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Neighbourhood Characteristics and the Distribution of Crime in Toronto: Additional Analysis on Youth Crime

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.	not available for any reference period
..	not available for a specific reference period
...	not applicable
0	true zero or a value rounded to zero
0s	value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
p	preliminary
r	revised
x	suppressed to meet the confidentiality requirements of the *Statistics Act*
E	use with caution
F	too unreliable to be published

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Neighbourhood Characteristics and the Distribution of Crime in Toronto: Additional Analysis on Youth Crime

by Mathieu Charron

1 Introduction

This study, funded by the National Crime Prevention Centre of Public Safety Canada, explores the spatial distribution of police-reported youth crime in Toronto. It examines how youth crime is geographically distributed in Toronto and endeavours to shed light on the relationship between police-reported youth crime and the neighbourhood characteristics that are most strongly associated with it. This report represents the second phase of the spatial analysis of police-reported crime data for Toronto and builds on the research paper, *Neighbourhood Characteristics and the Distribution of Police-reported Crime in Toronto* (Charron 2009). Other cities, including Edmonton, Halifax, Montréal, Regina, Saskatoon, Thunder Bay and Winnipeg have also been analysed as part of this series on the spatial analysis of police-reported crime data.

The spatial analysis of crime data provides a visual representation of areas of concentrated crime. It also helps identify neighbourhood characteristics that are related to crime levels (See Text box 1). It can be an important tool in the development and implementation of crime reduction strategies. (See Methodology section at the end of the report for more detailed information on the methodologies used in this study).

Data for this study cover the city of Toronto, an area patrolled by the Toronto Police Service. Toronto is located at the heart of a vast metropolitan system bordering the western end of Lake Ontario (from Oshawa to St. Catharines–Niagara), that includes 9 of the country's 33 census metropolitan areas and over 8,000,000 inhabitants (nearly one quarter of Canada's population). The city of Toronto is the capital city of Ontario and had a population of over 2,500,000 in 2006, the reference year for this study; about 175,000 were aged 12 to 17 years.

Previous studies undertaken by the Canadian Centre for Justice Statistics have similarly focused on the relationship between crime and neighbourhood characteristics (Charron 2009; Savoie 2008). These studies have shown that crime is not distributed evenly in a municipality, but tends to be concentrated in certain neighbourhoods or 'hot spots'. Additionally, other studies have focused specifically on youth crime. For example, Perreault et al. (2008) found that neighbourhood characteristics accounted for only a small proportion of youth crime hot spots in Montréal. In Toronto, Fitzgerald (2009) found that the delinquency of young students was not associated with the characteristics of the neighbourhoods surrounding their schools.

2 Overview of the study and its findings

The main analysis presented in this report examines incidents of youth crime in Toronto according to four types of location (i.e., outdoor public spaces; commercial establishments; private residences; and schools). This way, the factors associated with youth crime in each of these types of locations can be more fully explored. This part of the study looks at **police-reported incidents involving youth — it does not** count the number of youth accused of a criminal offence.[1] Thus, for the purposes of this study, youth crimes (also herein referred to as '**incidents of youth**

1. The focus in the first section of the study is on the criminal incident. The age of those accused in the incident is then used to distinguish between youth crime and adult crime. It should be noted that this definition of youth crime differs from that used in most other Statistics Canada studies. While this study uses a definition for youth crime that focuses on **counts of incidents involving youth**, other studies tend to use a definition that focuses on **counts of youth accused** of crime.

crime') are defined as police-reported incidents involving at least one accused person who is 12 to 17 years of age.[2] Incidents in which all the accused involved are 18 years of age and over are considered 'incidents of adult crime'.[3] A geographic depiction of police-reported youth crime by location is presented using maps.

The analyses of incidents of youth crime are based on data from the Incident-based Uniform Crime Reporting (UCR2) Survey, which reflect incidents known to, and substantiated by, police services. It is important to note that many factors can influence the reporting of offences by police services, including the public's willingness to report crimes to police, changes in legislation and local police service policies or enforcement practices.

Overall, the results of this study show that youth commit more crimes in places that are more easily accessible to them and where there is less social control. Nevertheless, neighbourhood characteristics explain only a small portion of the spatial distribution of youth crime.

3 Where do youth commit crime?

3.1 Two-thirds of Toronto's police-reported incidents of youth crime took place in an outdoor public space or commercial establishment

Similar to incidents of adult crime in Toronto, one-third (33%) of incidents of youth crime in 2006 took place in an outdoor public space, and another third (32%) in a commercial establishment (Table 1).[4] The remaining incidents occurred in a private residence (17%), on school property (12%) or in other locations (6%).[5,6] Compared to youth incidents, incidents of adult crime were more likely to be committed in a private residence (28%) and less likely to be committed on school property (1%).

2. A small number of these incidents (approximately 2%) involved an accused who was under the age of 12.
3. Given this study analyses neighbourhood characteristics wherein youth commit crime and not the volume of crime in relation to adults, incidents involving multiple accused where at least one of the accused is aged 12 to 17 are considered incidents of youth crime. Incidents that include a mix of adult and youth represent only a small proportion of the total number of incidents.
4. See the *Juristat* article, "Where and when youth commit police-reported crimes, 2008" (Statistics Canada Catalogue no. 85-002- X, vol. 30, no. 2), for a more detailed national-level discussion of the location, time of year, day of the week and time of day of police-reported youth crimes in Canada.
5. Other locations include universities and colleges, other non-commercial buildings and public institutions and buildings.
6. Data presented in this section may differ from data on youth crime published in other reports using UCR2 data because they are based on counts of incidents of crime involving youth, whereas other reports present data based on the number of youth accused.

Table 1
Police-reported incidents of youth crime by location and type of offence, Toronto, 2006

Type of offence	Total incidents	School	Commercial establishment	Outdoor public space	Private residence	Other location [1]
	number	percent				
Violent crime						
Robbery [2]	658	13	18	60	8	2
Serious assault (levels 2 and 3) [2]	442	25	7	33	29	7
Common assault (level 1) [2]	946	31	8	27	26	9
Uttering threats [2]	537	30	4	24	31	11
Total incidents of youth violent crime [3]	**2,365**	**25**	**11**	**35**	**22**	**7**
Property crime						
Breaking and entering [2]	241	12	15	0	69	3
Theft of motor vehicle [2]	121	2	3	64	30	2
Shoplifting [2]	1,770	0	99	0	0	0
Mischief [2]	425	13	13	33	29	11
Total incidents of youth property crime [3]	**2,921**	**4**	**66**	**15**	**13**	**2**
Total incidents of youth crime [4]	**7,412**	**12**	**32**	**33**	**17**	**6**
Total incidents of adult crime [5]	**42,853**	**1**	**30**	**35**	**28**	**7**

1. Includes universities and colleges and other non-commercial buildings and public institutions and buildings.
2. Includes all recorded violations in each incident.
3. Includes the most serious violation in each incident only.
4. Includes the most serious violation in each incident only. Includes violent crime, property crime, 'other' *Criminal Code* violations (e.g., failure to comply with conditions, possession of weapons) and violations of the *Controlled Drugs and Substances Act* (e.g., possession of cannabis). Incidents including at least one accused aged from 12 to 17 years old. Includes a small number (approximately 2%) of accused youth under the age of 12.
5. Incidents where all accused persons are 18 years and older.

Note(s): Incident with unknown locations are excluded from analysis. Represents the incident count and not the accused count. Percents have been rounded.
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

Different types of incidents tended to be concentrated in specific places, suggesting that some places are more conducive to the commission of certain types of crime. For example, overall, youth property crimes (66%) were most likely to occur in commercial establishments, whereas youth violent crimes tended to take place in outdoor public spaces (35%). To take these factors into consideration, the analyses that follow focus on the spatial distribution of incidents of youth crime for four types of locations: outdoor public spaces, commercial establishments, private residences and schools.

Text box 1

Measuring the association between youth crime and neighbourhood characteristics

The following analyses are intended to shed light on the neighbourhood characteristics that are associated with incidents of youth crime. In this study, the neighbourhood is defined as the census tract (CT). (See the explanation of 'neighbourhood' under Variables, in the Methodology section at the end of the report). Unless otherwise indicated, data on neighbourhood characteristics are derived from the Census of Population.

Eleven characteristics were selected, based on available data and a review of the literature: night-time population; day-time population; subway traffic; commercial activity; residential mobility; central neighbourhood; access to resources; economic vulnerability; bars; immigration; and incidents of adult crime. These characteristics represent the two most referenced concepts in the literature, **criminal opportunities** and **social control**.

Criminal opportunities

Criminal opportunities refer to spatial and temporal concentrations of the potential victims and accused (Cohen and Felson 1979). The daily movements of people and the commercial and residential structures are such that there will be more criminal incidents where opportunities are concentrated. For example, shopping centres and private residences contain many goods that can be stolen, while the intersection of public transit networks makes some locations more accessible.

The presence of people in a neighbourhood increases the number of crimes that may be committed there. To take this reality into account, the study uses night-time and day-time population counts by neighbourhood. The **night-time population** consists of youths (aged 5 to 17) who live in the CT or of persons aged 18 and over for models on adult crime. The **day-time population** includes youth (aged 5 to 17) who attended a school in the CT in 2006/2007 according to data provided by the Ministry of Education, or the population working in the CT for models on adult crime.[7]

Subway traffic represents the number of persons who passed through the subway stations in the CT in 2007, based on data released by the Toronto Transit Commission. It rounds out the measure of the ambient population by indicating the CTs in which there are vast flows of people. Also, subway stations are busy places where crime might go unnoticed; they may facilitate escape and are easily accessible to young people.

Commercial activity can bring many opportunities for crime in a single location. It is measured by the number of retail trade, accommodation and food service workers who work in the CT, according to the 2006 Census.

