

Neighbourhood Change Research Partnership

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Neighbourhood Change and the Spatial Distribution of Violent Crime

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Co-investigator/s	Elizabeth Griffiths, Rutgers University
Community Partner/s	Community-Academic Advisory Board composed of representatives from Federation of Canadian Municipalities, United Way Toronto, Social Planning Toronto, and the Canadian Association of Neighbourhood Services; and University of Toronto professors, including David Hulchanski, Kathleen Gallagher, and John Myles.

1. Rationale & Potential Policy Relevance

The proposed research will examine the relationship between neighbourhood change and violent crime. Studies of the spatial distribution of crime at the neighbourhood level consistently show that areas of a city characterized by economic disadvantage, residential instability, low rates of home ownership, and large percentages of marginalized racial minorities tend to have high rates of violent crime, whereas (contrary to popular opinion) those with high proportions of foreign-born residents tend to have lower rates of violent crime.¹ However, almost all of this research has been conducted in the U.S. and has adopted a static approach, analyzing neighbourhoods and crime at one point in time. Few researchers have examined the issue dynamically, by looking at “how processes of growth, change, and decline affect neighbourhood rates of crime”² or by considering how these relationships may vary by national context.³ Investigating neighbourhood change and crime is particularly important during a time when many Canadian cities, including Toronto, have become more economically segregated and socially polarized as well as more ethnically and culturally diverse.⁴

Given these trends and the well-known relationship between various forms of inequality and crime, one might expect violent crime rates to have increased in North American cities in recent years; yet in general they have not. In Canada as a whole and in most of its major cities, rates of violent crime have dropped since the mid-1990s. But if growing spatial inequality and economic polarization have not been accompanied by higher levels of urban violence, perhaps they have led to a spatial concentration of violent crime. In other words, crime, like other types of disadvantage, may have become more concentrated and spatially segregated within the urban landscape. If this is so, some neighbourhoods should have experienced decreases in crime while others may have experienced increases. Furthermore, violent crime may be a source of neighbourhood change, for example, by encouraging out-migration, affecting local public and private infrastructure, etc.; and so the reciprocal relationships between violent crime and other neighbourhood characteristics require examination. Evidence about these sorts of relationships between violent crime and neighbourhood change is of importance to social service agencies serving populations at risk of violent offending and victimization (e.g., economically disadvantaged young people, people marginalized because of mental illness or homelessness) as well as to municipal, provincial, and federal government agencies dealing with community safety.

The proposed research will examine the spatial distribution of violent crime -- and changes in it -- in the City of Toronto between 1998 and 2009, using a data set obtained from the Toronto Police Service (TPS) that contains almost 900,000 calls for service for violent crimes between 1998 and 2009. Most research on neighbourhoods and crime has relied on annual official crime reports issued by the police and measured at either the census-tract or police district level. Such data have two limitations: they limit the extent to which crime events can be precisely located in time and space; and they filter out events that police decide not to record because, for example, the victim or the person who reported the crime is not present or not willing

to be interviewed when the police arrive. In discussing the limitations of official crime reports over 20 years ago, Sherman and colleagues noted that they “suffer from the well-known problem of frequent police decisions not to record many crimes that citizens report to them.” However, they went on to point out that “a new source of data on crime has recently become available [that is] ... relatively so precise and casts so wide a net that [it] someday may provide a third major indicator of crime trends, supplementing official crime reports and victimization surveys.”⁵ This then-new source was police data on calls for service. While not without their own limitations, calls for service data are now sought out by researchers because they are less affected by police filtering and have been shown to be more reliable than other data sources.⁶ The TPS data includes the location (i.e., census dissemination area) of the crime which will allow each call for service to be geocoded to a specific location in the city, along with information about the specific crime (e.g., robbery, domestic assault, aggravated assault with a knife or with a firearm, etc.), and the sex and age of the victim (for approximately two-thirds of the cases).

2. Research Questions (number list)

1. What was the spatial distribution of violent crimes/calls for service for violent crimes across Toronto neighbourhoods during 1998 to 2009?
2. Did the spatial distribution of violent crimes/calls for service for violent crimes across Toronto neighbourhoods change between 1998 and 2009, and if so, in what way?

