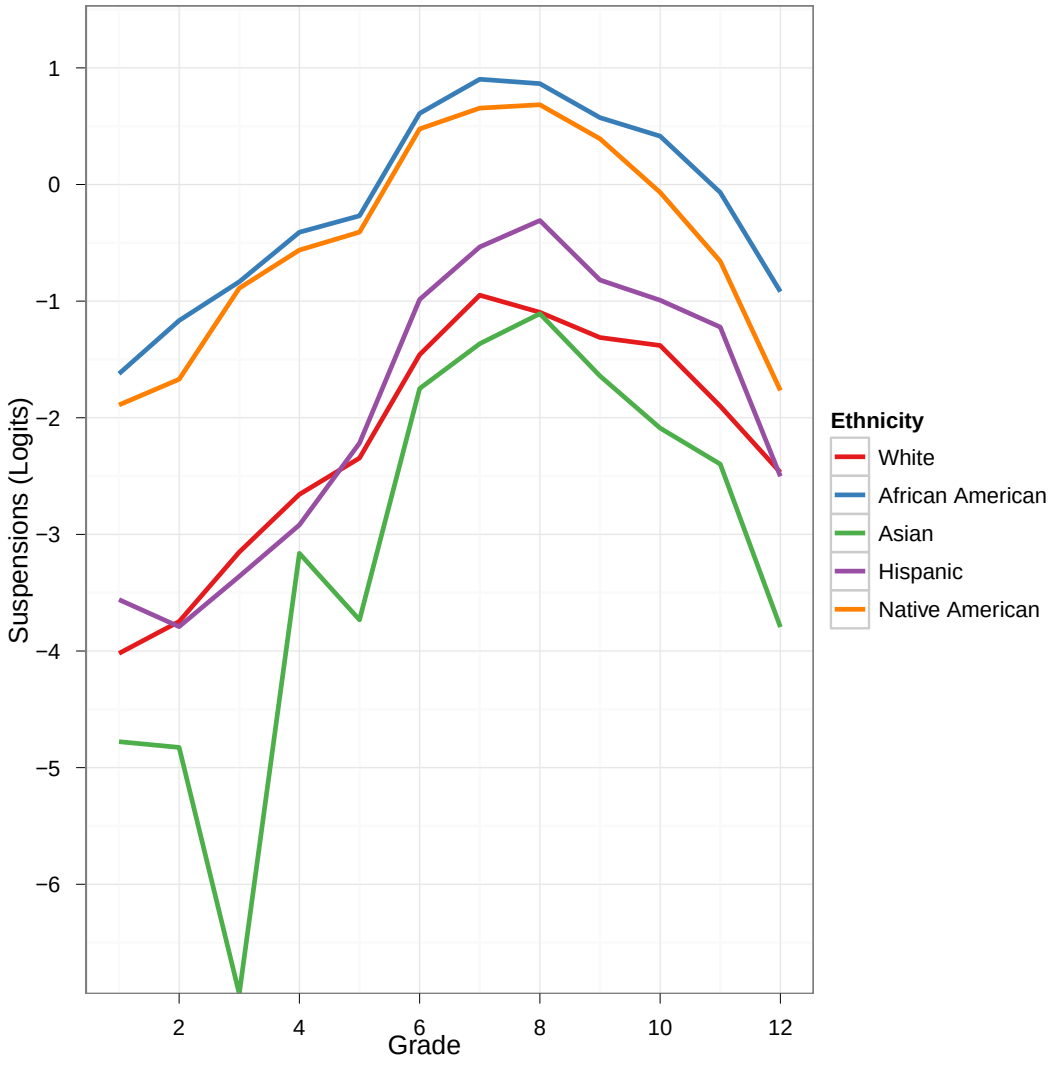
Growth Model



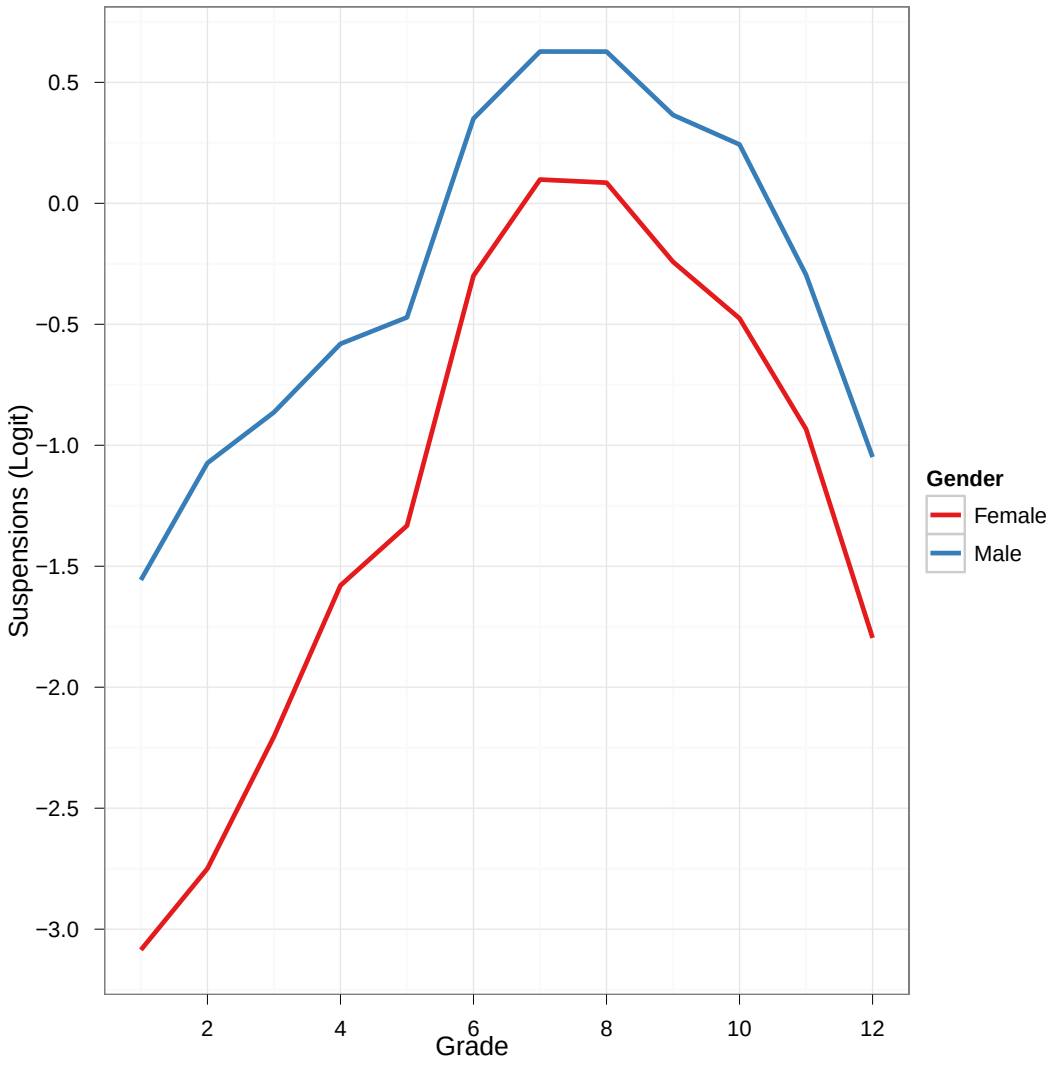
Risk Effects



Ethnicity Effects



Gender Effects



Discussion

- Trajectory/growth of suspension similar to other problem behaviors
  - Timing of the crescendo was earlier for suspensions
- Suspensions peaked in the middle grades and tapered off as students entered high school
- Potential causes: Puberty? School transitioning? Increased influence of peers? ...

Conclusions/Implications

- Results corroborated a continuum of risk for suspensions
- The pattern and timing of the suspension crescendo was similar across risk level, ethnicity, and gender
- Results suggested a surge in suspensions coinciding with the transition period of early adolescence and middle school, superimposed on stable risk gradients
- Bayesian multilevel ZIP models should be considered when data are over dispersed and/or zero-inflated
- Further research is needed to understand the individual, contextual, interactional, and developmental influences that may play a role in generating the crescendo pattern for suspensions