Social control

Social control, as well as similar concepts of social cohesion and collective efficiency, refers to the capacity of the local population to regulate the behaviours of people who live in the CT, go there to work or pass through in transit (Sampson and Raudenbush 1999). Since the pioneering work associated with the Chicago School (Park and Burgess 1925; Shaw and McKay 1942), the urban nature of neighbourhoods has been linked to a particular way of life. Residents of central neighbourhoods in large cities live in a busy environment which brings together many individuals who do not know each other and who have come to the neighbourhood for various reasons. Such conditions can influence social relationships, which become more anonymous and individualistic. By impeding the development of strong social networks, of social cohesion in the neighbourhood (Sampson and Morenoff, 2004) and of attachment to one's neighbourhood, those conditions might foster crime (Pain 2000; Brown et al. 2004).

Residential mobility and the central nature of neighbourhoods were used to summarize the urban aspects of CTs. CTs with high residential mobility have more renters and persons who moved in the previous year. By contrast, CTs with low residential mobility are characterized by a sizable number of residents of long-standing (more than five years), and single-detached houses. **Central neighbourhoods** are grouped around the downtown area and tend to include older residences. (The concepts of residential mobility and central neighbourhoods, as well as the concepts of access to resources and economic vulnerability, which are described below, were measured as factor scores from a factor analysis. For more details, see Factor Analysis in the Methodology section.)

It is generally accepted that the lack of access to socio-economic resources (such as income and education) impedes the establishment of social control of crime by the resident population (Forrest and Kearns 2001; Sampson et al. 2002). In addition, the lack of integration into the economic system and the resulting stigmatization compromise adherence to the behavioural norms held by society in general (Massey 1996; Body-Gendrot 2001; Forrest and Kearns 2001; Bauder 2002; Sampson et al. 2002).

7. The age range of 5 to 17 was used to determine day-time and night-time population based on the presence of school-aged children. Youth under the age of 12 cannot be charged with a criminal offence, although a small proportion (2%) of incidents involved youth under the age of 12.

Residents of CTs where there is greater **access to resources** have higher education and income levels, while lone-parent families and households living in low income are more numerous in CTs where there is less access to resources. CTs with greater **economic vulnerability** have larger proportions of unemployed persons, low-income households and dwellings that are overcrowded and require major repairs.

The role of **bars** in criminal activity has been examined in a number of studies. These studies were based on the assumption that the presence of such establishments might influence social standards in the neighbourhood (allowing more tolerance) or might attract drinkers to a setting that favours violent crime (Treno et al. 2007). In this paper, bars are measured by the number of workers in licensed beverage establishments in the CT.

Most research demonstrating a link between **immigration** and crime show that increased immigration equates to less crime (Martinez 2006). For immigrant youth in Toronto, research suggests that a greater personal investment in their education translates into a greater commitment to conformity thereby mitigating their involvement in illegal activities (Dinovitzer et al. 2009). For the present study, immigration is measured by the proportion of neighbourhood residents who immigrated to Canada between 1997 and 2006, according to the 2006 Census.

Finally, several studies have focused on the links between juvenile delinquency and exposure to violence in the neighbourhood, assuming that such exposure to violence could have an impact on social cohesion and the attitudes and norms valued in the neighbourhood (Preski and Shelton 2001, Lynch 2003, Stein et al. 2003, Spano et al. 2009). Police-reported **incidents of adult crime** based on UCR data are, therefore, also included in the models.

3.2 Youth crime in outdoor public spaces

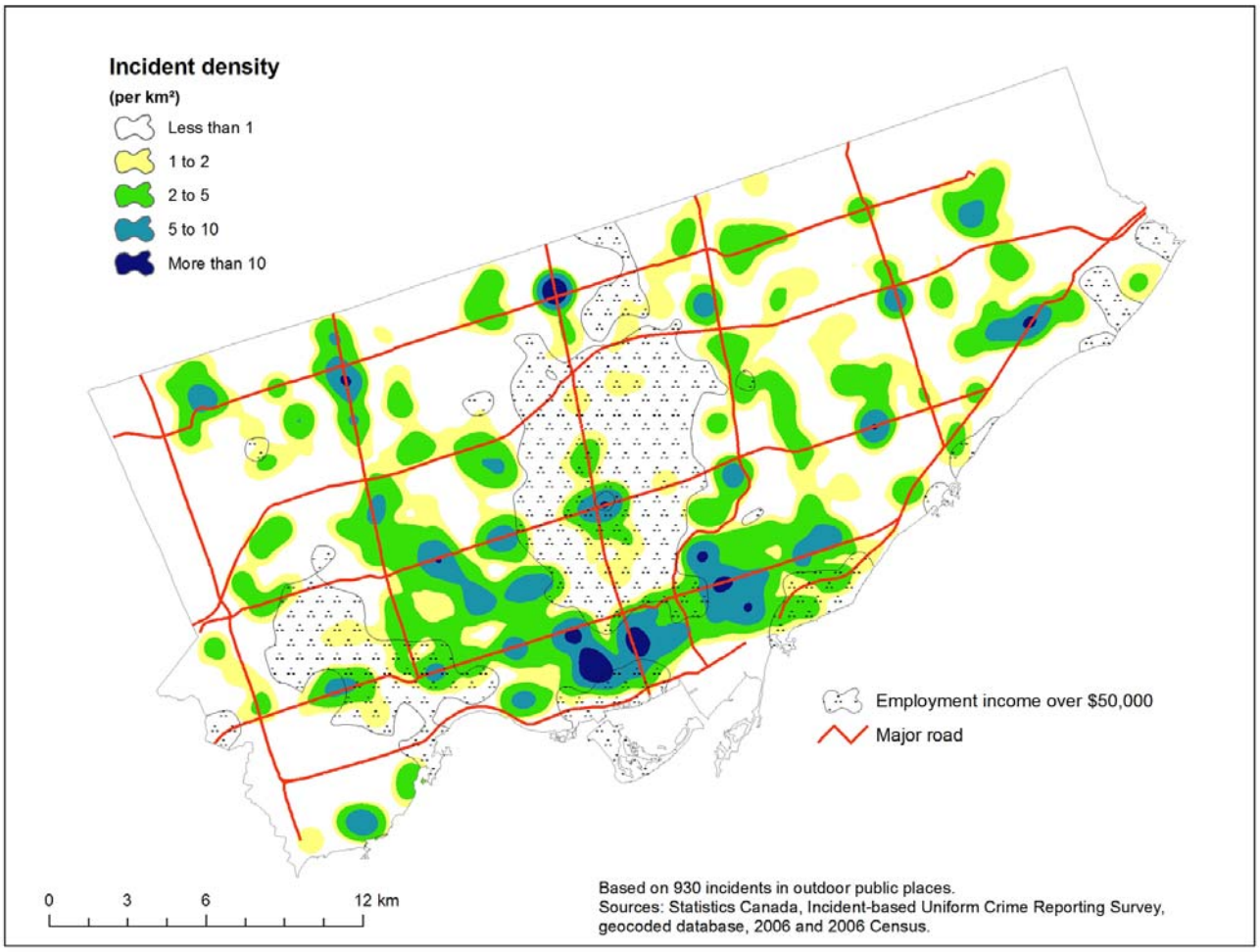
As children grow older, their spatial universe expands, and in adolescence it generally grows beyond their place of residence and their school to include other public spaces. Too young to have their own dwelling, teens use freely accessible spaces to socialize.

In 2006, nearly 2,500 youth crime incidents were committed in an outdoor public space in Toronto. More than 1,500 (63%) of these incidents took place on the street, while others were committed in a park (15%), in a parking lot (13%) or in the public transit system (9%).

Of the 2,500 youth crime incidents in outdoor public spaces, 1,149 yielded sufficient spatial information to be located on a map and assigned to a CT. Since the spatial information pertaining to incidents that occurred on the street was often less specific, these incidents were overrepresented among those that could not be located (71%). Half (51%) of incidents that could not be located included offences against the administration of justice (failure to comply with an order, failure to appear, breach of probation, etc.).

The geography of these youth crime incidents in outdoor public spaces (Map 1) is complex and depends on many factors. Some hot spots are located in the vicinity of shopping centres, while others are located around subway stations, especially those stations that are at the end of a line. This type of hot spot was also noted in Montréal (Perreault et al. 2008).

Map 1
Density of youth crime in outdoor public spaces, Toronto, 2006



Multivariate models show that the outdoor spaces where youths commit more crimes are characterized by their criminal opportunities and low social control (Table 2, first model). More specifically, the results suggest that the greater the number of youth living in a neighbourhood, the greater the number of police-reported youth crime incidents. Other places that attract young people, such as subway stations and commercial areas, are also associated with youth crime.

Table 2
Police-reported incidents of youth crime committed in outdoor public spaces, regression models, Toronto, 2006

Neighbourhood characteristics	Incidents of youth crime [1]		Incidents of adult crime [2]
	Model 1	Model 2	Model 3
	regression coefficients (b)		
Night-time population [3]	0.17071***	0.15081***	0.17409***
Day-time population [4]	…	…	0.21369***
Subway traffic	0.10838*	…	…
Commercial activity	0.1901***	0.17989***	…
Bars	0.16508***	…	0.3787***
Immigration	…	…	-0.18994***
Residential mobility	…	…	0.17499***
Central neighbourhoods	0.15187***	0.09553*	0.17749***
Economic vulnerability	0.17965***	0.12392**	0.21514***
Access to resources	-0.19302***	-0.14908***	-0.1119**
Incidents of adult crime [2]	x	0.28921***	x
	r^2		
Explanatory power	0.17	0.20	0.43

… not applicable (variables excluded from the model because they are not significant [p<0.05])
* Significantly associated with dependent variable p<0.05
** Significantly associated with dependent variable p<0.01
*** Significantly associated with dependent variable p<0.001
1. Incidents including at least one accused aged from 12 to 17 years old. Includes a small percentage of accused youth under the age of 12.
2. Incidents in which all accused were 18 years and older.
3. Population aged from 5 to 17 years old living in the census tract for youth crime. Population aged 18 years old and over living in the census tract for adult crime.
4. Population aged from 5 to 17 years old going to school in the census tract for youth crime. Population aged 18 years old and over working in the census tract for adult crime.

