

A neighborhood-level analysis of immigration and crime in Vancouver, Canada, 2003-2016

by

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Abstract

In recent years, conflict and violence have propelled the rate of displaced individuals to the highest levels since the Second World War, reigniting concerns on immigration and crime. Mass re-settlement initiatives have also changed the social and economic landscape of cities and neighborhoods, opening up an entirely new set of challenges for host nations. From an academic vantage, empirical inquiries are complicated by the dynamic, multifaceted and heterogeneous nature of immigration—complexities that also impact theory-based interpretations of the relationship. The polarization of sentiments complicate political and social perspectives. Advocates for restrictive immigration policies argue that immigrants are inextricably crime prone, while those in support of open immigration policies counter. Empirical research has proliferated in recent years, findings consistently show negative or null relationships between immigration and crime—yet researchers still know relatively little about *why* findings occur. As such, the current thesis aims to contribute to a better understanding of the immigration-crime link by addressing empirical and methodological gaps that help identify contextual mechanisms that underlie the relationship. Empirically, multi-dimensional, theoretically derived measures of immigration are analyzed—attending to the limitation of overly broad, single dimension, measures. Limitations also stem from a paucity of research that test the relationship at smaller aggregate units. This gap is addressed using census-tract level data and spatially referenced crime data to test immigration effects on disaggregated property crime types across neighborhoods in Vancouver, British Columbia, Canada, 2003-2016. Methodological limitations develop from the use of global analytic models in assessments of ecological spatial data. Accordingly, local-level spatial analytic techniques are utilized—the spatial point pattern test and geographically weighted regression and a decomposition model. Overall, findings importantly show significant spatial variation in the effect of immigration on property crime (spatial non-stationarity). Results also demonstrate significant variation across immigration measure, property crime classification, effects are also distinguished between and within neighborhoods. Findings therefore, illustrate the context dependent nature of immigration effects on crime. Therefore, in order to develop a better understanding of the immigration-crime link future research should move beyond monolithic expectations and adopt research strategies that account for contextual factors that help explain differential relationships between immigration and crime.

Keywords: Immigration and crime; neighborhood-level analysis; spatial patterns, local point pattern test; geographically weighted regression; spatial non-stationarity

Dedication

I dedicate this thesis to my beautiful daughter, Elizabeth. At just three years old you are, and will always be, my endless source of inspiration, my motivation, my driving force, my everything! You don't realize it now but this thesis is just as much for me, as it is for you. One day, I hope you'll be able to draw inspiration from my work, and create your own inspiring work. I want you to experience the beauty of discovery, knowledge, critical thought and creativity. I want you to explore, innovate, create, do what *you* love, be happy and proud to share your passion with those mentors, friends and family who will support and guide you through the process—all things I've been so fortunate to have experienced during the course of my PhD. Elizabeth, always have the courage to seek and exercise your full potential, it won't always be easy, or fun, adversity is inevitable. However, I see your resilience, your strength, and know you will be able to overcome and keep pushing forward—being accomplished in your own right is invaluable and worth every ounce of effort. Moving forward, I envision only the most amazing things for you, my only ask is that you embrace education, respect and enjoy the process, it will allow you to seek, appreciate, and maximize the beauty and benefits embedded in knowledge. This PhD has been an absolute honor, incredibly rewarding, truly an experience of a life time—I'm certain you'll find the same sense of purpose and accomplishment in your own achievements. Lastly, Elizabeth, know that your prospects are limitless, be true to yourself, be inspired, work hard and you will find happiness and build *any* life you choose. Elizabeth, I am so excited for all the places you'll go...

Love always,

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Chapter 1.

Introduction

The impact of immigration on crime has become a major and highly contentious policy issue in most European countries and the United States in particular, though somewhat less so in Canada. Negative public, media, and political representations regarding the impact of immigration on crime appear to reflect traditional stereotypes of immigrants as more prone to committing crime than multi-generation citizens and residents (Adelman, Kubrin, Ousey & Reid, 2018). In Canada, young male adolescents and adults from certain ethnic immigrant families in major cities such as Montreal, Toronto and Vancouver particularly have been presented in the media as being disproportionately involved in gang related violence especially gun homicides. While this fear of apparent ethnically defined adult/youth gangs and more general immigrant based criminality has not reached anywhere near the scale of fear evident in the US—particularly under the presidency of President Donald Trump that has given antipathy toward immigrants a new voice, gang and gun violence that involve a more recent generation of immigrant males have become a major national and local policy issue in Canada (McConnell, 2019). For example, in Surrey British Columbia, Canada's fastest growing city, residents overwhelmingly elected a new mayor and municipal council based largely on replacing the long standing RCMP Surrey detachment because of its perceived inability to mitigate, let alone prevent, weekly gang related shootings and homicides (McConnell, 2019). Many of the perpetrators and victims were from the Sikh community even though the adult/youth gangs' members involved were, or are, from multi-ethnic and middle- and upper-income families. The gang violence throughout Canada primarily resulted from conflicts over drug trafficking as well as inter and intra gang retaliations (McConnell, 2019).

Though less media salient, immigration too has been related to domestic violence frequently against wives, girlfriends, and daughters often associated with culturally based honor issues. Similarly, non-violent crimes other than drug trafficking such as fraud, money laundering, and tax evasion, arguably, have been associated with certain immigrant group stereotyping (Smith, 2019). Proponents of immigration counter

these negative stereotypes with several key assertions, most importantly, immigrants generally have lower crime rates than non-immigrant residents (see. Martínez & Lee, 2000). Moreover, immigrants typically are extensively embedded in extended family networks with prosocial values and related anti-social behavioral restraints. Clearly, this debate is based on conflicting empirical assertions and stereotypes about immigration and crime (Adelman et al. 2018).

Criminological theories and research began systematically examining this relationship, albeit indirectly, in the initial decades of the 20th century in inner Chicago neighborhoods (Thomas, 2011). Shaw and Mackay (1969; 1942; 1931) initiated the classic study of crime in economically and socially stable and relatively homogenous ethnic areas compared to economically disadvantaged and socially unstable mixed ethnicity areas. They found that crime was low in the former neighborhoods and pervasive in the latter. A near century of subsequent research has continued to examine immigration/ethnicity and crime primarily at the neighborhood level (Kubrin & Mioduszewski, 2018). As will be evident in the following brief review of this research and in the subsequent article chapters in this thesis, no simple inferences emerged. This suggests that the complex and dynamic nature of this phenomenon requires empirical and methodological attention that is to unravel some of the complexities and nuances that underlie this intricate relationship. Nonetheless, most of the studies did provide certain degrees of support for several theoretical propositions, namely social disorganization (Shaw & Mackay, 1931), immigrant revitalization (Martinez & Lee, 2002) and immigrant enclave perspectives (Portes, 1987; Portes & Bach, 1985). However, it is important to note that although prominently referenced in the literature, the theoretical mechanisms that underlie these theoretical perspectives provide insufficient explanations of empirical findings (see. Kubrin & Mioduszewski, 2018).

