

## School Bullying, Family Structure and Socioeconomic Status in the US from 1989 to 2009:

### Repetitive Trends and Persistent Disadvantage

#### Introduction

While child and youth bullying behaviors, especially in school contexts, have received increased attention during the past three years from the press, policy makers, and school administrators, it has been argued that current anti-bullying efforts nationwide not only fail to change the status quo but lead to an intensification of school bullying. Without concrete evidence about historical trends in school bullying and the prevalence of bullying behaviors across demographic, social and economic groups, the wisdom behind the war against school bullies will continue to be challenged. Important questions remain as to whether the recent upsurge in school bullying is unique, and the relative risk of bully victimization of students with different socio-demographic and behavioral characteristics and the variation of these risks over time. To address these problems, this research uses a nationally representative dataset to analyze the trends, changes of school bullying and the differential exposure of demographic, social and economic groups to school bullying over time.

#### Data

This research is based on the Monitoring the Future (MTF) project, a nationally representative study designed to explore trends and changes in values, behaviors and orientations of American adolescents. The survey of 12<sup>th</sup> graders was initiated in 1975 and surveys of 8<sup>th</sup> and 10<sup>th</sup> graders have been conducted since 1991. Every year, thousands of 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> graders participate in this survey and respond to questions on a series of subjects, such as drug use, religious orientation, school performance, violence, and socio-economic status of their parents. In the current research, more than 50,000 12<sup>th</sup> graders interviewed from 1989 to 2009 were included.

#### Dependent variables and covariates

Questions regarding school bullying appear in the questionnaire as follows.

“The next questions are about some things which may have happened TO YOU while you were at school (inside or outside or in a school-bus). During the LAST 12 MONTHS, how often ...”

1. Has an unarmed person threatened you with injury, but not actually injured you?
2. Has someone threatened you with a weapon, but not actually injured you?
3. Has someone injured you on purpose without using a weapon?
4. Has someone injured you with a weapon (like a knife, gun, or club)?

These four questions are hereinafter referred *as threatened without injury, threatened with a weapon, injury without a weapon and injury with a weapon*, respectively. Response categories for all four questions are the same: 1) not at all; 2) once; 3) twice; 4) 3-4 times; 5) 5+ times. For each of the four questions for each year from 1989 to 2009, the frequency distributions of the total samples of 12<sup>th</sup> graders were obtained from MTF codebooks. Frequency distributions of certain demographic, economic and social groups (such as sex, race and parental education) were retrieved and computed from individual MTF datasets from 1989 to 2009. Due to relative small sample sizes of some single socio-economic groups in the individual years, data smoothing was applied to observed frequency distributions in order to facilitate the detection of temporal trends.

Covariates include ten dummy variables denoting demographic background, socioeconomic status and behavioral characteristics of 12<sup>th</sup> graders: sex (male vs. female), residency (on a farm or in the

country *vs.* in a city), single-parent and no-parent families, father's educational attainment (secondary education and below *vs.* tertiary education), mother's educational attainment (secondary education and below *vs.* tertiary education), mother's employment status (no employment or part-time employment *vs.* full employment), race (African American *vs.* non-African American), religious attendance (rare or no attendance *vs.* regular attendance), religious orientation (important *vs.* unimportant) and GPA (B+ and below *vs.* A- and above)

## Methods

Classic statistical models for analyzing rare events (such as school bullying) are built upon Poisson distribution. To account for differential exposure to bullying behaviors, i.e., bullying processes are not operative in the school environments of all 12<sup>th</sup> graders, we estimated zero-inflated Poisson (ZIP) distributions, with probability mass function given as follows:

$$\begin{cases} P(x=0 | P, \lambda) = (1-P) + P * Poisson(\lambda) = (1-P) + P * \exp(-\lambda) \\ P(x | P, \lambda) = P * Poisson(\lambda) = P * \frac{\exp(-\lambda) * \lambda^x}{x!} \quad \text{when } x > 0 \end{cases}$$

where  $\lambda$  lambda is the mean number of occurrence (average number of school bullying in a year) given an individual at risk and P is the proportion of individuals exposed to bullying behaviors, as suggested by the law of large numbers.