Note(s): Model 1 and model 2 test the associations between incidents of youth crime (dependent variable) and neighbourhood characteristics (independent variables). Incidents of adult crime are excluded from model 1 but are included in model 2. Model 3 tests the associations between incidents of adult crime (dependent variable) and neighbourhood characteristics (independent variables).
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

Youth have easy access to central neighbourhoods, primarily via public transit. These neighbourhoods, therefore, attract numerous young people who go there to shop, pass the time and enjoy themselves. Their presence increases the potential for youth crime in those places (Table 2).

Outdoor public spaces located near bars, in vulnerable neighbourhoods and in neighbourhoods whose population has only limited access to socio-economic resources are also more at risk of youth crime. Incidents of youth crime are less numerous in neighbourhoods where households have higher incomes (Map 1).

Outdoor public spaces where youths commit more crimes are also more likely to see a greater number of crimes committed by adults (Table 2, second model). This result suggests that the factors associated with youth crime in public spaces are similar to those related to adult crime.

As with youth crime, adult crime in outdoor public spaces is based on potential offenders' daily activities and the places they go to (Table 2, third model). Thus, public spaces located in neighbourhoods with a large ambient population (i.e., both a large residential population and a large number of people working in the area) will be more at risk. However, adult crime seems to be more influenced by urban characteristics (central neighbourhood and residential mobility) and the presence of bars.

It is important to note that neighbourhood characteristics, as included in the multivariate analysis in this study, account for only one-fifth of the explanation of youth crime in outdoor public spaces (Table 2, second model). Other important factors may not have been taken into account in this analysis due to the limitations of the data.

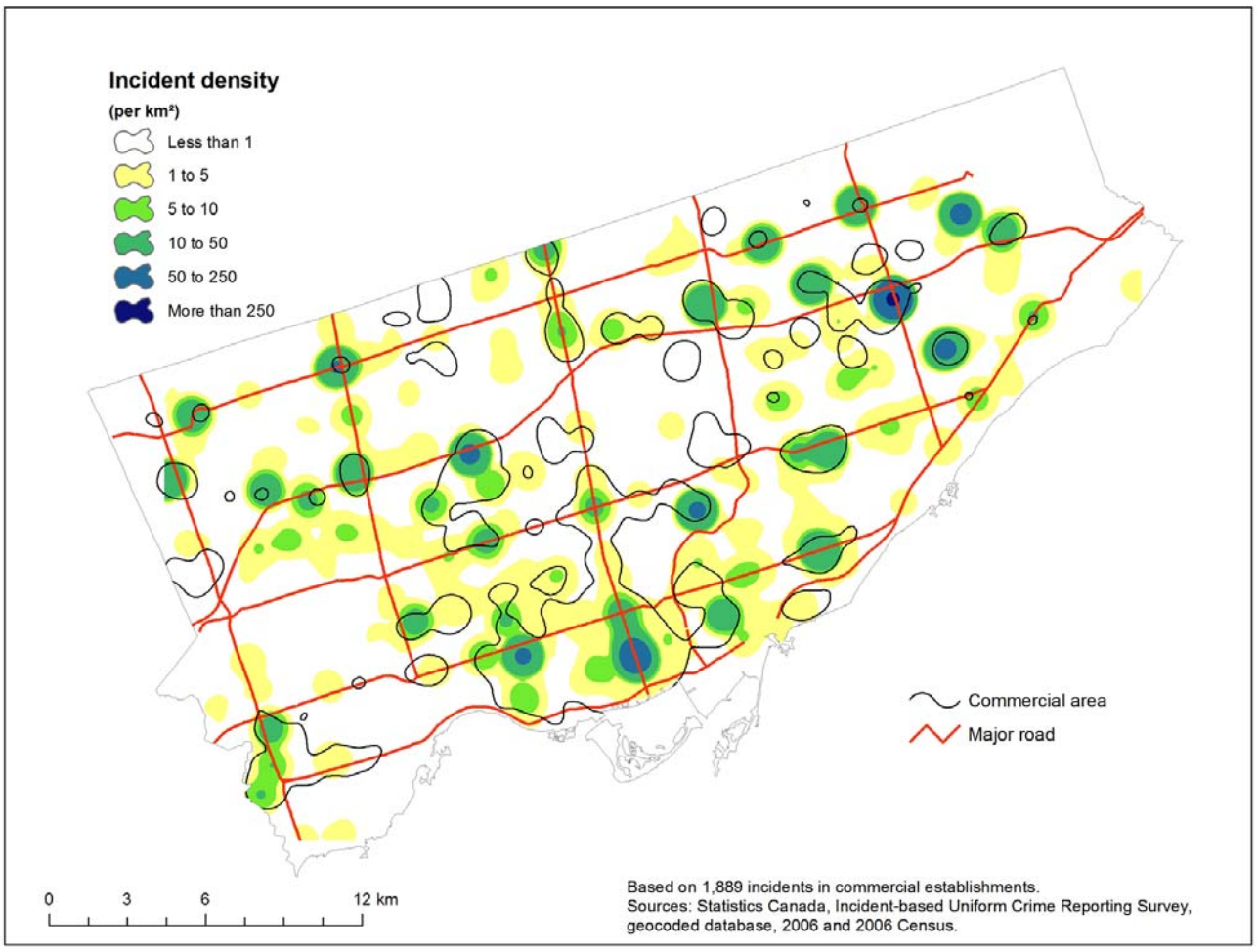
3.3 Youth crime in commercial establishments

Commercial activity is generally highly associated with crime, especially property crime (Perreault et al. 2008, Savoie 2008, Charron 2009). Commercial establishments offer clear criminal opportunities, mainly for theft, but also for mischief, robbery and breaking and entering. Also, commercial areas bring together large numbers of persons whose interactions can lead to violent crimes (Charron 2009).

In 2006, 2,377 incidents of youth crime in a commercial establishment were reported by police in Toronto, the large majority (73%) of which were shoplifting incidents. For most (87%) of these incidents of crime in commercial establishments, sufficient information was available in the UCR database to allow them to be located on a map and assigned to a CT.

Map 2 indicates clearly that the geography of youth crime committed in commercial establishments closely matches the geography of Toronto's commercial activity. Most of the commercial areas show a high density of crime, and most hot spots of crime in commercial establishments are located in a commercial area.

Map 2
Density of youth crime in commercial establishments, Toronto, 2006



However, there are some exceptions. For example, youth do commit crimes in neighbourhood establishments, such as restaurants and convenience stores that are situated in residential settings, outside areas of high commercial concentration. They also commit fewer crimes in commercial areas such as industrial parks and big box stores, in comparison to other types of commercial areas.

The association between commercial activity and incidents of youth crime in commercial establishments is also evident in the multivariate model (Table 3). Commercial activity is the only neighbourhood characteristic that was found to be associated with incidents of youth crime in commercial establishments (Table 3, first model). The fact that commercial activity does not fully explain the spatial organization of youth crime in commercial establishments indicates that some establishments are targeted more than others.

Table 3
Police-reported incidents of youth crime committed in commercial establishment, regression models, Toronto, 2006

Neighbourhood characteristics	Incidents of youth crime [1]		Incidents of adult crime [2]
	Model 1	Model 2	Model 3
	regression coefficients (b)		
Night-time population [3]	…	…	…
Day-time population [4]	…	0.05094*	…
Subway traffic	…	-0.1242***	0.09253**
Commercial activity	0.49292***	-0.19293***	0.71232***
Immigration	…	…	…
Residential mobility	…	…	…
Central neighbourhoods	…	-0.0701**	…
Economic vulnerability	…	…	0.0595*
Access to resources	…	…	…
Incidents of adult crime [2]	x	0.97853***	x
	r^2		
Explanatory power	0.24	0.66	0.57

… not applicable (variables excluded from the model because they are not significant [p<0.05])
* Significantly associated with dependent variable p<0.05
** Significantly associated with dependent variable p<0.01
*** Significantly associated with dependent variable p<0.001
1. Incidents including at least one accused aged from 12 to 17 years old. Includes a small percentage of accused youth under the age of 12.
2. Incidents in which all accused were 18 years and older.
3. Population aged from 5 to 17 years old living in the census tract for youth crime. Population aged 18 years old and over living in the census tract for adult crime.
4. Population aged from 5 to 17 years old going to school in the census tract for youth crime. Population aged 18 years old and over working in the census tract for adult crime.

Note(s): Model 1 and model 2 test the associations between incidents of youth crime (dependent variable) and neighbourhood characteristics (independent variables). Incidents of adult crime are excluded from model 1 but are included in model 2. Model 3 tests the associations between incidents of adult crime (dependent variable) and neighbourhood characteristics (independent variables).
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

The results of the second model show that the number of incidents of adult crime in commercial establishments is strongly associated with the number of youth crime incidents in these same establishments. Thus, it would seem that the commercial establishments most at risk of incidents of youth crime are also at risk of incidents of adult crime.

Despite major similarities between youth crime and adult crime in commercial establishments, there are some differences (Table 3, third model). Incidents of youth crime are slightly more numerous in commercial establishments located near schools attended by youth aged 12 to 17, probably because these places are more accessible to young people. It also appears that in comparison to adults, youth commit more of their offences in commercial establishments that are far from subway stations, located in outlying neighbourhoods and smaller commercial zones.

These results could indicate that youth tend to commit more crime in small retail stores located in residential areas. However, more information would be needed to understand which factors put commercial establishments at risk for crime. The results of an earlier study of crime in Toronto suggested that businesses of the big-box type were more

protected than others (Charron 2009). Other factors such as services offered, type of merchandise sold, business hours and private security may also play a role.