Nonetheless, contemporary studies on the immigration-crime relationship indicated consensus on several general themes. First, research that demonstrated either no association or negative relationships between immigration and crime. Martínez and Lee (2000) illustrated this consensus in an extensive review of literature, concluding that “a centuries of research on immigration and crime has shown that immigrants nearly always exhibit lower crime rates than native groups” (p. 496). A second and related trend in findings is that the individual-level link between immigrants and crime appears to wane across generations (Kubrin & Mioduszewski, 2018). Most simply put, second

generation immigrants, or the children of immigrants born in the United States exhibit higher offending rates than their parents (Lopez & Miller, 2011; Morenoff & Astor, 2006; Rumbaut, Gonzales, Komaie, Morgan, & Tafoya-Estrada, 2006; Sampson et al., 2005; Taft, 1933; Zhou & Bankston, 1998). This observation is particularly true in the Canadian context, given that many of the young males involved in gang and gun violence are not first-generation immigrants but instead second generation or the children of immigrant parents (see. Van Ngo, Calhoun, Worthington, Pynch, & Este, 2017). Finally, at the neighborhood-level Kubrin & Mioduszewski (2018) summarize the extensive literature that reveals on average, neighborhoods with greater concentrations of immigrants have lower rates of crime and violence (Akins, Rumbaut, & Stansfield, 2009; Butcher & Piehl, 1998a; Chavez & Griffiths, 2009; Desmond & Kubrin, 2009; Feldmeyer & Steffensmeier, 2009; Graif & Sampson, 2009; Kubrin & Ishizawa, 2012; Lee & Martínez, 2002; Lee, Martínez, & Rosenfeld, 2001; MacDonald, Hipp, & Gill, 2013; Martínez, 2000; Martínez, Lee, & Nielsen, 2004; Martínez, Stowell & Cancino, 2008; Martínez, Stowell & Lee, 2010; Nielsen & Martínez, 2009; Nielsen, Lee, & Martínez, 2005; Ousey & Kubrin, 2009; Reid, Weiss, Adelman, & Jaret, 2005; Stowell, 2007; Stowell & Martínez, 2007, 2009; Stowell, Messner, McGeever, & Raffalovich, 2009; Velez, 2009; Wadsworth, 2010).

Despite this scholarly research, advocates for restrictive immigration policies continue to assert that immigrants are inextricably crime prone and, accordingly, a substantial threat to the safety and security of multi-generational populations (Ousey & Kubrin, 2018; Kubrin & Mioduszewski, 2018). In effect, it is possible to argue that negative media representations and intense political polarization simply have overwhelmed the above disseminated research, which challenged the negative stereotypes of this relationship (see. Berg, 2009; Brader & Suhay, 2008; Lee & Bean, 2010). The latter widespread perceptions in the US have influenced the implementation of highly restrictive immigration policies beginning with the advent of the Trump administration in 2017 (Ousey & Kubrin, 2018). However, as mentioned above, several immigration–crime relationship key themes will be discussed (Kubrin, Hipp & Kim, 2018).

1.1. Canadian immigration-related research context

The Canadian federal government has adopted a historic multi-year immigration levels plan to admit up to 1,080,000 new permanent residents from 2019 to 2021 (Government of Canada Annual Report to Parliament on Immigration, 2018). Also, included in the

2019-2021 Immigration Levels Plan are greater targets for the number of refugees and displaced people to be admitted into Canada (Government of Canada Annual Report to Parliament on Immigration, 2018). This immigration plan will lead to an increase in the concentration of immigrants and refugees in urban-metropolitan regions in Canada, thereby, supporting Sampson's (2013) assertion of the forthcoming increase in "global neighborhoods" (Logan & Zhang, 2010).

The general intent of this thesis is to not only, provide empirical and substantive contributions that help advance the immigration-crime literature but also inform policy and public perceptions in a Canadian context. This is important because extant research has overwhelmingly taken place in US contexts. In other words, there is a paucity of research in other national jurisdictions (Sydes, 2017). Again, the general consensus was that increases in immigration are either negatively or insignificantly associated with crime (Sydes, 2017). Furthermore, neither immigrants nor their children pose a greater crime threat than the non-immigrant born population (Butcher & Piehl, 1998, 2007; Hagan & Palloni, 1999; Morenoff & Astor, 2006; Portes & Rumbaut, 2006). Although studies conducted at the neighborhood-level revealed negative relationships between immigrant concentration and neighborhood crime rates, explanations on why these relationships exist remain incomplete (see. Chavez & Griffiths, 2009; Desmond & Kubrin, 2009; Kubrin & Ishizawa, 2012; Martinez, Stowell, & Lee, 2010).

As mentioned, there are few studies that explore immigration effects on crime outside the US context and findings from existing studies are inconsistent. For instance, while Bell and Machin (2013) found that immigrant concentration was negatively associated with crime rates in England, in France, Aoki and Todo (2009) identified a positive correlation. As well, Bircan and Hooghe (2011) reported that the relationship between immigration on crime in Belgium was dependent on the operationalization definitions of immigration. They stated that the impact of total immigration on crime was insignificant, yet, when using measures that were disaggregated to include ethnic group classifications, group-specific effects were revealed; non-European Union nationals and African nationals were related to higher crime in certain municipalities (Bircan & Hooghe, 2011).

In a Canadian context, Andresen (2013) found an indirect relationship between immigration and crime i.e. an increase in the immigrant subpopulation of young males

was associated with crime. Following Zhang (2014) too tested the immigration-crime link with a smaller scale of aggregation in Canada utilizing Canadian census tracts. His study showed a significant negative relationship between immigration and property crime rates. In a more recent Canadian study employing a longitudinal macro-level test of the relationship, Jung (2017) showed that changes in immigration were either insignificantly or negatively related to the crime types tested. Sydes (2017) examined the association of immigration on violent crime across 882 neighborhoods in two Australian cities (Brisbane and Sydney). This study suggested that ethnic group concentration was not linked to more violence but instead the former likely was a protective phenomenon against neighborhood violence.

