

Understanding Micro-Spatial Crime Patterns: A Comprehensive Trajectory Analysis of Violent Crime at Street Segments in St. Louis, MO

Ph.D. Dissertation

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Abstract

Spatial crime studies have existed in some form for over a century, but the last 20 years have seen a turn in focus toward micro-spatial units such as street blocks and street segments. A particular subfield of this modern micro-spatial perspective is called crime trajectory analysis, in which scholars use techniques originating from other social science disciplines (primarily developmental psychology) to model patterns of crime at small places over long periods of time. Crime trajectory analysis has uncovered interesting “crime behaviors” at small spatial units in coastal cities, but the technique has never been used to characterize crime patterns in a Midwestern city. This project fills that research gap by using the group-based trajectory modeling (GBTM) algorithm to uncover patterns of violent crime at street segments in St. Louis, MO. The project addresses four specific issues which have gone either understudied or unexplored in prior research. First, using Uniform Crime Reports (UCR) data, an attempt is made to model violent crime trajectories with GBTMs by finding the best balance of parsimony and model fit, thus producing a model in better concordance with crime theory and having more practical applicability. Second, using data from the UCR, the decennial Census, and the City of St. Louis, multinomial logistic regression models are employed in order to find relationships between the crime trajectories and the various demographic and land use characteristics of the street segments. Third, the demographic factors that influence the amount of segment-level violent crime heterogeneity within a neighborhood are investigated using ordinal logistic regression models. Fourth, negative binomial regression models are used to distinguish which demographic and land use characteristics of a high-crime street segment influence the probability of the segment being located near others of its kind. The results of these four research inquiries are placed within the larger context of GBTM and micro-spatial crime research. Finally, applications and optimal directions for future research are discussed in the hope that this project’s findings may be useful for police departments, crime prevention scholars, and practitioners.