As discussed above, the reported numbers of bullying behaviors are combined (3-4 times) and right-censored (5+ times) in response categories, which means that no existing statistical software package can be readily applied to analyze such data. To overcome the challenge imposed by data structure, we wrote a program using R to estimate the parameters of the zero-inflated Poisson distributions over observed frequencies by minimizing mean absolute deviations in each year.

## Findings

Our empirical results are listed from Figure 1 to Figure 8, which can be summarized as below:

- For those 12<sup>th</sup> graders who were exposed to bullying behaviors in a given year, the *intensity of bullying* as measured by the average number of times they were bullied ( $\lambda$ ), the recent upsurge in the 2002-2009 years (except for threatened with a weapon) is similar to what happened in the early 1990s—but the current one is more dramatic. But the *proportion of 12<sup>th</sup> graders exposed to school bullying* (P) shows a long-term downward trend (see Figure 1).
- Our analyses point to the *persistent disadvantage* of 12<sup>th</sup> graders from single-parent & no-parent families in terms of both the proportion exposed to bullying behaviors and the intensity of bullying victimization (see Figure 2). Results for other covariates are listed as follows.
- Estimates of the *proportion exposed to bullying* parameter (P) show increased risk for 12<sup>th</sup> graders who were male, had less religious attendance and inferior school performance show persistent disadvantage over time, as compared with their counterparts. Those having less-educated fathers and African-American background show disadvantage over most of the period. A similar, but less salient, trend has been found for those with less-educated mothers (results not shown).
- Estimates of the *intensity of bullying victimization* parameter, the average number of bullying behaviors for those at risk ( $\lambda$ ), show higher rates for respondents who were female (except for injury with a weapon) and non-African-American (except for threatened without injury) and lived in a city virtually show advantage over the entire period (results not shown).