3.4 Youth crime in private residences

The analysis of crime in private residences focuses on the location of the incident, which may include the home of the accused, of the victim or of another person.[8] Information on this aspect is not available from the database on police-reported crime.

In 2006, 1,230 incidents committed in private residences by youths were reported by police in Toronto. Almost half (46%) of them were reported as occurring in a house, the other half (50%) in a dwelling unit and the remainder in a structure on private property, such as a shed or a detached garage. According to Census data, dwelling units are characterized by more renters, low-income households and overcrowded dwellings (Table 4). (According to UCR2 definitions, the main difference between a house and a dwelling unit is that a house has an individual outside entrance.)

Table 4
Selected household and dwelling characteristics, by type of housing, Toronto, 2006

Characteristics	Type of housing	
	House	Dwelling unit
	number	
Residents	1,194,170	1,272,995
	percent	
Renters	10	67
Low income households	14	35
Overcrowded dwellings	5	14

Note(s): Counts have been rounded to a base of 5, as per Census data dissemination confidentiality guidelines. Percents have been rounded.
Source(s): Statistics Canada, 2006 Census.

The types of crimes committed in houses by youths differed from those committed in dwelling units. Houses are more accessible than dwelling units (which cannot be entered directly from the street). Houses were the location of 62% of property crimes, including breaking and entering, theft and mischief, committed by youths in private residences (Table 5). Dwelling units were the site of 59% of violent offences committed by youths in private residences.

8. The neighbourhood of residence of the accused youth is discussed in the section of this report entitled, 'Where do accused youth live?'.

Table 5
Police-reported incidents of youth crime in a private residence, by type of housing, Toronto, 2006

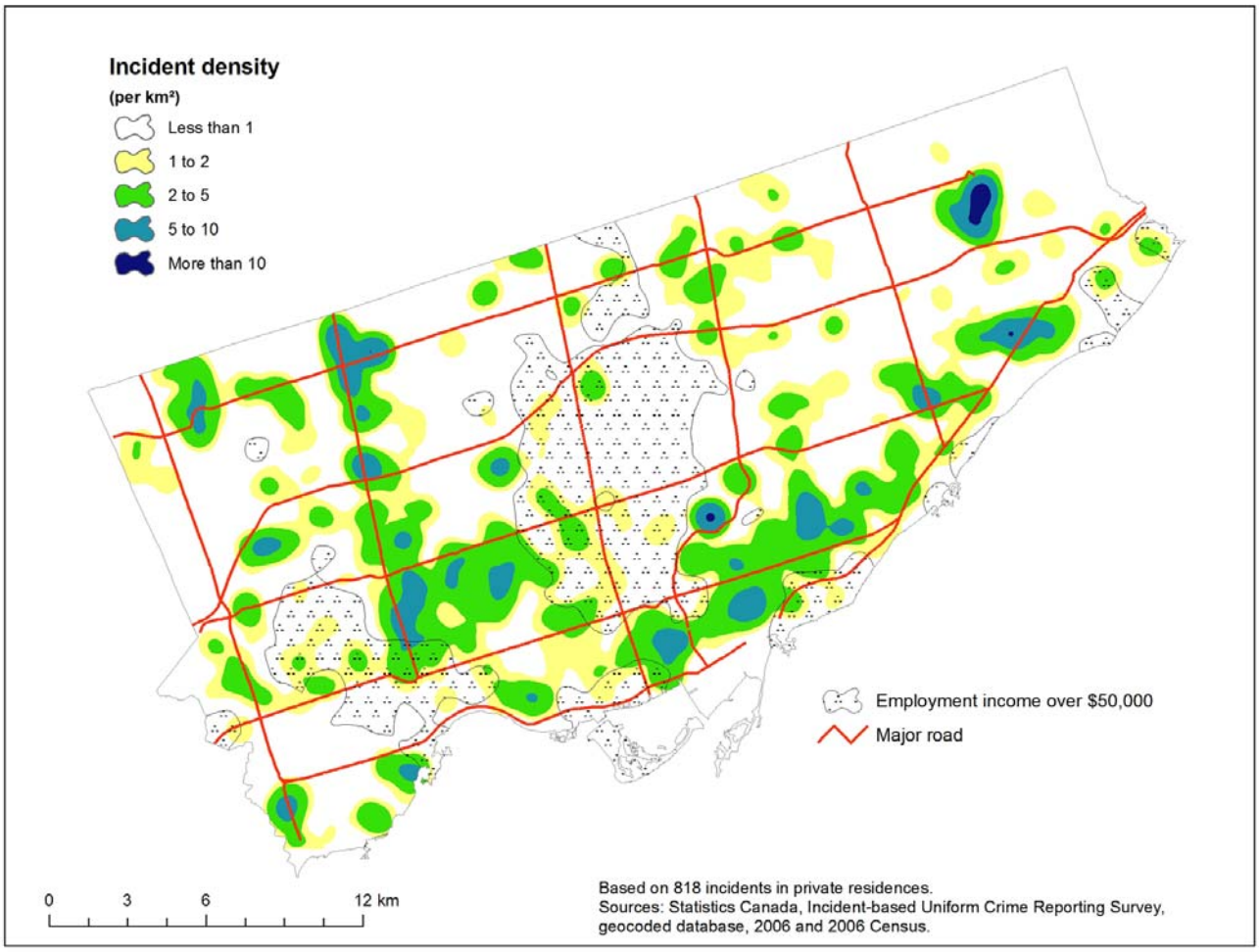
Type of offence	Type of housing			
	House	Dwelling unit	House	Dwelling unit
	number		percent	
Violent crime				
Robbery [1]	12	36	25	75
Serious assault (levels 2 and 3) [1]	54	71	43	57
Common assault (level 1) [1]	117	122	49	51
Uttering threats [1]	70	97	42	58
Total incidents of youth violent crime [2]	**211**	**303**	**41**	**59**
Property crime				
Breaking and entering [1]	107	56	66	34
Theft [1]	45	38	54	46
Mischief [1]	60	55	52	48
Total incidents of youth property crime [2]	**217**	**134**	**62**	**38**
Total incidents of youth crime [3]	**564**	**615**	**48**	**52**

1. Includes all recorded violations in each incident.
2. Includes the most serious violation in each incident only.
3. Includes the most serious violation in each incident only. Includes violent crime, property crime, 'other' *Criminal Code* violations (e.g., failure to comply with conditions, possession of weapons) and violations of the *Controlled Drugs and Substances Act* (e.g., possession of cannabis). Incidents including at least one accused aged from 12 to 17 years old. Includes a small number (approximately 2%) of accused youth under the age of 12.

Note(s): Represents the incident count and not the accused count. Percents have been rounded.
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

Two-thirds (66%) of the police-reported incidents of youth crime in private residences could be located and assigned to a CT (Map 3). In general, these incidents tend to be concentrated in the same neighbourhoods as incidents of youth crime committed in outdoor public spaces (Map 1). However, some differences emerge. In particular, incidents of youth crime in private residences are less numerous in central neighbourhoods than incidents of youth crime in outdoor public spaces.

Map 3
Density of youth crime in private residences, Toronto, 2006



The multivariate model also identifies this difference (Table 6, first model). The central neighbourhoods are not statistically associated with the number of incidents of youth crime committed in private residences.

Table 6
Police-reported incidents of youth crime committed in private residences, regression models, Toronto, 2006

Neighbourhood characteristics	Incidents of youth crime [1]		Incidents of adult crime [2]
	Model 1	Model 2	Model 3
	regression coefficients (b)		
Night-time population [3]	0.28584***	0.24106***	0.49366***
Day-time population [4]	…	…	0.09175*
Subway traffic	…	…	-0.08364*
Commercial activity	…	…	…
Bars	…	…	…
Immigration	-0.17113**	-0.13786**	-0.23489***
Residential mobility	…	…	0.13207**
Central neighbourhoods	…	…	0.19631***
Economic vulnerability	0.241***	0.16955**	0.43103***
Access to resources	-0.2421***	-0.18911***	-0.40265***
Incidents of adult crime [2]	x	0.16513***	x
	r^2		
Explanatory power	0.19	0.20	0.53

… not applicable (variables excluded from the model because they are not significant [p<0.05])
* Significantly associated with dependent variable p<0.05
** Significantly associated with dependent variable p<0.01
*** Significantly associated with dependent variable p<0.001
1. Incidents including at least one accused aged from 12 to 17 years old. Includes a small percentage of accused youth under the age of 12.
2. Incidents in which all accused were 18 years and older.
3. Population aged from 5 to 17 years old living in the census tract for youth crime. Population aged 18 years old and over living in the census tract for adult crime.
4. Population aged from 5 to 17 years old going to school in the census tract for youth crime. Population aged 18 years old and over working in the census tract for adult crime.

Note(s): Model 1 and model 2 test the associations between incidents of youth crime (dependent variable) and neighbourhood characteristics (independent variables). Incidents of adult crime are excluded from model 1 but are included in model 2. Model 3 tests the associations between incidents of adult crime (dependent variable) and neighbourhood characteristics (independent variables).
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

More youth crimes committed in private residences are reported in neighbourhoods that have more young residents. This association may be related to the fact that many of these crimes are committed in the residence of the accused youth, the victim (48% of the victims of accused youth in private residences were themselves young) or of a friend of the accused youth. Nevertheless, the number of young people living in the neighbourhood only partially accounts for the spatial concentrations of crimes committed by youths in private residences.

A higher proportion of recent immigrants in the neighbourhood and residents' greater access to socio-economic resources are related to a smaller number of incidents of youth crime, while the increased economic vulnerability of residents is associated with a larger number of incidents committed by youths in private residences.

Neighbourhoods that had more adult crime in private residences are also those with more crimes committed by youths (Table 6, second model). This association may be related to exposure to violence and the resultant weakening of social control.