These few non-US national studies on immigration and crime were somewhat inconsistent for several reasons. First, it appeared that the measure of immigration used was related to positive or negative relationship findings. For example, in the Aoki and Todo (2009) study in France, disaggregating immigration by ethnic group revealed a positive relationship as did Andresen's (2013) Canadian study, which disaggregated the immigrant category by sex and age. Second, the unit of analysis employed (e.g. neighborhood, city, national) too was associated with variations in the relationships found. Third, the various studies examined different crime types (e.g. property and violent crime) at different aggregate units. Fourth, studies varied by their research designs (cross sectional, longitudinal, sample sizes). Fifth, it is inherently difficult to incorporate country specific cultural and immigration laws/policies differences into the analyses of immigration and crime. In effect, while all these studies contributed to our understanding of the relationship between immigration and crime, external validity issues limit their generalizability both within countries and cross nationally.

The current study contributes to the immigration-crime literature in a Canadian context and possibly has some level of generalizability to the US where most research has occurred. Conversely, US based theories and related studies' findings concerning this relationship are very important in Canadian contexts. It is necessary, therefore, to discuss contextual differences between Canadian and the United States.

1.2. Immigration and the Canadian Context

Canada, like the US and Australia, has long been considered as a “nation of immigration”. From their inception, these countries established immigration laws to build their non-Indigenous populations systematically, rapidly, and overwhelmingly in urban areas. These countries further had similar immigration laws that favored European immigrants. As a result, these former British colonies had somewhat similar historical waves of different immigrant ethnic groups settling in urban and then suburban enclaves or communities as exemplified in Shaw and Mackay’s (1931;1942) Chicago study and Sampson and Groves (1989) evaluation of social disorganization theory. As will be discussed below in greater detail regarding Canada, since the 1970s, these more recent and substantial immigrant waves included individuals and families from “Third World” or economically developing countries mainly in Africa, East/South Asia, the Middle East, Central America, and the Caribbean. In effect, the negative stereotypes associated with perceived increased crime, especially involving gangs and organized crime in the above countries was influenced by the this changing race and/or religion based ethnic immigrant profile.

Canadian laws and related specific policies have emphasized relatively large scale “managed migration” i.e., immigrant resettlement through economic immigration, family reunification, and the protection of refugees and vulnerable persons (Government of Canada Annual Report to Parliament on Immigration, 2018). Accordingly, immigrants currently represent one in five residents in Canada (Government of Canada Annual Report to Parliament on Immigration, 2018). Canada’s immigration policy consists of three distinctive features that, typically distinguish its immigration policies from many similar liberal democratic and advanced economic nations (Reitz, 2012). First is the selection of skilled immigrants through the use of a “points system” implemented by the Federal government in 1967 (Kelley & Trebilcock, 1998). This policy is based on the assertion that skilled immigrants fill shortages in various employment sectors or labor markets, which, in turn, stimulated economic growth (Government of Canada Annual Report to Parliament on Immigration, 2018). The points system assigns scores according to specified criteria such as having: arranged employment; knowledge of English and/or French; a relative in Canada; an area of intended settlement; in demand education, training, occupation, and professional skills. Age too is a criterion (Kelley &

Trebilcock, 1998). This immigration law has effected a demographic change in the contemporary profile of Canadian immigrants (Jung, 2017). Because the points system emphasized the university educated, there has been a substantial increase in the proportion of immigrants with university degrees and employment success among Canadian immigrants (Reitz, Curtis, & Elrick, 2014). Canada admitted 159,262 permanent residents in Economic Class programs, representing 55.6% of all 2017 admissions (Government of Canada Annual Report to Parliament on Immigration, 2018).

The second immigration policy feature is the role of provinces; they have autonomy in the administration of immigration, most notably, francophone Quebec (Reitz, 2012). Currently, all Canadian provinces and territories with the exception of Nunavut, have formal agreements with Citizenship and Immigration Canada that consider the distinctive economic needs and goals of each province (Jung, 2017). More specifically, provinces can determine provincial nominees, international students, temporary foreign workers, reception of refugees, and settlement programs (Citizenship and Immigration Canada, 2010). Furthermore, the Provincial Nominee Program allow each province and territory to address the economic development needs that are specific to their area while distributing the benefits of economic immigration across all provinces and territories (Government of Canada Annual Report to Parliament on Immigration, 2018). The nomination process involves the assessment of skills, education and work or business experience of prospective candidates by provincial and territorial governments to ensure that the nominees can contribute economically to the nominating province or territory (Government of Canada Annual Report to Parliament on Immigration, 2018). Under this program, potential immigrants apply first to the province they intend to immigrate, are vetted by provincial officials, then Citizenship and Immigration Canada determines whether each nominee fulfills federal admissibility requirements regarding health, security, and criminality (Carter, Padney, & Townsend, 2010).

Lastly, immigration policies in Canada are distinguished in terms of the degree to which immigrants are integrated culturally. In Canada there is a multiculturalism law, introduced in 1971 and enshrined in the constitution in 1982, with further legislatively mandated policies in 1988 (Reitz, 2012). This multiculturalism policy includes specified programs which encourage integration into local communities, such as language training, fast-track citizenship and an array of human rights and equality guarantees

along with recent efforts to improve the recognition for foreign-acquired qualifications. Although, multiculturalism has become entrenched in Canada's immigration system and a positive symbol supporting the integration of immigrants, the effectiveness of multicultural policies in integrating immigrants into Canadian society remains unclear (Reitz, 2012). Despite the federal governments' promoted publicly popular perception that multicultural policies have been significantly effective in integrating immigrants, there were too few studies to confirm this assertion. Nonetheless, in the Canadian context, multiculturalism is regarded as a key feature of the national identity and an important bases of popular support for immigration in Canada and the more benign view of its negative association with crime (Reitz, 2012).

1.3. Contextual differences between the United States and Canada

The United States and Canada are contextually similar in several ways; politically stable liberal democracies; predominantly English-speaking; and among the top seven advanced industrial/technologically based global economies (Mercer & Goldberg, 1986). Furthermore, both nations have similar patterns (though not rates) of crime, immigration, and, fertility. Regarding the latter two commonalities, both countries have had steady declines in fertility rates and, rely on immigrants to sustain population growth (Adsera, 2004). In his 2018 annual report to parliament on immigration, Canada's immigration minister asserted that:

“With an ageing population and low fertility rates, immigration plays an important role in ensuring that Canada's population and labor force continue to grow. Given that immigrant newcomers are, on average, younger than the Canadian-born population, immigration can help mitigate some of the challenges of an ageing demographic”

Both nations share similarities in their geography of immigration; immigrant settlement patterns are located disproportionately in metropolitan/urban locations (Chui & Flanders, 2013). As well, since the 1990s Canada and the United States have had steady declines in crime rates (Farrell, Tilley, Tseloni & Mailley, 2010). However, there are contextual differences between Canada and the United States that possibly could assist in explaining any differences in the immigration-crime relationship, again, specifically regarding the rates of serious and violent crimes.