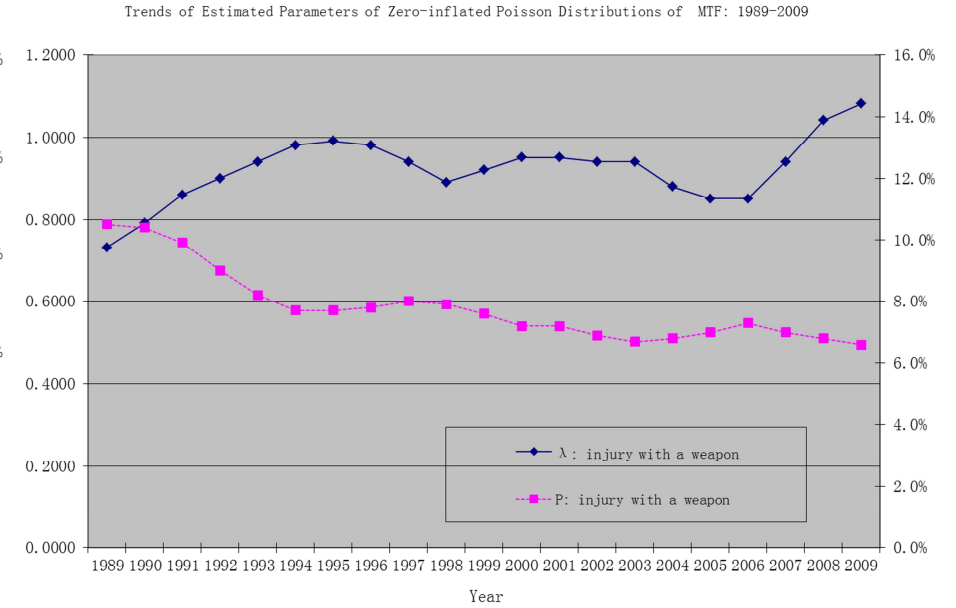
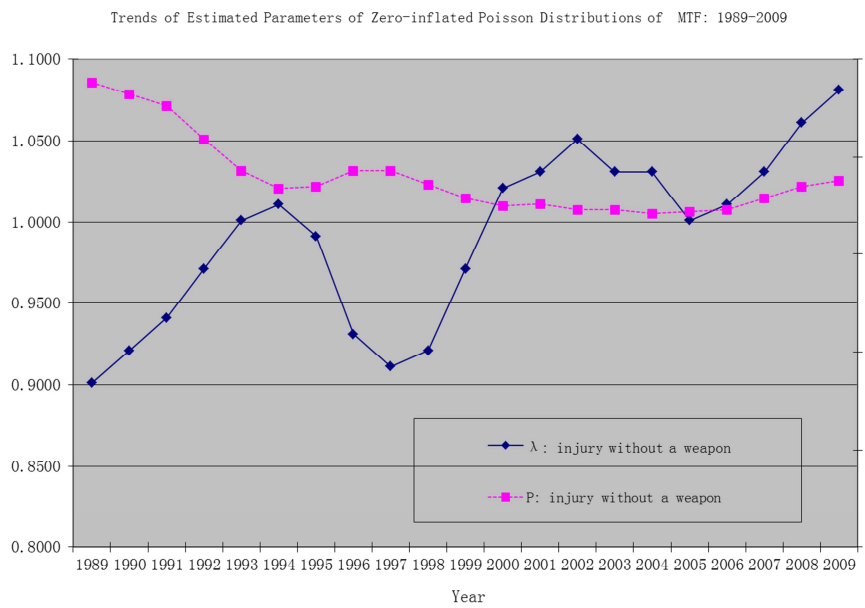
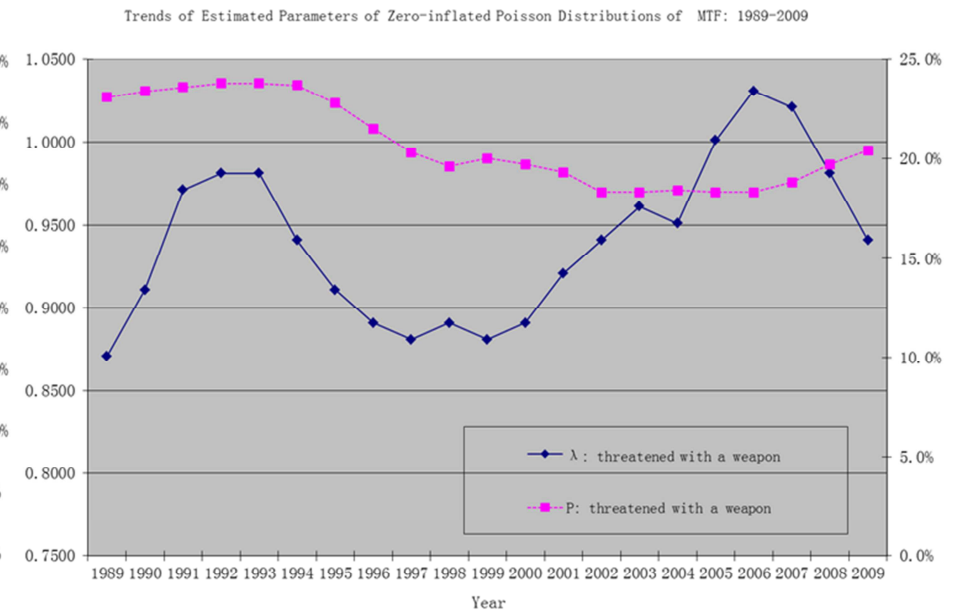
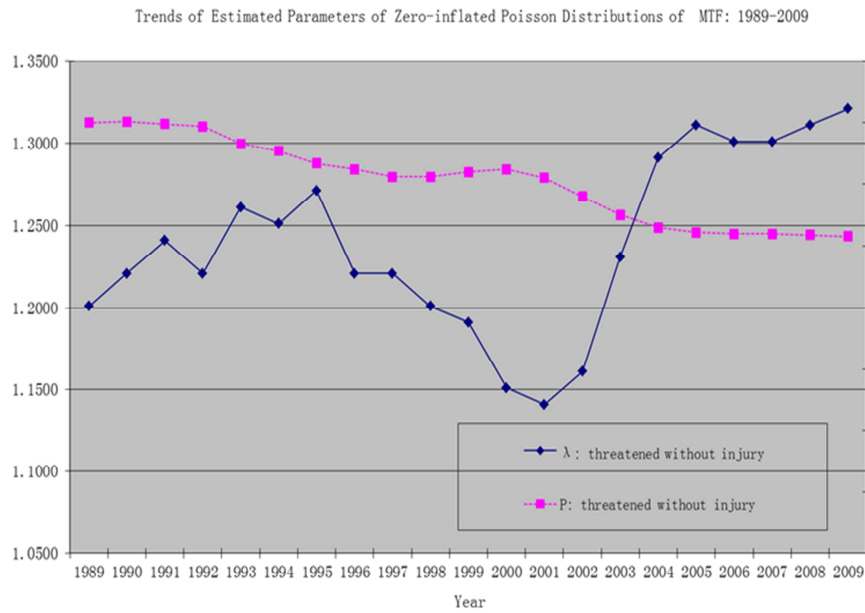