The neighbourhood characteristics included in this study have much more impact on incidents of adult crime in private residences than on incidents of youth crime. Indeed, they account for more than half of the explanation of the spatial distribution for adult crime but scarcely one-fifth of that youth crime (Table 6, first and third models). While relatively low, the proportion of the explanation of youth crime explained by the models is similar to the one observed for youth in Montréal (Perreault et al. 2008), and does not mean that the observed statistical associations are not significant. Rather, it means that many other factors might have an impact on the location of youth crime.

3.5 Youth crime in schools

School occupies an important place in the lives of most young people, if only because they spend considerable time there. Attachment to school and academic performance are often examined in relation to delinquent behaviours (Fitzgerald 2003, 2010), and the school environment may constitute a protective factor for youths at risk of delinquency. In a study of self-reported delinquency in Toronto, higher levels of student attachment to school (i.e., whether students were committed to or liked their school) and teacher engagement, as well as the availability of school extracurricular activities were found to reduce the risk of delinquency among students (Fitzgerald 2009). Conversely, schools with higher levels of damage, vandalism and problem behaviours such as thefts, peer fighting and drug use were found to increase that risk. However, the same study found that the characteristics of the neighbourhood in which the school was located had no impact on the delinquency of youths attending that school.

In 2006, 883 incidents of police-reported youth crime were committed on school property in Toronto. Data from the Ministry of Education indicate that there were more than 165,000 students aged 12 to 17, enrolled in Toronto schools in 2006/2007. This translates to 1 incident of youth crime reported by police for every 187 students aged 12 to 17.

Of the 883 incidents of youth crime in schools reported by police, two-thirds (585) took place during supervised activities. A look at violent crimes in schools shows that almost 7 in 10 (69%) of those reported by police occurred during supervised activities (Table 7). In fact, only incidents of robbery, breaking and entering and mischief were more numerous outside supervised activities.

Table 7
Police-reported incidents of youth crime committed at school, Toronto, 2006

Type of offence	Location			
	During supervised activities	Outside supervised activities	During supervised activities	Outside supervised activities
	number		percent	
Violent crime				
Robbery [1]	41	45	48	52
Serious assault (levels 2 and 3) [1]	75	34	69	31
Common assault (level 1) [1]	197	92	68	32
Uttering threats [1]	122	37	77	23
Total incidents of youth violent crime [2]	**399**	**183**	**69**	**31**
Property crime				
Breaking and entering [1]	4	25	14	86
Theft [1]	41	11	79	21
Mischief [1]	25	31	45	55
Total incidents of youth property crime [2]	**62**	**58**	**52**	**48**
Total incidents of youth crime [3]	**585**	**298**	**66**	**34**

1. Includes all recorded violations in each incident.
2. Includes the most serious violation in each incident only.
3. Includes the most serious violation in each incident only. Includes violent crime, property crime, 'other' *Criminal Code* violations (e.g., failure to comply with conditions, possession of weapons) and violations of the *Controlled Drugs and Substances Act* (e.g., possession of cannabis). Incidents including at least one accused aged from 12 to 17 years old. Includes a small number (approximately 2%) of accused youth under the age of 12.

Note(s): Represents the incident count and not the accused count. Percents have been rounded.
Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

The greater number of violent crimes during hours of operation might be attributable to the fact that during that period, youths are brought together in large numbers and interact extensively. As well, violent incidents that occur during supervised activities might be more likely to be reported to police. On the other hand, offences requiring more stealth (breaking and entering and mischief) were more likely to occur outside supervised activities.

It has been shown that in Toronto, the risk of delinquency varies considerably from one school to another (Fitzgerald 2009). Unfortunately, since geographic information on school location was available for only 300 of the crimes in schools, it was not possible to analyse the spatial distribution of police-reported crime in Toronto schools.

Text box 2

Where do accused youth live?

The preceding analyses all focus on the places where youth crime incidents occur and provide information on contextual aspects related to the location of an incident. By analyzing the neighbourhood characteristics of the accused youth, we now shift the focus to the environment in which these young people live. This analysis looks at the characteristics of the neighbourhoods where youth accused of crime live, in an effort to better understand the possible association between neighbourhood characteristics and the rates of youth accused. The analyses of the neighbourhoods where accused youth live are based on data aggregated at the neighbourhood level, supplied by the Toronto Police Service.

Neighbourhood characteristics are derived from the 2006 Census of Population. The Census is conducted by Statistics Canada every five years and, at the time this study was conducted, 2006 was the last cycle for which Census data were available. For purposes of comparability, this paper draws on police data from 2006. Data on school enrolment, provided by the Ontario Ministry of Education, are for the 2006/2007 school-year, while data on the traffic at subway stations, made public by the Toronto Transit Commission, cover 2007.

Using the police data, it was possible to locate the neighbourhoods where 7,893 (17%) youths accused of a crime in Toronto in 2006 resided.[9] However, there are reasons to believe that some youth commit a disproportionate number of crimes. According to Carrington and Schulenberg (2004), 9% of young people arrested in 2001 had had more than five previous contacts with the police. Also, 91% of delinquent acts self-reported by youth in Toronto in 2006 had been committed by less than half of all self-reported delinquents (Savoie 2007). In this current study it was not possible to identify youth with more than one contact with the police.

As with incidents of youth crime in outdoor public spaces and private residences (Maps 1 and 3), the accused rates for youths are higher in some areas characterized by lower resident incomes and lower in neighbourhoods where residents' incomes are high (Map 4).

The results of the regression models show that the characteristics of the neighbourhoods where the youths live are more strongly associated with the rates of youth accused (Table 8) than are the characteristics of the neighbourhoods where they committed crimes (Tables 2, 3 and 6). These results suggest that neighbourhood characteristics have a greater influence on youth residents' risk of being accused than they have on the location of incidents of youth crimes.

More specifically, it appears that youth who live in neighbourhoods with higher residential mobility and economic vulnerability are at greater risk of being accused (Table 8, first model). Conversely, the risk is lower in immigrant neighbourhoods and areas where residents have easier access to socio-economic resources.

Incidents of adult crime in the neighbourhood also have a significant impact on the rate of youth accused (Table 8, second model). This result suggests that exposure to crime or violence in a neighbourhood may increase the risk of delinquency for young people.

Neighbourhood characteristics associated with the adult accused rate (Table 8, third model) are quite similar to those associated with the youth accused rate (Table 8, first model). The multivariate models (Table 2, 3, 6 and 8) show that neighbourhood characteristics are more strongly associated with the places where accused youth live than with the places where they commit their crimes.

9. The Toronto Police Service provided the total number of youth accused of a crime by dissemination area (i.e., neighbourhood) of residence. No actual addresses for accused youth were provided.

Table 8
Rate of youth accused, regression models, Toronto, 2006

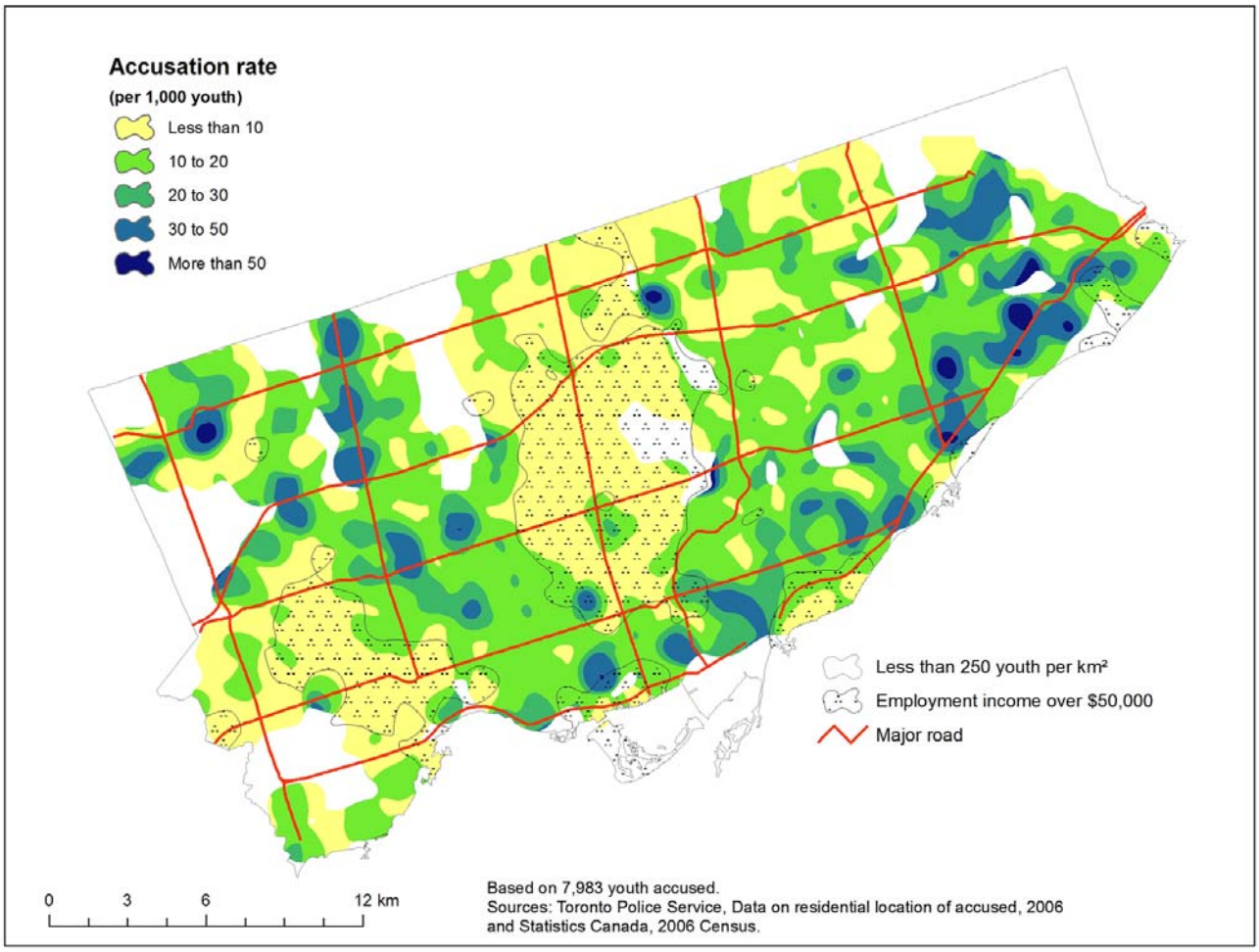
Neighbourhood characteristics	Youth accused rate [1]		Adult accused rate [2]
	Model 1	Model 2	Model 3
	regression coefficients (b)		
Immigration	-0.54824***	-0.41578***	-0.43231***
Residential mobility	0.17712**	...	0.26475***
Central neighbourhoods	-0.10306*	-0.08944*	0.12515**
Economic vulnerability	0.65784***	0.6383***	0.53108***
Access to resources	-0.3651***	-0.32044***	-0.5166***
Incidents of adult crime [2]	x	0.15167**	x
	r^2		
Explanatory power	0.48	0.51	0.66