First, Canada is far more geographically isolated than the US. This difference is critical because illegal immigration in Canada is relatively rare compared to the United States with its estimated 11 million illegal and undocumented immigrants (Fazel-Zarandi, Feinstein, & Kaplan, 2018). The latter have been attributed to the 3,200 kilometer (approximately 2,000 mile) land border with Mexico (Reitz, 2011). However, irregular migration involving illegal border crossings into Canada from the United States have increased in recent years (Barrett, 2018). Portes (1978) maintained that the causes of irregular migration were related to “structural determinants in both sending and receiving countries” (1978: 477). This seems to be the current case, as illegal border crossings from the United States into Canada surged after the 2016 United States presidential election of Donald Trump. The latter’s electoral platform focused on immigration policies and crime. President Trump repeatedly asserted that most Mexican and Central American immigrants and refugees were serious and violent criminals, many of whom he claimed belonged to major transnational organized crime gangs (Rumbaut, Dingeman, & Robles, 2018). During his three year administration to date, certain classes of illegal immigrants have been threatened with expulsion, which has been linked to the estimated 2,145 individuals that crossed the land border via the US to claim asylum in Canada in the first two months of 2017 (Atak, 2018). Most of these illegal border crossings involved the provinces of Ontario and Quebec. Accordingly, recent immigrant ethnic based gang violence has become a highly salient media/political issue in Toronto. Whether these new and overwhelmingly refugee immigrantsacerbate the negative immigrant-crime stereotype remains problematic so far. However, Royal Canadian Mounted Police (RCMP) members, Canada’s national police force, apprehended 19,419 asylum seekers in 2018 who had entered Canada between official ports of entry (Quan, 2019). Nonetheless, the massive differences in the scale of immigrants and refugees between the US and Canada still constitutes a fundamental structural distinction with important theoretical and policy implications for the immigration-crime relationship.

Most importantly the US has been the largest immigrant receiving country globally, with nearly half (45%) of the world’s immigrants. Yet on a per capita basis, the Canadian immigration program is relatively larger (Jung, 2017) and immigrants in Canada constituted a larger part of the population (21%) than the US (13%) (Woroby, 2015). Canada’s long standing immigration law and policies with its focus on economic class immigrants (i.e. specialized skills and higher levels of education) have been

institutionalized. In contrast, the US has institutionalized its immigration program based on family reunification (Reitz et al., 2012). President Trump has argued vociferously that this program has resulted in families whose members have extensive criminal histories entering the US on a massive scale where they continue committing serious and violent crimes (see. Alamillo, Haynes & Madrid, 2019; Larsen, 2019).

Another structural demographic difference between involves the country of origin for their respective immigrant populations. As discussed above, both Canada and the US throughout the 19th century and the first half of the 20th century maintained an immigrant selection program. During this time, greater preference was given to favored immigrants from Western and Northern Europe, a preference based on the premise that immigrants from these regions appeared less foreign and, thus, easier to assimilate (Seller, 1982; Tulchinsky, 1994). Accordingly, a substantial portion of Canadian and American immigrants from the pre-1960 era were selected from these regions (Somerville & Walsworth, 2009; Jung, 2017). Since the 1990s, immigrants to the United States disproportionately originated from Hispanic countries, with the majority from Mexico (Feldmeyer & Steffensmeier, 2009). Canadian immigration during this period overwhelmingly consisted of immigrants from Asia and South Asia (Chui & Flanders, 2013; Jung, 2017). By early 2010, the majority of new immigrants to the United States were from Latin America while more than half of the new immigrants to Canada were from Asia (Woroby, 2015).

Another structural difference involved the concentration of immigrant settlements, especially in neighborhoods within large urban/metropolitan areas. In the Canadian context, immigrant settlement in urban neighborhoods were more dispersed and less exclusionary, these as was most evident in Canada's largest metropolitan region, Toronto (approximately population of six million). Along with Toronto, the Vancouver and Montreal the metropolitan areas had the greatest immigrant populations (Balakrishnan & Hou, 1999; Walks & Bourne, 1996; Jung, 2017). In contrast, urban/metropolitan immigrant settlements in the US were characterized by substantial racial and ethnic segregation (Hou, 2004). Jung (2017) hypothesized this difference in settlement patterns occurred, in part, because of the divergence between Canada and the US in the ability of immigrants to integrate into their new host societies. This ability has been associated with differences in naturalization rates. Tran, Kustec, and Chui (2005) found that most eligible immigrants (84%) in Canada were naturalized as citizens compared to less than

half (40%) in the US. Arguably, it is possible to hypothesize that naturalization facilitates prosocial values and behavior for several reasons. First, it denotes the host country's acceptance of the immigrant as a fellow citizen. Second, it provides a new dual integrated identity (e.g. Chinese Canadian, Mexican American), which usually facilitates routine social and even occupational interactions (Fleischmann & Verkuyten, 2016). Third, it provides a passport, which entails several rights and protections while travelling abroad. Fourth, it allows the right to vote at all levels of government and run for political office (excepting the Presidency/Vice Presidency in the US), which further potentially empowers a sense of individual political efficacy and belonging. Fifth, it can provide access to programs and employment opportunities (e.g. scholarships, certain criminal justice occupations, national security positions) reserved for citizens only. In effect, these advantages are consistent with traditional criminological theories such as social disorganization, strain based, differential association, social bonding, and developmental/life course respective hypotheses all that all incorporate, albeit very different ways, the protective effects against engaging in criminality associated with the above naturalization advantages.