After this data analysis is completed, we will be able to address the following questions:

3. How are neighbourhood characteristics (including demographic, socio-economic, and ethno-cultural characteristics of residents; social and commercial infrastructure; housing mix, etc.) related to violent crimes (and calls for service to the police for violent crimes) in Toronto’s neighbourhoods?
4. How are changes in neighbourhood characteristics (including demographic, socio-economic, and ethno-cultural characteristics of residents; social and commercial infrastructure; housing mix, etc.) related to changes in violent crimes (and calls for service to the police for violent crimes) in Toronto’s neighbourhoods between 1998 and 2009?

3. Specific Fit with the NCRP Objectives & Research Questions

- Violent crime is likely to be one of the consequences (and, indeed, an indicator of) socio-spatial inequality.
- Violent crime and changes in it are likely to be related to the education, employment, mobility, and social attitudes of neighbourhood residents, particularly young people.
- Neighbourhood restructuring trends and processes are likely to be reciprocally related to violent crime and to residents’ willingness to mobilize the police to deal with violent crime.
- Interventions by the police, social service agencies, and other organizations at the neighbourhood level are likely to be reciprocally related to violent crime and residents’ willingness to mobilize the police to deal with violent crime.

4. Research Design & Methods

We have obtained a data set from the Toronto Police Service (TPS) of almost 900,000 calls for service for violent crimes between 1998 and 2009. The data set includes, for each call, information on the type of crime (e.g., armed and unarmed robbery, domestic assault, sexual assault), date, time, and location (i.e., postal code) of the crime, and (in the 65% of cases where a victim was identified) sex and age of victims. Duplicate calls and calls verified as false reports have been eliminated. It is possible that the TPS will extend the data set further back and forward in time, but at this point if and when that might happen aren’t clear. These data need to be cleaned, coded, and geocoded, as they are currently not structured for statistical analysis.

Data on characteristics of the neighbourhoods in which the crimes occurred also need to be collected and added to the violent crime calls for service data set. Much of this data can be obtained from the 1996, 2001, 2006, and 2011 Canadian censuses. Additional neighbourhood-level data on social infrastructure (e.g., libraries, social service agencies, community centres, health centres, public transportation), commercial infrastructure (e.g., types of businesses), public and private development and gentrification projects, and police enforcement and community mobilization programs during the period 1998 – 2009 also need to be collected and added to the crime data set. Some of these data will be available from organizational websites and publications; other sorts of data may require discussions with people working in various organizations, searching annual reports, community blue books, etc. from the late 1990s onward.

Once this incident-level data set (i.e., calls for service will be the unit of observation and analysis), is completed, neighbourhood/year-level data sets will be constructed from it. In the incident-level data set, the number of observations will be c. 900,000 (representing each call for service for a violent crime). In the neighborhood/year-level data sets, each call for service will be geocoded to a neighbourhood (or neighbourhood-year) and neighbourhoods (or neighbourhood-years) will be the unit of analysis. The number of observations will depend on how neighbourhoods are defined. For example, if we use the 140 neighbourhoods designated for the city of Toronto by SPAR and the United Way, the number of observations will be 140×12 (years) = 1,680. We may, depending on the level at which neighbourhood characteristics are measured, construct other data sets using different geographic boundaries. For example, if we use the 13 TPS divisions to define the geographic boundaries, the number of observations will be $13 \times 12 = 156$. In other words, once the incident-level data set has been geocoded, the incidents can be aggregated up to geographic areas of different sizes to create neighbourhood/year data sets.