… not applicable (variables excluded from the model because they are not significant [p<0.05])
* Significantly associated with dependent variable p<0.05
** Significantly associated with dependent variable p<0.01
*** Significantly associated with dependent variable p<0.001
1. Accused aged from 12 to 17 years old. Includes a small percentage of accused youth under the age of 12.
2. Accused aged 18 years and older.

Note(s): Model 1 and model 2 test the associations between youth accused rate (dependent variable) and neighbourhood characteristics (independent variables). Adult accused rate is excluded from model 1 but included in model 2. Model 3 tests the associations between adult accused rate (dependent variable) and neighbourhood characteristics (independent variables).

Source(s): Statistics Canada, 2006 Census; Toronto Police Service, data on accused persons' place of residence.

Map 4
Rate of youth accused, Toronto, 2006



4 Discussion

The objective of this study is to shed light on the geographical distribution of youth crime in Toronto. More specifically, it endeavours to provide a better understanding of the neighbourhood characteristics that are most strongly associated with various types of youth crime.

The results show that nearly one-third of incidents of youth crime took place in a commercial establishment. Most of these incidents were non-violent crimes, and nearly three-quarters (73%) were shoplifting incidents. As with incidents of adult crime, incidents of youth crime in commercial establishments were mostly concentrated in commercial areas. However, the results suggest that some other commercial establishments such as neighbourhood establishments in residential areas or those near schools were more at risk than others.

Incidents committed by youths in outdoor public spaces were more numerous near places frequented by young people, such as commercial establishments, places of residence and public transit.

Incidents of youth crime committed in outdoor public spaces and private residences were more numerous in neighbourhoods with less access to socio-economic resources, which is a factor related to low social control. Social

control can be defined as the ability of the local community to control delinquent behaviour (Shaw and McKay 1942, Sampson and Groves 1989, Sampson and Raudenbush 1999). According to these authors, social control is less efficient where the local population is dealing with a difficult economic situation (unemployment, low income and housing problems) and has limited access to socio-economic resources (low levels of education and income).

Relatively few police-reported incidents of youth crime are committed at school. Indeed, 12% of youth crime incidents were committed on school premises, two-thirds of them during supervised activities. The low number of incidents of youth crime in schools made it impossible to evaluate the impact of neighbourhood characteristics on youth crime committed in schools.

Overall, results from the study suggest that neighbourhood characteristics explain only a small portion of the spatial distribution of youth crime. However, characteristics of the neighbourhoods where youth lived, particularly those associated with social control, did play a more important role in explaining the rates of youth accused of crime.

Neighbourhood characteristics were more strongly associated with accused rates for the youth who lived in them, than with rates of incidents of youth crime. In other words, the neighbourhood had more influence on the risk of young residents committing a police-reported crime (whether in that neighbourhood or elsewhere) than on the number of criminal incidents committed in that neighbourhood by youth. The accused rates were higher in neighbourhoods with high residential mobility and where the local population was economically vulnerable.

Economic vulnerability has the greatest impact on the youth accused rate, with rates lower where the local population had better access to economic resources. This finding could suggest that living in a neighbourhood characterized by economic insecurity increases a young person's risk of being accused of committing a crime.

Immigration emerged as a protective factor against crime and delinquency in the place of residence. Like similar findings in other sources, this could suggest that immigrant neighbourhoods are characterized by greater social control (Martinez 2006).

These statistical associations suggest that young people's criminal behaviour is influenced by the neighbourhood in which they live. For various reasons, residents of some neighbourhoods could be less inclined to ensure that social norms are followed and to instil those standards in neighbourhood children. As well, other research has suggested that youths living in neighbourhoods with higher rates of violent crime incidents are affected by the violence that they witness or experience and that they are influenced by the violent attitudes of some neighbourhood residents (Preski and Shelton 2001, Lynch 2003, Stein et al. 2003, Spano et al. 2009).

Still, the results of the analyses show that the neighbourhoods where accused youth live account for only a small portion of the locations where youth crime takes place, indicating that the proximity of the neighbourhood of residence is only one factor to consider. These results are consistent with what Savoie et al. (2006) observed in Montréal, namely that for youths aged 12 to 17 engaged in criminal activity, the median distance between their place of residence and the crime scene was more than two kilometres. These results are also a reminder that the space in which young people live their lives extends well beyond their neighbourhood of residence (Oberwittler 2007). Also, while incidents of youth crime were slightly more common in commercial establishments near schools, the proximity of a school had no significant impact on the spatial distribution of youth crime in private residences and outdoor public spaces.

The results also show that neighbourhood characteristics associated with the place of residence of accused youth differ subtly from those associated with the place of the incident. It seems that central neighbourhoods experience more crime in their public spaces, while high population turnover in the neighbourhood of residence increases the risk of being identified as an accused. Other research has indicated that the anonymity and accessibility of central neighbourhoods appear to be conducive to crime in outdoor spaces (Tittle and Grasmick 2001, Wilcox et al. 2004, Treno et al. 2007), while residential mobility and more difficult access to home ownership seem to be more favourable to delinquent behaviour among people dealing with these conditions (Sampson and Morenoff, 2004; Pain 2000; Brown et al. 2004).

The mechanisms that explain the relationship between the neighbourhood and youth crime are complex and difficult to show clearly with limited statistical data. Owing to the lack of details in these data, it was not possible to explore

the direction of causality or to determine how risk factors overlap. Nevertheless, the results of this study lend support to the idea that some neighbourhood conditions favour youth crime.

5 Methodology

5.1 Data sources

5.1.1 Incident-based Uniform Crime Reporting Survey

The Incident-based Uniform Crime Reporting (UCR2) Survey collects detailed information on individual criminal incidents reported to the police, including incident, accused and victim characteristics.

The UCR2 Survey allows a maximum of four offences per criminal incident to be recorded in the database. The selected offences are classified according to their level of seriousness, which is related to the maximum sentence that can be imposed under the *Criminal Code*.

This report includes most *Criminal Code* offences and all offences under the *Controlled Drug and Substances Act*, but it excludes offences under other federal and provincial statutes and municipal by-laws. Also excluded are *Criminal Code* offences for which there is either no expected pattern of spatial distribution or a lack of information about the actual location of the offence. For example, administrative offences, including bail violations, failure to appear and breaches of probation, are typically reported at court locations. Also, threatening or harassing phone calls are often reported at the receiving end of the call and impaired driving offences may be more likely to be related to the location of apprehension (for example, apprehensions resulting from roadside stop programs).

5.1.2 Toronto Police Service data on accused persons' neighbourhood

The information on accused persons' neighbourhood was provided by the Toronto Police Service, aggregated at the dissemination area[10] level. The addresses of accused were not provided, but rather the total number of youth accused of a crime by their dissemination area (i.e., neighbourhood) of residence.

5.1.3 Census of population

The Census of Population provides the population, dwelling and workplace counts not only for Canada as a whole, but also for each province and territory, and for smaller geographic units, such as cities or districts within cities. The census also provides information about Canada's demographic, social and economic characteristics.

The detailed socio-economic data used in this report are derived from the long form of the census, which is completed by a 20% sample of households. The Census of Population is conducted by Statistics Canada every five years, and in the most recent data available are from 2006.

5.1.4 Ontario Ministry of Education data on school enrolment

The Ontario Ministry of Education provided data on school enrolment for elementary and secondary schools in publicly funded Boards in the City of Toronto. Data provided were detailed by age and sex and represented the 2006/2007 school year.

5.1.5 Data on traffic at subway stations

Data on traffic at subway stations were obtained from the website of the Toronto Transit Commission. The Toronto Transit Commission publishes key operating statistics on the transit system's performance annually. The oldest

10. A dissemination area is a small, relatively stable geographic unit composed of one or more adjacent dissemination blocks. It is the smallest standard geographic area for which all census data are disseminated. Dissemination areas cover all the territory of Canada.

data available cover 2007. For more information on the Toronto Transit Commission operating statistics see *http://www3.ttc.ca/About_the_TTC/Operating_Statistics/2007.jsp*.

5.2 Geocoding

Geocoding is the process that is used to match a particular address with a geographic location on the earth's surface. In this report, an address corresponds to the location of an incident that was reported to the police, after aggregation to the block-face level— that is, to one side of a city block between two consecutive intersections. This is done by matching records in two databases, one containing a list of addresses, the other containing information about the street network and the address range within a given block. The geocoding tool will match the address with its unique position in the street network. As the street network is geo-referenced (located in geographic space with reference to a co-ordinate system), it is possible to generate longitude and latitude values—or X and Y values—for each criminal incident. Where the incident location does not correspond to an address, geocoding is performed by creating a point on, say, an intersection of two streets or the middle of a public park. X and Y values in the criminal incident database provide the spatial components that allows points to be mapped, relative to the street or neighbourhood in which the incidents occurred.