The list of contextual differences between the Canada and the US is incomplete. For example, universal health control, gun control restrictions, geographically dispersed government supported "social" housing, province wide educational funding policies further distinguish Canada from the US. And, according to the several social disorganization theory propositions involving various forms of vertical social capital i.e. access to community resources to improve the daily quality of life such as health care, schools, safety, these differences all can be utilized to explain the vastly different rates in homicide and gang violence, for example, between these two countries (see. Akçomak & Ter Weel, 2012). According to Agnew's general strain theory perspective, these quotidian available resources reduced strain and individual trauma associated with the struggle in accessing basic needs by typically under-resourced individuals and families (Agnew, 1999). From Merton's original pioneering strain theory of crime (Merton, 1938) to Agnew's elaborations, lacking the means to obtaining basic goals was fundamental to explaining the choice to commit crimes. Historically, the most common reason immigrants (non-refugees) moved to rapidly expanding industrial countries such as Canada and the US was to escape intergenerational poverty and improve their life chances (Van Hook & Bean, 2009). These differences in contextual factors are further

important to keep in mind because they likely are associated too with understanding the immigration-crime theme central to the thesis empirical article chapters.

1.4. Contributions of this thesis to the literature

In addition to the contextual contribution, the current study introduces a multiple dimensional conceptualization of immigration. Sydes (2017) in her review of the immigration-crime literature asserted empirical studies typically employed single dimension based measures of immigration such as total immigration or immigrant concentration. Yet immigrants not only are diverse culturally and socio-economically but also as aggregated ethnic/racial groups, the latter needs to be distinguished on an array of theoretically determined dimensions. This multidimensional conceptualization approach is central to this thesis assertion that it is necessary to assess the validity of existing and novel hypotheses about the relationship between immigration and crime. And, further, the use of simplistic single or dual measures likely has contributed to the negative stereotyping of all immigrants and misleading “facts” in media and public debates, as well as, electoral and government policies in liberal democracies.

The current thesis employs ten measures of immigration that account for key aspects or factors of the heterogeneity of immigrant populations, most importantly by duration of time spend in the host country and age of arrival. The five duration of time spent in Canada and age arrival dimensional indicators are: 1) immigrants who arrived in Canada at the age of five years or younger; 2) immigrants who have resided in Canada for 10 years+; 3) resided for 20 years+, and; 4) resided for 30 years or longer and 5) recent immigrants, those who have been in Canada for five years or less. Temporal distinctions among immigrants according to the length of time spent in the host country are asserted to be essential in capturing the acculturation and integration processed that likely reduces immigrant involvement in crime. Key criminological theories in the following section all emphasize this temporal component and immigrant crime involvement, albeit in different ways. Moreover, multiple measures that capture various aspects of immigrant heterogeneity are included in the data and they are: 1) immigrant heterogeneity; 2) recent immigrant heterogeneity; 3) visible minorities; 4) ethnic heterogeneity. Lastly, total immigration is included in the analysis, a majority of studies have employed this aggregate measure and, therefore, it is included to provide a basis for comparison to existing studies.

These theories focus on the barriers typically encountered by new or recent immigrants, which were hypothesized to influence their decisions to engage in crime. The social disorganization framework and related research, which has been dominant, originally proposed and found that, during the early part of the 20th century in Chicago, those immigrants burdened by restricted access to economic resources tended to settle in high crime areas or socially disorganized neighborhoods primarily because of the availability of inexpensive housing options (Shaw & McKay, 1931; 1942). However, social disorganization theory proponents did not explicitly assert a direct relationship between immigration or immigrants and crime. Instead changes in immigration were indirectly linked to crime by the weakening of both their imported socio-economic networks and informal community prosocial social control restraints (Shaw & McKay, 1931; 1942). However, Shaw and McKay (1931; 1942) did not follow immigrants who eventually relocated into more structurally stable neighborhoods, therefore, it was not evident whether crime patterns remained stable after new immigrants move out of the structurally disorganized neighborhoods. The current study examines this relationship by comparing new immigrants from long-time immigrants concerning crimes.

Historically, a varied but significant portion of recent immigrants that lacked economic and social capital resided, at least initially or in transition, in higher crime urban areas or higher urban and suburban (e.g. Paris' "banlieue" suburbs) crime areas with high concentrations of new immigrants of both similar and diverse ethnic groups (Gonick, 2011). Typically, those immigrants that developed social capital and economic capital then predictively moved in lower crime areas with stable social organization neighborhoods (Shaw & McKay, 1931; 1942). Again, the latter were depicted as having higher housing stock family ownership levels, higher performance schools, institutionalized community organizations (e.g. churches, mosques, temples), fully resourced recreational facilities (e.g. parks, soccer pitches), small street front businesses, easily accessible and safe public transit and adult monitoring of youth in common social spaces as well as minor property, nuisance and non-victim crimes (Sampson & Groves, 1989). The inclusion of measures that categorize immigrants according to the duration of time spent in Canada facilitates empirical assessment of social disorganization and general strain theoretical perspectives of immigration and crime.

In addition, these analyses can inform policies/programs directed at providing transition resources to immigrant populations. In Canada, these programs are administered by provinces largely through the funding of local level governments' delivery. However, the federal government did engage in research and funding of experimental /demonstration programs concerning serious crimes committed overwhelming by members of street gangs associated with organized crime including high proportions of second-generation immigrant males from certain ethnic/racial groups. For example, in Montreal several street level gangs have disproportionate numbers of Haitian Canadians while in Toronto these gangs are disproportionately Caribbean Canadian and in greater Vancouver either Asian or South Asian. Regarding the latter gang members, a substantial theoretical anomaly emerged; many if most of the largely second South Asian gang members were or are from middle to upper income families in Canada's fastest growing city, Surrey. This city has the highest concentration of South Asian in Canada concentrated in several communities with stable local cultural institutions, particularly Sikh Gurdwaras. The latter religious facility has been a longstanding focal social capital resource point for religious Sikhs as well as assisting in organizing annual and large-scale Surrey wide attended festivals. Yet, as mentioned above, Surrey for several years has experienced continual gang violence primarily attempted and actual assassinations of competing street gang members. The shooting and killings of innocent bystanders too has caused an intense public and political reaction, possibly approaching a "moral panic" (McConnell, 2019). Nonetheless, the federal government of Canada provided major funding to the city of Surrey to introduce a 5 year experimental program to reduce gang recruitment and increase desistance among gang member/affiliates (Bhatt & Tweed, 2018).

The current study also includes measures of various categories of immigrant heterogeneity; ethnic heterogeneity, immigrant heterogeneity and recent immigrant heterogeneity. In a macro context, Statistics Canada projected that the visible minority population will account for nearly one third (30%) of the total population likely to be over 40 million by 2031. As discussed above, these immigrants were from diverse ethnic/racial groups residing in different major urban/suburban regions across Canada (Malenfant, Lebel, & Martel, 2010) asserted that this heterogeneity was key factor in explaining potential immigration effects on crime. Again, the social disorganization perspective too emphasized the importance of this heterogeneity at the

community/neighborhood level and various types of property and public nuisance crimes, as well as, more serious gang involved crimes.