Figure 1 Trends of estimated parameters of zero-inflated Poisson distribution from 1989 to 2009: 12<sup>th</sup> graders

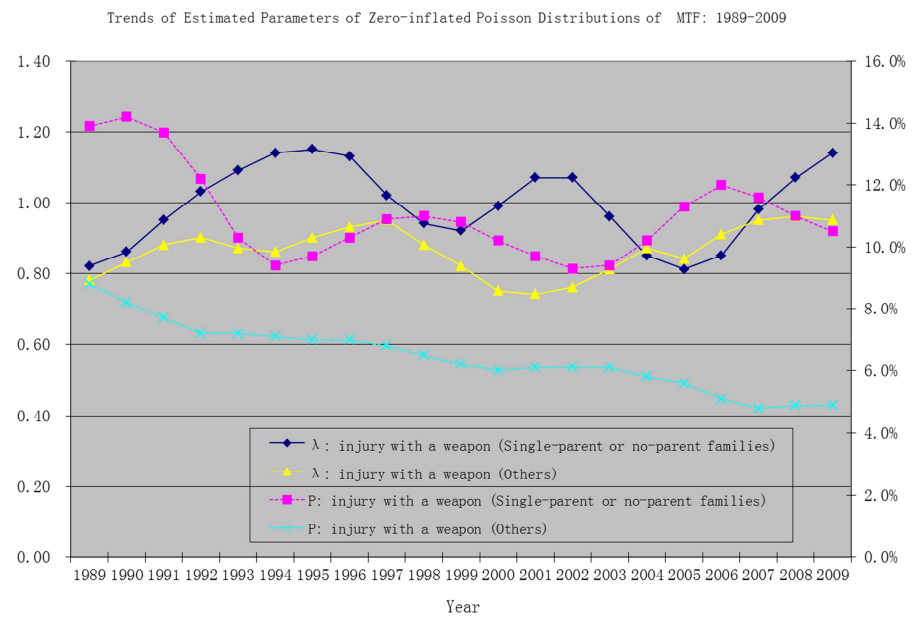
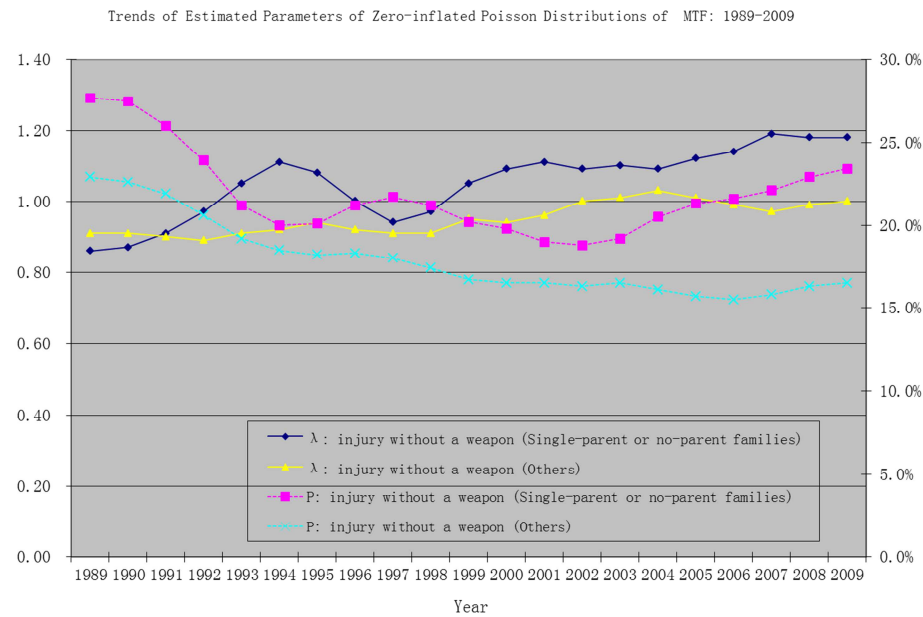