For the purposes of this report, the Toronto Police Service sent to the CCJS the addresses of incidents committed by youth, which were reported and entered in the UCR2 database in 2006. This information was resolved by the CCJS into a set of geographical co-ordinates (X and Y) for each address. These co-ordinates were rolled up to the mid-point of a block-face in the case of specific addresses, and to intersection points in the case of streets and parks. Information on residential location of accused were provided by the Toronto Police Service, aggregated at the dissemination area level.

5.3 Mapping techniques

Kernel analysis is a method for representing the spatial distribution of crime data. This method makes it possible to examine criminal incident point data across neighbourhood boundaries and to identify areas where these incidents are concentrated. The goal of kernel analysis is to estimate, based on a point pattern, how the density of events varies across a study area. Kernel analysis produces a smooth map of density values.

In kernel estimation, a fine grid is overlaid on the study area. Distances are measured from the centre of a grid cell to each observation that falls within a predefined region of influence known as a bandwidth. Each observation contributes to the density value of that grid cell based on its distance from the centre of the cell. Nearby observations are given more weight in the density calculation than those that are farther away. The product of the kernel estimation method is a matrix (raster image) displaying local density values. In this study, the grid cell size is 100 square metres and the research radius used is 1,000 metres. This method of analysis was applied using the kernel density tool available in the ArcGIS Spatial Analyst extension.

5.4 Variables

5.4.1 Youth crime

This study looks at youth crime, which under the *Youth Criminal Justice Act*, are crimes where the accused is a young person aged 12 to 17. The youth crime studied here is reported by the police and compiled in the Incident-based Uniform Crime (UCR2) Survey. A criminal incident is considered a youth crime if at least one of the accused is between 12 and 17 years of age. However, a small number of these incidents (approximately 2%) involved young people who were under the age of 12.[11] In Toronto in 2006, 11% of police-reported criminal incidents in which at least one accused was between 12 and 17 years of age also included at least one adult accused.

11. The focus in the first section of the study is on the criminal incident; the age of those accused in the incident is then used to distinguish between youth crime and adult crime. It should be noted that this definition of youth crime differs from that used in most other Statistics Canada studies. While this study uses a definition for youth crime that focuses on counts of incidents involving youth, other studies tend to use a definition that focuses on counts of youth accused of crime.

A number of criminal incidents committed by youth are not studied in this report because they are not reported to or by the police. Indeed, a sizable number of incidents never come to the attention of the police. According to the International Youth Survey, conducted in Toronto in 2006, only 5% of youths who reported having had at least one delinquent behaviour during their life said that it had been discovered by the police.

Criminal incidents were classified in four location categories for analysis purposes. Crimes taking place at school include institutions providing courses from junior kindergarten through to grade 13 where the main purpose is to provide education to children. This category includes all structures upon the school ground including school parking lot and playground.

Incidents taking place in a commercial establishment were those reported in a store, a car dealership, a bank, a convenience store, a gas station or any building where the main purpose is to conduct legitimate business for profit. Outdoor public spaces include parking lots, public transportation facilities, streets, parks and playgrounds.

Incidents taking place in a private residence were those that had occurred in a private (owned or rented) dwelling (single home, duplex or apartment building) or on the grounds of that property.

Residential locations of accused persons were provided by the Toronto Police Service, aggregated at the dissemination area level.

5.4.2 Neighbourhood

Since this study concerns the potential influence of the neighbourhood on youth crime, the incidents were grouped by neighbourhood for analysis purposes. The neighbourhood is a structuring place for the individuals who live there. In addition to interacting there, neighbourhood residents are subject to the same local conditions, extending from the food supply to pollution and including architecture and social makeup. The neighbourhood is therefore an important unit of analysis for a number of social phenomena (Kearns and Parkinson 2001). The impact of the neighbourhood could be even more important for children, who spend most of their time there (Sampson et al. 2002).

However, the spatial definition of the neighbourhood is problematic. Neighbourhood boundaries are not always obvious and unambiguous (Ingoldsby and Shaw 2002; Holloway and McNulty 2003; Martin 2003). Among other things, it appears that some aspects of the neighbourhood are more evident at the level of large neighbourhoods, while others would seem to operate at a much more fine-grained level, such as the street or the city block (Brown et al. 2004; Charron and Shearmur 2005).

In this study, the neighbourhood is defined as the census tract (CT). This spatial unit is a small geographic area that usually has a population of 2,500 to 8,000 and is delineated by a committee of local specialists in conjunction with Statistics Canada. The CT is the unit most often used to measure the neighbourhood. Unless otherwise specified, data on neighbourhood characteristics are drawn from the 2006 Census.

A few clarifications are in order regarding the statistical analysis of social phenomena at the neighbourhood level. It should first be noted that these analyses, referred to as ecological, focus on neighbourhoods rather than individuals. Thus, if an association is observed between crime and economic vulnerability in the neighbourhood, for example, this does not mean that crimes tend to be committed more by disadvantaged persons.

Also, major criticisms have been made regarding the evaluation of “neighbourhood effects,” that is, the impact of a neighbourhood on the behaviour of individuals. The main criticism has to do with selection bias (Ingoldsby and Shaw 2002; Sampson et al. 2002). If an association is observed between a neighbourhood characteristic (say, economic vulnerability) and juvenile delinquency, how are we to know whether this characteristic is conducive to delinquency or instead plays a role in youths at risk coming to live in this neighbourhood? Also, how are we to know whether this association is not related to the fact that juvenile delinquency, carried on over a long period, might be one of the causes of economic vulnerability? Thus, it is generally not possible to determine the direction of causality.

5.4.3 Number of incidents and rate of accused persons

The objective of this study is to shed light on the links between neighbourhood characteristics and youth crime, and the central hypothesis of this report is that youth crime is more concentrated in neighbourhoods that have certain characteristics.

For this type of analysis, crime is generally measured as the crime rate in the neighbourhood (Savoie 2008; Charron 2009). The crime rate is the ratio of the number of crimes to the population at risk. Thus, it measures the statistical risk that a member of the at-risk population runs of being a victim or accused in a criminal incident.

The population at risk can be measured precisely if it is stable. For example, the population of a country is relatively stable, since only a small proportion go outside its borders regularly. The situation is more complex for city neighbourhoods, because most residents leave their neighbourhood of residence every day. In earlier studies, the at-risk population of a neighbourhood was considered to be the sum of the population residing there and the population working there, so as to take daily movements into account (Savoie 2008, Charron 2009).

But this measure of the at-risk population does not lend itself to a separate analysis of incidents that have taken place in schools, businesses or outdoor public spaces. Accordingly, another approach was used in this report. The ambient population is considered here as a risk factor, meaning that the larger the ambient population in the neighbourhood, the higher the risk of criminal incidents. Although the population at risk and the ambient population are two similar concepts and are often measured in similar ways, their definitions are somewhat different. The population at risk estimates the risk of the local population being a victim or accused in a criminal incident, whereas the ambient population estimates the population present in a place.

In this study, the ambient population is measured by two variables. The night-time population consists of youths (aged 5 to 17) living in the CT or, for models on adult crime, the population aged 18 and over. The day-time population includes the population of youth (aged 5 to 17) who attended a school in the CT in 2006/2007 or, for models on adult crime, the population working in the CT.[12]

In preceding research papers, the crime rate, which incorporates both the crime count and the population, was used as the dependent variable in the regression models. In this paper, the crime count is used as the dependent variable while night-time and day-time populations are used as two different independent variables.

The analyses on the neighbourhoods where the accused youth reside are based on accusation rates, that is, the number of youth accused in the CT divided by the number of youths residing in the CT. In this case, we are seeking to determine whether the characteristics of the neighbourhood in which a young person lives are associated with his or her risk of adopting delinquent behaviours. Since we are directly interested here in the delinquent behaviours of residents (and not those of the ambient population), the accused rate is more appropriate.

Unlike the information on criminal incidents, which is drawn from the UCR2, the information on accused persons' place of residence was provided by the Toronto Police Service.

5.5 Factor analysis

Factor analysis is used to reveal latent characteristics (i.e. those that are not measured directly) using variables with which they might be associated. With this method, variables that are strongly correlated contribute more to the definition of certain factors. These contributions make it possible to determine the importance of each factor in a census tract (CT) by calculating a factor score. The factor score becomes the neighbourhood characteristic that is used in a multivariate regression model.

In this study, factor analyses are used to define the main spatial structures contained in the socio-economic and urban characteristic variables. Several census variables only partially and imperfectly account for the socio-economic and

12. The age range of 5 to 17 was used to determine day-time and night-time population based on the presence of school-aged children. Youth under the age of 12 cannot be charged with a criminal offence, although a small proportion (2%) of incidents involved youth under the age of 12.

urban realities of neighbourhoods. Factor scores represent the major spatial trends common to the variables used in the factor analyses and are thus indicators of the various socio-economic and urban aspects of CTs.

The factor analyses were produced using SPSS software. It was preferred over the principal components analysis in order to reveal latent factors (Costello and Osborne 2005).

The first factor analysis carried out in this study was designed to identify the main spatial structures of the socio-economic inequalities that exist among neighbourhoods (Table 9). Eight variables were included in the analysis: the proportion of residents who had obtained a university degree; the proportion of residents who had not finished high school; residents' average income; the unemployment rate; the proportion of residents belonging to a lone-parent family; the proportion of residents living in a low-income household; the proportion of dwellings requiring major repairs; and the proportion of residents living in an overcrowded dwelling.