1.5. Research design issues

Immigration-crime studies have been critiqued primarily because of: first, the paucity of longitudinal research designs (see. Adelman, Reid, Markle, Weiss, & Jaret, 2017; Butcher & Piehl, 1999; Stowell et al., 2009; Ousey & Kubrin, 2009; Wadsworth, 2010; Sydes, 2017) ; second, the absence of smaller aggregate units of analysis, particularly neighborhood-level assessments; and, third, the underutilization of local-level spatial analytic methodologies. Regarding the first validity concern, only longitudinal tests of the immigration-crime relationship can reveal the state of the relationship or patterns of immigration effects on crime over time. All the theories employed to explain this relationship are dynamic and complex (Adelman et al., 2017). The central theoretical themes of acculturation and the construction of social and economic capital, typically occur over extended time periods if not generations (Ousey & Kubrin, 2009; 2014; Ferraro, 2016; Sydes, 2017; Kubrin et al., 2016) and constructs such as Sampson's (2006) collective efficacy too assume sufficient time to build community support relationships based on shared needs and trust. However, most studies have relied on cross-sectional data analyses to examine immigration-crime relationship hypotheses (Light, 2017). As mentioned above, cross-sectional designs have been theoretical insightful, particularly involving the relationships between crime and static factors such as immigrant group status and gender as well as allowing for limited validity inferences about dynamic factors (e.g. levels of social capital) within immigrant groups and between them at the same time point.

The current thesis includes an article (Chapter four) that employs a longitudinal design to examine hypotheses about immigration on crime over time. There has been little empirical evidence at the neighborhood level to support the negative association between immigration and crime often found at the aggregate-level (see. Lee & Martinez, 2009). Although the immigration construct is conceptually relevant and measurable at multiple levels, the focus of theoretical perspectives use to guide the immigration-crime research has been at the neighborhood-level. As such, Stansfield (2014) cautioned that smaller-units of analysis facilitate the assessment of key relationships or its variations

that would otherwise be concealed using higher aggregate units of analysis, for instance analyses at the city-level.

Accordingly, the three thesis articles utilized national census tract data for Vancouver BC, which, arguably, provided close approximations of neighborhood-level data on the key immigration variables and other independent variables hypothesized to be associated with certain types of crime. Furthermore, the spatial methodology used in chapters three and five, that identify spatially varying processes that underlie immigration effects on crime provide additional context to neighborhood-level analysis. According to the environmental criminological theoretical perspective, most crimes, but especially property crimes, cluster in geographic space (Andresen, 2011). Specifically, the ecology of crime literature demonstrated that neighborhood structural characteristics such as, poverty, unemployment and immigration were spatially clustered, therefore various crime types varied across spatial units (Andresen, 2011). Most of the studies from this perspective focused on the identification of invariant structural covariates of crime. However, these studies were limited theoretically because they did not explore the possibility that local differences among predictor variables were associated with differing crime levels (see. Land, McCall, & Cohen, 1990). In effect, most studies in searching for invariant covariates problematically assumed that relationships between predictor and dependent variable were completely invariant or stationary across and within the study area level units. Accordingly, the studies presented in chapters three and five provide empirical assessments of the immigration-crime relationship that explicitly consider whether the processes that underlie this relationship exert significantly different effects across spatial units and, thereby, nonstationary.

Cahill and Mulligan (2007) asserted that for both theoretical and empirical reasons environmental perspective studies needed to examine independent variables' spatial patterns at the local level. In other words causal processes of crime vary over space i.e. predictor variables may operate differently in different locations within a study area (Baller, Anselin, Messner, Deane, & Hawkins, 2001; Fotheringham, Charlton, & Brunson, 2001). From a policy perspective, context of crime studies are especially important concerning the allocation of resources focused on crime prevention initiatives. Baller et al., (2001) claimed that this failure to account for variations in causal processes, if they existed, could lead to statistical misspecification of models and the danger of inaccurate or false inferences. Cahill and Mulligan (2007) asserted further that even in

instances where theory did not support the exploration of spatially varying patterns, researchers nonetheless need to at least explore this theme to ensure that models are accurately specified. Elaborating further, in the case of ecological data it is important to employ spatial models that adequately test for the presence of local spatial trends. Otherwise, if these trends exist but are unaccounted for, they can significantly impact the accuracy of global models or, more seriously, lead to the misspecification of the global model employed (Cahill & Mulligan, 2007).

To date, Graif & Sampson (2009) are the only researchers to have explicitly accounted for locally varying patterns of immigration and crime. Therefore, a substantial gap exists in the literature with regard to local spatial accounts and, the use of local spatial analytic models in neighborhood tests of immigration and crime. For this reason, this thesis includes two articles, chapters three and five respectively, that use spatial analytics, the spatial point pattern test (see. Andresen, 2009) and Geographically Weighted Regression (see. Brunson, Fotheringham and, Charlton, 1996) that are capable of assessing local-level variations or nonstationary associations to tests neighborhood-level associations between immigration on crime. Moreover, the article presented in chapter four, that evaluates the distinction between immigration effects on property crime within and between neighborhoods over time, contributes to the gap in literature that stems from a lack of longitudinal research.

Taken together, using Canadian Census data for 2003-2016 for census tracts in Vancouver, British Columbia, the current thesis examines whether changes in multiple immigration measures of immigration are related to various classifications of property crime over time, within neighborhoods, between neighborhoods and, across neighborhoods. As mentioned above, Toronto, Vancouver and Montreal have long been considered the “gateway” centers for new immigrants, with the highest concentrations of immigrants residing in Toronto, followed by Vancouver then Montreal (Hou & Bourne, 2006). The economic and sociodemographic relationship between immigration crime flows is, therefore, best assessed in any of these urban/metropolitan areas (Hou & Bourne, 2006). The current thesis studies ultimately provide an opportunity to evaluate whether immigration effects in Vancouver neighborhoods are comparable primarily to similar US studies as well as future studies in other Canadian gateway cities.

Chapter 2.

Theoretical and empirical review

Tests of the immigration and crime nexus are premised on several theoretical perspectives, many of which predict a positive relationship, while some of the more contemporary perspectives posit negative associations. In spite polarized predictions, theoretical perspectives belonging to each camp are underscored by the theoretical reasoning that immigration can impact social life in ways that either increase or decrease crime rates in geographic areas (Ousey & Kubrin, 2018). Although the primary aim of this thesis is not to develop or test a specific theoretical framework, it is nonetheless important to elaborate on theory as theoretical insights help cultivate a foundational understanding for the relationships tested.

