



Brief report: Examining children's disruptive behavior in the wake of trauma – A two-piece growth curve model before and after a school shooting



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ABSTRACT

School shootings may have serious negative impacts on children years after the event. Previous research suggests that children exposed to traumatic events experience heightened fear, anxiety, and feelings of vulnerability, but little research has examined potential aggressive and disruptive behavioral reactions. Utilizing a longitudinal dataset in which a local school shooting occurred during the course of data collection, this study sought to investigate whether the trajectory of disruptive behaviors was affected by the shooting. A two-piece growth curve model was used to examine the trajectory of disruptive behaviors during the pre-shooting years (i.e., piece one) and post-shooting years (i.e., piece two). Results indicated that the two-piece growth curve model fit the data better than the one-piece model and that the school shooting precipitated a faster decline in aggressive behaviors. This study demonstrated a novel approach to examining effects of an unexpected traumatic event on behavioral trajectories using an existing longitudinal data set.

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Introduction

The impact of traumatic events such as Hurricane Katrina, 9/11, and school shootings is multifaceted for children. Retrospective studies of “single-incident traumas” indicate that direct and indirect exposure (including media exposure) can heighten feelings of fear, anxiety, and vulnerability in children (Comer et al., 2010; Eisenberg & Silver, 2011; Gould, Munfakh, Kleinman, Lubell, & Provenzano, 2004; Hoven et al., 2004). School shootings, in particular, heighten feelings of insecurity, feeling too unsafe to attend school, and symptoms of posttraumatic stress (Brenner, Simon, Anderson, Barrios, & Small, 2002; Suomalainen, Haravuori, Berg, Kiviruusu, & Marttunen, 2011). Unfortunately, the rate of mass shootings seems to be increasing (Cohen, Azrael, & Miller, 2015). Further, such distressing incidents have the potential to prompt reactionary, aggressive, disruptive behaviors among school children. Witnessing school or community violence has been

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linked to higher adolescent aggressive behaviors (Lambert, Boyd, Cammack, & Jalongo, 2012; O'Keefe, 1997; Schwab-Stone et al., 1999), though findings are mixed (Mrug & Windle, 2010). Due to the unpredictable nature of single-incident traumas, few studies have evaluated consequences using longitudinal data spanning large time windows before and afterward.

Disruptive behaviors have been linked to lower academic achievement (Masten et al., 2005) and higher risk of suicide (Verona, Sachs-Ericsson, & Joiner, 2004). Disruptive behavior tends to decline from elementary school through high school, though subpopulations may maintain elevated levels (Bongers, Koot, van der Ende, & Verhulst, 2004; Nagin & Tremblay, 1999), and some studies indicate behavioral stability over this period (Broidy et al., 2003). Comparing patterns of decline in disruptive behavior during this period could shed light on naturally-occurring development versus changes due to external events (Curran & Muthen, 1999). To our knowledge, no studies have examined whether exposure to a school shooting changes children's disruptive behaviors. This study used data from an existing, prospective longitudinal study during which a local school shooting unfortunately occurred during the middle of data collection years. Using latent growth curve models, this study examined whether exposure to a school shooting was associated with a change in the trajectory of disruptive behaviors during adolescence.

Methods

Procedures

Linking the Interests of Families and Teachers (LIFT) is a multimodal, universal preventive intervention for conduct problems (Eddy, Reid, & Fetrow, 2000). All children attending the participating 12 public elementary schools in the Eugene–Springfield, Oregon metropolitan area were invited to participate. Randomization into the LIFT intervention or services as usual control groups was at the level of the school. Detailed study procedures are provided elsewhere (Eddy, Reid, Stoolmiller, & Fetrow, 2003; Reid, Eddy, Fetrow, & Stoolmiller, 1999; Wood et al., 2012). At baseline, most children were in first or fifth grade. Participants were enrolled over a three year period, with data collected between 1991 and 2006. Participants were assessed on a yearly or every other year basis, depending on study phase. In 1998, a school shooting occurred at a local public high school. On campus, two students were killed and 25 were wounded. The parents of the student were killed off campus. At that point in time, most study participants were attending public schools within a 15-mile radius of the high school, including multiple schools within the same school district.

Child disruptive behavior was measured by mothers' report with 14 items from the Child Behavior Checklist (CBCL; Achenbach, 1991; Achenbach & Edelbrock, 1983). The frequency of each behavior was rated with the response options: 1 = *Never* to 5 = *More than once a day*. Responses were summed to create an overall score. Internal reliability was acceptable ($\alpha = .88$). The distribution of scores on the standardized CBCL scale for Externalizing Behavior at the various time points resembled those for the national normative sample (Achenbach, 1991).

Treatment of missing data

By study design, not all participants were followed for the entire 12 years to adhere to grant funding limitations during follow-up; during the last period of funding, attempts were not made to try to contact participants who had been unreachable for several years (approx. 17% of the sample). Missing rates by wave were: Wave 3, 3.6%, Wave 4, 8.8%, Wave 5, 12.8%, Wave 6, 12.4%, Wave 8, 17.9%, Wave 10, 24.3%, Wave 12, 68.9%. To address missing data, multiple imputation was performed using Mplus (Version 6.11). This method is commonly used to impute missing covariates in longitudinal studies by using information from participants with incomplete sets of observations (Kenward & Carpenter, 2007). Five data sets were imputed, and means of missing data values were used as the final value for analyses (Asparouhov & Muthén, 2010).

Statistical analyses

Two growth curve models (GCMs) were fitted to assess the growth trajectory of disruptive behavior for Cohort 3 of the LIFT study. Only Cohort 3 had multiple waves of data both before and after the shooting. The one-piece GCM captured Wave 3 to Wave 12. The two-piece GCM split the growth trajectory into two parts: the pre-shooting period (Wave 3 to Wave 6), and the post-shooting period (Wave 8 to Wave 12). Although each wave was separated by one year, the CBCL was not administered at all waves (i.e., 7, 9, and 11). Therefore, loadings for the indicators of the TIME variable were fixed at 0, 1, 2, 3, 5, 7, and 9 for the one-piece GCM. In the two-piece GCM, indicators of TIME were fixed at 0, 1, 2, and 3 (pre-shooting), and at 0, 2, and 4 (post-shooting). Using the two-piece GCM, distinct initial status and growth rates were estimated for disruptive behavior separately for the pre- and post-shooting periods. Both GCMs controlled for intervention condition, gender, and grade level. Model fit chi-square test statistics were compared between the one-piece and two-piece GCMs to assess which was a better fit. All analyses were performed using Mplus (Version 6.11).

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