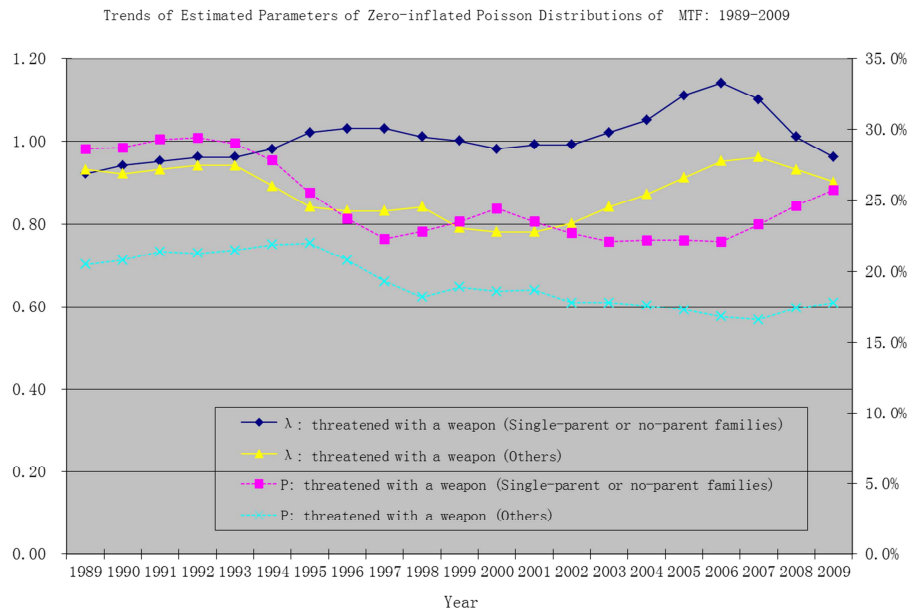
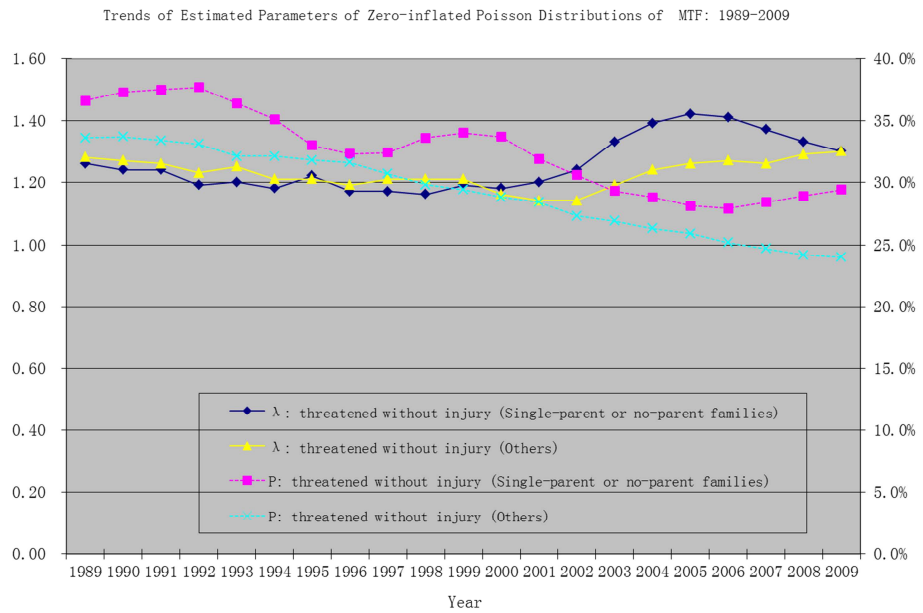


Figure 2 Trends of estimated parameters of zero-inflated Poisson distribution from 1989 to 2009: single-parent and no-parent families