Generally, the theoretical perspectives that suggest higher geographic concentrations of immigrants lead to increases in crime are rooted in traditional sociological and criminological theories. These perspectives have a long history in the criminological literature and, therefore, are commonly used to not only guide studies of immigration and crime but also referenced to help explain findings (Kubrin & Mioduszewski, 2018). Broadly, four theoretical perspectives belong to the camp that posits this positive immigration-crime association. These perspectives are as follows: strain theory, economic model of rational criminal behavior, subculture theory, social control theory and social disorganization theory. In contrast, there are two primary perspectives and a secondary perspective that predict an inverse relationship—immigration decreases crime. These perspectives are, the immigrant revitalization and the immigrant enclave perspectives along with the perspective that immigrants are a self-selective group and, therefore, have characteristics that are distinguished from those who remain in their home country. Each of the theories and perspectives mentioned above are discussed in turn, beginning with those that predict a positive relationship between immigration and crime.

Strain theory (Merton, 1938) rests on the notion of opportunity structures and the impact of these structures on members of society including immigrants. Merton (1938) believed that in capitalist societies, culturally defined goals that often relate to wealth and

prestige provide an aspirational framework that the majority strive to achieve. However, access to legitimate means such as, higher education or meaningful employment that is required to achieve these goals are not equally distributed. With this framework, immigrant populations are highly susceptible to barriers that constrain their ability to access legitimate means and, thus, find it difficult to obtain the tools necessary to achieve the goals that qualify success in capitalist terms (Andresen, 2013). For these reasons, the strain experienced by immigrants, particularly newcomers may act as a catalyst for criminal involvement (Merton, 1938). This scenario can be exacerbated by the fact that immigrants may not have access to social institutions that usually help maintain social control (Messner & Rosenfeld, 1994; 2001).

Similarly, an economic model of crime (see. Becker, 1968; Ehrlich, 1973; Freeman, 1999) that assumes individual rationality, suggests those who have limited access to legitimate means will weigh the costs and benefits of legal and illegal activities and choose to engage in crime if the benefits outweigh the costs (Zhang, 2014). Within this framework, the concern amongst law makers and the general public is that increases in immigrant populations, often perceived as socially and economically stratified threatens to increase crime rates. This concern is premised on the common belief that immigrants are less likely than native born populations to have access to legitimate and meaningful employment (Zhang, 2014). From a Canadian perspective empirical studies have assessed this notion, finding that new immigrants earn substantially less than native-born workers (see. Aydemir & Skuterud, 2005; Frenette & Morissette, 2005; Green & Worswick, 2012). Existing studies also demonstrate that immigrant populations are highly susceptible to unemployment during the first five years of arriving to a new country (McDonald & Worswick, 1997; Picot & Sweetman, 2012). Taken together, both strain theory and economic models of crime predict unequal access to legitimate means increases the risk of crime for new immigrants and, thus, areas with greater concentrations of immigrants or increasing immigrant populations are expected to have more crime.

Subculture theory or, more broadly, cultural based theories provide another framework to guide tests of the immigration-crime link. Like Strain theory, subculture theory belongs to the camp that posits a positive association between immigration and crime. However, these perspectives are distinguished in terms of the explanatory factor for crime that relate to conflicts in cultural values rather than socioeconomic inequalities

or differential opportunities. The underlying concept of subculture theory is premised on the notion that new immigrant populations often arrive with a set of cultural values that differ from those of the dominant interest groups who are responsible for setting the rules of law (A. K. Cohen, 1955; Andresen, 2013). The laws of a receiving country are representative of the conduct norms and values held by the dominant majority. Therefore, the normative or acceptable behaviors that are established in mainstream society may be at odds with the conduct norms of new immigrants (Andresen, 2013). For this reason, the behaviors that recent immigrants view as legitimate are actually illegitimate and illegal as they go against the norms established by the dominant group. Cultural theories take care to provide a distinction between new immigrants and subsequent generations with regard to normative conflicts. The assumption here is that recent immigrants have yet to familiarize themselves or grow accustomed to the conduct norms of the host country and, thus, are more susceptible to normative conflicts. However, as subsequent generations become more familiar with the conduct norms of the dominant majority they become less susceptible to behaviors born out of normative conflicts that would be deemed criminal. As such, the main theoretical proposition of sub-culture or cultural based theories as related to the immigration and crime nexus is that geographic areas with greater concentrations of recent immigrants are expected to have higher rates of crime. Additionally, further application of sub-culture theory would predict that geographic areas comprised of recent immigrants who on average behave in ways that conform to their own norms and values will have greater instances of legal violations that stem from normative conflicts (Jung, 2017).

Social control theory pivots on the notion of bonds, in particular social bonds that provide restraints against criminal involvement. More specifically, Hirschi (1969) elaborates on the importance of commitments and attachments as deterrents to criminal behavior (Nagin & Paternoster, 1994). Commitments broadly pertain to one's investment in conventionality or conventional lines of actions, and the fear of losing these commitments deter individuals from illicit activities (Nagin & Paternoster, 1994). Attachments, on the other hand, relate to the investments that individuals make to stable and satisfying social relationships (Nagin & Paternoster, 1994). Having conventional bonds and relationships with friends, family, co-workers, and other members of conventional society provide the bonds for integration into a community. Some (see. Nagin & Paternoster, 1994) believe conventional commitments and attachments to be

investments in personal capital that, akin to financial investments, involve the accumulation of capital stock with the goal of a future return. Accordingly, the fear of losing the social ties or enduring attachments in which one is heavily invested provides high incentive against the commission of criminal acts, because criminal involvement puts these relationships at risk. Most often social control theory, when applied in the immigration-crime context, predicts a positive relationship (Lee & Martinez, 2009). The underlying assumption being that immigrant populations, especially those newest to a host society when compared to native born populations have little or no conventional bonds. Therefore, it is expected that with little or no investment in conventionality and, thus, limited bonds to conventional society, immigrants are more likely than native born populations who have greater stakes in conventionality to engage in crime. Consequently, areas with high concentrations of new immigrants are expected to have higher levels of crime.