When these data sets are completed, they will allow analyses that link neighbourhood characteristics (and changes in them) to calls for service (and changes in them). We do not expect to conduct a full range of analyses within the time frame of this project, but will be able to produce descriptive information documenting the spatial distribution of violent crime calls for service (and changes in these) over the 12-year period. After the completion of this project, we expect to conduct more sophisticated analyses (e.g., growth curve modeling and trajectory analysis; pooled cross-sectional time-series analyses; spatial exploratory and regression techniques; and structural or simultaneous equation modeling) addressing questions such as the following:

- How are immigration (and changes in it) and violent crime (and changes in it) related at the neighbourhood level?
- What are the consequences of urban revitalization and gentrification processes for violent crime?
- Is violent crime related to neighbourhood change vis a vis the composition and turnover of the resident population, commercial infrastructure (e.g., the mix and character of local businesses), and social infrastructure?
- What is the relationship between targeted policing programs and strategies (e.g., enforcement and community development) and violent crime? E.g., do specific enforcement strategies reduce violent crime in the local areas they target? If so, for how long? Do they diffuse violent crime to adjacent areas?
- Have some types of neighbourhoods benefitted from the overall decrease in violent crime in Toronto since the mid-1990s whereas others have experienced stable or increasing rates of violent crime? In other words, has the spatial distribution of crime become more unequal over time?

5. Role of Community Partners

Representatives of the community partners on our Community-Academic Advisory Board will be an important resource for identifying neighbourhood-level characteristics and sources of information on these as we construct the neighbourhood-level database to be merged with the violent crime database. We will also seek their input on the questions that we could address after the proposed project is completed (i.e. after we move into the analytic portion of the project); e.g., if they have specific questions about the

relationship between particular neighbourhood-level programs and violent crime that we can investigate after the proposed research is completed, we will do so. We will also report back to them at the end of the proposed research and provide research briefs (including maps of changes in violent crime at the neighbourhood level) for their organizations.

6. Role of Students / Research Assistants and Contributions to Training

We expect to employ two graduate students at the University of Toronto to assist in developing measures of neighbourhood-level characteristics (drawing on the literature on neighbourhoods and crime), identifying sources for these (in consultation with community partners and other organizations), and collecting, coding, and inputting these data for statistical analysis. Each will gain skills in: archival work (e.g., locating information about neighbourhood-level characteristics in the late 1990s and early 2000s); working with census data; managing data for computer analysis; and conducting basic statistical analysis. Via an in-kind contribution from the School of Criminal Justice at Rutgers University, we will also employ one Rutgers graduate student to geocode the data and prepare it for spatial analyses, using a variety of statistical software and analytic techniques. Professor Griffiths (who is at Rutgers) is an expert in the spatial analysis of crime and is familiar with cutting-edge statistical techniques used by criminologists and others studying neighbourhoods and crime; and the School of Criminal Justice at Rutgers provides much more in-depth training in statistical and data analysis techniques than does the Centre for Criminology and Sociolegal Studies, where Gartner is located. Furthermore, Griffiths (in collaboration with Gartner) plans to seek further funding from U.S.-sources for subsequent analyses of the data collected in this project and for collection of comparable data from a U.S. city (possibly Newark, N.J.). Therefore, it will be important to train a graduate student at Rutgers in the management and use of the data collected for the proposed project.

7. Schedule (timeline of research tasks, including deliverables submission dates)

Two research tasks will be conducted simultaneously.

Mid-September 2013 to mid-February 2014: One task is the cleaning, coding, and formatting of the calls for service data set (N = 900,000). Currently, the data are in Microsoft Access format and all by one of the variables (the census dissemination area number) are either in string format (i.e., the crime type is entered as text and the terms used are not entirely consistent over time) or in numeric form that must be converted (e.g. the victim age range may be listed as 35-44; but the age categories are also not entirely consistent over time). We expect this to take approximately 5 months and will be done by a graduate research assistant from the University of Toronto, working on average one day a week). The graduate research assistant at Rutgers will assist in geocoding the spatial data, as annual data sets are cleaned and coded. We expect this to take 2-3 months in total.

October 2013 to August 2014: The other task is collecting relevant neighbourhood-level data (after determining what may be relevant) that can be added to the calls for service data set. Part of this will be done in consultation with people working with neighbourhood-level census data for the larger NCRP in Toronto. The second graduate research assistant from the University of Toronto will be tasked with collecting the additional neighbourhood level data (as outlined above); we expect this to take approximately 10 months.

The final two months of the project will be devoted to constructing and finalizing the neighbourhood/year-based data set(s) and maps showing the spatial distribution of the calls for service data.