Table 9
Matrix of contribution to socio-economic factors, Toronto, 2006

Percent of variance explained	Access to resources	Economic vulnerability
	percent	
	44	21
	contribution to factor	
University graduates	0.941	0.035
No high school diploma	-0.897	0.010
Average employment income	0.651	-0.329
Unemployment rate	-0.128	0.789
Single-parent families	-0.744	0.358
Low-income households	-0.414	0.765
Dwellings in need of major repairs	-0.133	0.505
Overcrowded dwellings	0.096	0.797

Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

Access to resources and economic vulnerability cover several socio-economic concepts. Residents of CTs where there is greater access to resources have higher education and income levels, while lone-parent families are more numerous in CTs where there is less access to resources. CTs characterized by greater economic vulnerability have higher proportions of unemployed persons, low-income households and dwellings that are overcrowded or in need of major repairs.

The second factor analysis was designed to identify the main urban differences among neighbourhoods (Table 10). Seven variables were included in the analysis: proportion of renters; average age of residences; proportion of single detached houses; proportion of residents who had moved in the previous year; proportion of residents who had not moved in the previous five years; proportion of residents who used a car to get to work; and distance to downtown.

Table 10
Matrix of contribution to urban factors, Toronto, 2006

Percent of variance explained	Residential mobility	Central neighbourhoods
	percent	
	52	25
	contribution to factor	
Renters	0.754	0.239
Age of buildings	-0.247	0.888
Single-detached houses	-0.833	-0.161
Residential stability (five years)	-0.906	0.135
Residential mobility (one year)	0.827	-0.052
Commuting by car	-0.693	-0.571
Distance from downtown	-0.326	-0.843

Source(s): Statistics Canada, Incident-based Uniform Crime Reporting Survey, geocoded database, 2006 and 2006 Census.

Residential mobility and neighbourhood centrality summarize the urban aspects of CTs. CTs with high residential mobility have more renters and persons who moved in the previous year. By contrast, CTs with low residential mobility are characterized by a large number of residents of long standing (more than five years) and single detached houses. Central neighbourhoods are grouped around the downtown and include older buildings.

5.6 Multivariate regressions

The backward method was used to determine the variables included in the models. The small number of incidents could have caused some problems because of the large number of CTs where no incidents of youth crime were reported by the police. However, since the residuals from these models had a near-normal distribution, this had no effect on the models.

Contrary to previous research documents on the spatial organization of crime within cities released by the Canadian Centre for Justice Statistics (Savoie 2008; Charron 2009) no spatial autocorrelation was observed between observations. Consequently, regression models showed in this report did not include a spatial component.

6 Bibliography

Bauder, Harald. 2002. “Neighbourhood effects and cultural exclusion.”*Urban Studies*. Vol. 39. p. 85-93.

Body-Gendrot, Sophie. 2001. “The politics of urban crime.”*Urban Studies*. Vol. 38. p. 915-928.

Brown, Barbara B., Douglas D. Perkins and Graham Brown. 2004. “Incivilities, place attachment and crime: Block and individual effects.”*Journal of Environment Psychology*. Vol. 24. p. 359-371.

Carrington, Peter J. and Jennifer L. Schulenberg. 2004. “Prior police contacts and police discretion with apprehended youth.”*Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 3. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2004003-eng.htm* (accessed September 7, 2010).

Charron, Mathieu. 2009. “Neighbourhood characteristics and the distribution of police-reported crime in the city of Toronto.”*Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 18. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2009018-eng.htm* (accessed September 7, 2010).

Charron, Mathieu and Richard Shearmur. 2005. “La ségrégation économique comme un phénomène complexe : une analyse spatio-temporelle du cas montréalais.”*The Canadian Geographer*. Vol. 49. p. 332-351.

Cohen, L. and M. Felson. 1979. "Social change and crime rate trends: A routine activity approach."*American Sociological Review.* Vol. 44, p. 588-608.

Costello, Anna B. and Jason W. Osborne. 2005. "Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis."*Practical Assessment, Research & Evaluation*. Vol. 10. p. 1-9.

Dinovitzer, Ronit, John Hagan and Ron Levi. 2009. "Immigration and youthful illegalities in a global edge city."*Social Forces*. Vol. 88. p. 337-372.

Fitzgerald, Robin. 2010. "Parenting, school contexts and violent delinquency." *Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 19. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2010019-eng.htm* (accessed September 7, 2010).

Fitzgerald, Robin. 2009. "Self-reported violent delinquency and the influence of school, neighbourhood and student characteristics."*Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 17. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2009017-eng.htm* (accessed September 7, 2010).

Fitzgerald, Robin. 2003. "An examination of sex differences in delinquency." *Crime andJustice Research Paper Series.* Statistics Canada Catalogue no. 85-561-MIE. No. 1. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2003001-eng.htm* (accessed September 7, 2010).

Forrest, Ray and Ade Kearns. 2001. "Social cohesion, social capital and the neighbourhood."*Urban Studies*. Vol. 38. p. 2125-2143.

Holloway, Steven R. and Thomas L. McNulty. 2003. "Contingent urban geographies of violent crime: Racial segregation and the impact of public housing in Atlanta."*Urban Geography*. Vol. 24. p. 187-211.

Ingoldsby, Erin M. and Daniel S. Shaw. 2002. "Neighborhood contextual factors and early-starting antisocial pathways."*Critical Child and Family Psychology Review*. Vol. 5. p. 21-55.

Kearns, Ade and Michale Parkinson. 2001. "The significance of neighbourhood."*Urban Studies*. Vol. 38. p. 2103-2110.

Lynch, Michael. 2003. "Consequences of children's exposure to community violence."*Clinical Child and Family Psychology Review*. Vol. 6. p. 265-273.

Martin, Deborah G. 2003. "Enacting neighborhood."*Urban Geography*. Vol. 24. p. 361-385.

Martinez, Ramiro Jr. 2006. *Immigration and Crime, Race Ethnicity and Violence*. New York University Press.

Massey, Douglas S. 1996. "The age of extremes: Concentrated affluence and poverty in the twenty-first century."*Demography*. Vol. 33. p. 395-412.

Oberwittler, Dietrich. 2007. "The effects of neighbourhood poverty on adolescent problem behaviours: A multi-level analysis differentiated by gender and ethnicity."*Housing Studies*. Vol. 5. p. 781-803.

Pain, Rachel. 2000. "Place, social relations and the fear of crime: A review."*Progress in Human Geography*. Vol. 24. p. 365-387.

Park, Robert E. and Ernest W. Burgess. (1925) 1967. *The City*. Chicago University Press.

Perreault, Samuel, Josée Savoie and Frédéric Bédard. 2008. "Neighbourhood characteristics and the distribution of crime on the Island of Montréal: Additional analysis on youth crime." *Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 11. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2008011-eng.htm* (accessed September 7, 2010).

Preski, Sally and Deborah Shelton. 2001. "The role of contextual, child, and parent factors in predicting criminal outcomes in adolescence."*Issues in Mental Health Nursing*. Vol. 22. p. 197-205.

Sampson, Robert J. and W. Byron Groves. 1989. "Community structure and crime: Testing social-disorganization theory."*The American Journal of Sociology*. Vol. 94. p. 774-802.

Sampson, Robert J. and Jeffrey D. Morenoff. 2004. "Spatial (dis)advantage and homicide in Chicago neighborhoods."*Spatially Integrated Social Science*. M.F. Goodchild and D.G. Janelle (eds.). Oxford. United Kingdom. Oxford University Press.

Sampson, Robert J., Jeffrey D. Morenoff and Thomas Gannon-Rowley. 2002. "Assessing 'neighbourhood effects': Social processes and new directions for research."*Annual Review of Sociology*. Vol. 28. p. 443-478.

Sampson, Robert J. and Stephen W. Raudenbush. 1999. "Systematic observation of public spaces: A new look at disorder in urban neighborhoods."*The American Journal of Sociology*. Vol. 105. p. 603-651.

Savoie, Josée. 2008. "Analysis of the spatial distribution of crime in Canada: Summary of major trends." *Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 15. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2008015-eng.htm* (accessed September 7, 2010).

Savoie, Josée. 2007. "Youth self-reported delinquency, Toronto, 2006."*Juristat*. Vol. 27. No. 6. Statistics Canada Catalogue no. 85-002-X. *www.statcan.gc.ca/pub/85-002-x/85-002-x2007006-eng.pdf* (accessed September 7, 2010).

Savoie, Josée, Frédéric Bédard and Krista Collins. 2006. "Neighbourhood characteristics and the distribution of crime on the Island of Montréal."*Crime and Justice Research Paper Series*. Statistics Canada Catalogue no. 85-561-X. No. 7. Ottawa. *www.statcan.gc.ca/pub/85-561-m/85-561-m2006007-eng.pdf* (accessed September 7, 2010).

Shaw, Clifford R. and Henry D. McKay. 1942. *Juvenile Delinquency in Urban Areas*. Chicago. Illinois. University of Chicago Press.

Spano, Richard, Alexander T. Vazsonyi and John Bolland. 2009. "Does parenting mediate the effects of exposure to violence on violent behaviour? An ecological-transactional model of community violence."*Journal of Adolescence*. Vol. 32. p. 1321-1341.

Stein, Bradley D., Lisa H. Jaycox, Sheryl Kataoka, Hilary J. Rhodes and Katherine D. Vestal. 2003. "Prevalence of child and adolescent exposure to community violence."*Clinical Child and Family Psychology Review*. Vol. 6. p. 247-264.

Tittle, Charles R. and Harold G. Grasmick. 2001. "Urbanity: Influence of urbanness, structure, and culture."*Social Science Research*. Vol. 30. p. 313-335.

Treno, Andrew J., Paul J. Gruenewald, Lilian G. Remer, Fred Johnson and Elizabeth A. Lascala. 2007. "Examining multi-level relationships between bars, hostility and aggression: Social selection and social influence."*Addiction*. Vol. 103. p. 66-77.

Wilcox, Pamela, Neil Quisenberry, Debra T. Cabrera and Shayne Jones. 2004. "Busy places and broken windows? Toward defining the role of physical structures and process in community crime models."*The Sociological Quarterly*. Vol. 45. p. 185-207.