8. Outcomes / Deliverables

Community deliverables will include the maps showing the spatial distribution of violent crime/calls for service in Toronto and changes in this over time, along with descriptive data categorizing neighbourhoods with different rates (e.g. low, medium, high) of violent crime calls for service and neighbourhoods with different time trends in violent crime calls for service (e.g., decreasing, stable/trendless, increasing). This

information can be written up for plain-language bulletins and put into slides for presentations to non-academic and academic audiences. We may also be able to write a journal article or book chapter based on these descriptive analyses. After the proposed project is completed, we expect to do analyses and write a number of journal articles addressing some of the questions outlined in section 4 (above).

9. Budget Explanation [and fill in separate budget worksheet page below]

- 2 Ph.D. students from the University of Toronto, 8 hours/week for 48 weeks @ \$32.20/hour (\$28/hr. plus 15% benefits) = \$24,730.
- 1 Ph.D. student from Rutgers University, 20 hours/week for 12 weeks @ \$20/hour = \$4,800 (to be funded via a \$5,000 in-kind contribution from Rutgers University)
- Local travel on public transportation for purposes of data collection @ \$10/mth = \$120
- SPSS student licenses, 1 @ \$60/year; StatTransfer, 1 @ \$180; SAS license, 1 @ \$110/year
- Office and computer supplies, photocopying: \$300/year

10. References

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- ² Kirk, D.S. and J.H. Laub, "Neighborhood change and crime in the modern metropolis," in M. Tonry (ed.), *Crime and Justice: A Review of Research*. Chicago: University of Chicago Press, 2010, p. 441.
- ³ Thompson, S.K. and R. Gartner. 2013. "The spatial distribution and social context of homicide in Toronto's neighborhoods." *Journal of Research in Crime and Delinquency*, published on May 16, 2013 as doi:10.1177/0022427813487352; hard copy, forthcoming, v. 51.
- ⁴ Hulchanski, D., *The Three Cities within Toronto: Income Polarization among Toronto's Neighbourhoods, 1970-2000*, Toronto: Centre for Urban and Community Studies, Cities Centre, University of Toronto, 2007; Walks, R.A. and L.S. Bourne, "Ghettos in Canadian cities? Racial segregation, ethnic enclaves, and poverty concentration in Canadian urban areas," *The Canadian Geographer*, 2006, 50: 273-97; Kazempiur, A. and S.S. Halli, "Neighborhood poverty in Canadian cities," *Canadian Journal of Sociology*, 2000, 25: 369-381; Chen, W-H., J. Myles, and G. Picot, "Why have poorer neighborhoods stagnated while the richer have flourished? Neighbourhood income inequality in Canadian cities," *Urban Studies Journal*, 2012, 49: 877-896.
- ⁵ Sherman, L., P.R. Gartin, and M. Buerger, "Hot spots of predatory crime: Routine activities and the criminology of place," *Criminology*, 1989, 27: 34.
- ⁶ Kurtz, E., B. Koons, and R.B. Taylor, "Land use, physical deterioration, resident-based control and calls for service on urban street blocks," *Justice Quarterly*, 1998, 15: 121-149; Andresen, M.A. and N. Malleon, "Testing the stability of crime patterns: Implications for theory and policy," *Journal of Research in Crime and Delinquency*, 2011, 48: 58-82.

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SSHRC Budget Worksheet

	Amount requested from NCRP	Contributions (In-Kind / Cash)	Contribution source	Total Project Cost
Personnel costs				
Student salaries and benefits/Stipends				
Undergraduate				
Masters *				
Doctorate *	\$19,730.00	\$10,000.00	SOURCE 1: Centre for Criminology & Sociolegal Studies, University of Toronto (\$5,000) SOURCE 2: School of Criminal Justice, Rutgers University (\$5,000)	\$29,730.00
Non-student salaries and benefits/Stipends				
Postdoctoral				
Other				
Travel and subsistence costs				
Applicant/Team member(s)				
Canadian travel				
Foreign travel				
Students				
Canadian travel	\$120.00			\$120.00
Foreign travel				
Other expenses				
Non-disposable equipment (specify)				
Other expenses (specify)				
	\$650.00			\$650.00
Total	\$20,500			\$30,500