At present perhaps the most common theoretical link between immigration and crime is drawn from social disorganization theory (Feldmeyer et al., 2009). Rooted in the Chicago School of sociology and advanced by Shaw and McKay (1931; 1942) social disorganization theory rests on the notion that areas with high degrees of unemployment, population turnover, and ethnic heterogeneity are socially disorganized and conducive to crime (Andresen, 2013). Shaw and McKay (1931; 1942) found that socially disorganized neighborhoods or higher crime areas offered a viable option for newcomers, as meager economic resources restricted them from locating to better areas. More specifically, with respect to crime and social disorganization, these researchers emphasize the effects of various structural properties of a neighborhood, such as ethnic heterogeneity and the impact of these properties in creating an environment for increased crime (Shaw & McKay, 1931; 1942; Bursik, 1988). Therefore, even though ethnic heterogeneity is related to immigrant populations, Shaw and McKay (1931, 1942) take care to convey that immigrant populations within neighborhoods are not direct correlates of crime.

Instead, social disorganization theory is structurally inclined and, so, the convergence of various structural properties of a neighborhood help shape crime rates. Therefore, one of the most important theoretical considerations relating to immigrant populations to come from the work of Shaw and McKay (1931; 1942) is that, on average, immigrants are not crime-prone. Instead, high crime rates within disorganized

neighborhoods where new immigrants often settle are attributed to the structural characteristics of those neighborhoods and not to the actual immigrants themselves. This notion is substantiated by the fact that although most immigrant groups initially settle in to socially disrupted, high crime areas most eventually relocate to areas lower in crime and higher in economic affluence, in these cases crime does not follow these immigrants into their new neighborhoods (Bursik, 2006). Therefore, socially disorganization theory in the form advanced by Shaw and McKay (1931; 1942) is structurally based, as crime and delinquency rates in disorganized neighborhoods demonstrated ecological stability (Jung, 2017). For this reason, the researchers advocated for a contextual rather than compositional effect of immigration on crime rates as evidenced by the observation that levels of crime remained relatively stable in disorganized neighborhoods even after immigrant populations have moved out (Shaw & McKay, 1942). The original work of Shaw and McKay (1931; 1942) has spawned an extensive body of criminological literature and the most contemporary contributions have subtly reformulated the original model into one that is more systematic (Jung, 2017). Included in more contemporary works are additional neighborhood characteristics such as collective efficacy and social ties that could present as mediating factors between some of the original neighborhood factors such as residential instability or low socioeconomic status and rates of crime (Bursik & Grasmick, 1993).

To date, social disorganization theory is considered one of the most important theoretical perspectives in the immigration and crime literature, as a majority of macro-level studies are informed by this perspective (see. Kubrin & Desmond, 2015; MacDonald, Hipp, & Gill, 2013; Martinez et al., 2010; Wadsworth, 2010; Akins, Rumbaut & Stansfield, 2009; Chavez & Griffiths, 2009; Graif & Sampson, 2009; Ousey & Kubrin, 2009; Velez, 2009; Stowell & Martinez, 2007; Martinez, Lee, & Nielsen, 2004; Lee & Martinez, 2009; Lee, Martinez & Rosenfeld, 2001). From a theoretical context, social disorganization theory is without doubt a prominent fixture in the immigration-crime literature. However, in spite of being prevalently referenced empirical findings, for the most part, do not support the positive association between immigration and crime as predicted by social disorganization theory. Studies on immigration and crime have instead demonstrated consensus toward no relationship or a negative association between the relationships tested (see. Kubrin & Desmond, 2015; MacDonald et al., 2013; Martinez et al., 2010; Wadsworth, 2010; Akins et al., 2009; Chavez & Griffiths,

2009; Graif & Sampson, 2009; Ousey & Kubrin, 2009; Velez, 2009; Stowell & Martinez, 2007; Martinez et al., 2004; Lee & Martinez, 2002; Lee et al., 2001). For this reason, contemporary scholars have begun to question the initial theoretical logic behind social disorganization theory, skeptical of whether the neighborhood factors originally identified actually exert significance disruption to communities as to be main predictors in neighborhood level crime. The growing skepticism with regard to the theoretical correlates advanced by social disorganization theory, specifically as relates to immigration and crime have lead some scholars (see. Lee & Martinez, 2002; see also Lee & Martinez, 2009; Sampson, 2008; Sampson, Morenoff, & Raudenbush, 2005) to consider alternative perspectives such as the emerging immigration revitalization perspective as well as, the ethnic enclave perspective both of which predict a negative immigration/crime relationship.

The immigration revitalization perspective has gained a lot of traction in contemporary literature and posits a position that is in many ways the theoretical inverse of social disorganization theory. Immigrant revitalization arguments have been categorized as “immigrant paradox” literature, where the general argument rests on the notion that residence in immigrant communities despite having higher levels of concentrated disadvantage and residential instability actually provide unexpected benefits (Ramey, 2013; Martínez et al., 2010; Sampson, 2008). Initially advanced by Lee and Martinez (2002), immigration revitalization is premised on the notion that immigration, ethnic heterogeneity, and residential instability are actually associated with reduced crime rates. These researchers and others have questioned whether constructs derived from social disorganization theory are still applicable in contemporary landscapes. It could be inferred that results from more contemporary studies of immigration and crime do not adhere to the theoretical predictions of social disorganization theory because contemporary societies are not fundamentally similar to those of the early to mid-twentieth century (Martinez et al., 2010). Martinez et al. (2010) believe that the process of social disorganization remain important and, accordingly, the structural constructs relevant. However, from a contemporary perspective the processes that underlie social disorganization may have changed in part due to the changing nature of immigration. Accordingly, the immigrant revitalization thesis suggests that an increase in immigrant populations could foster new forms of social control, promote civic organization, contribute to community institutions and, thus, aid in the development of

adaptive social structures that help cushion the deleterious consequences of residing in socially disorganized communities (Martinez & Lee, 2000; Lee & Martinez, 2002; Lee et al., 2001).

Furthermore, revitalization theorist often elaborate on the impact of large scale immigration in reinvigorating economies that help to strengthen social networks and community institutions in traditionally disadvantaged areas (Velez, 2009). The impact of economic revitalization provides a structural indicator for an unresolved issue of the revitalization thesis that relates to the identification of salient changes brought on by immigration that contribute to a decrease in community crime rates (Ousey & Kubrin, 2009). In contrast to the common belief that immigrants who are often economically marginalized add strain to existing public services, economic revitalization instead focuses on the positive economic contributions of immigrants (Ousey & Kubrin, 2009). In this sense, immigrant residents could help redevelop and revitalize urban areas that have been neglected as a result of being deemed undesirable for residential living and, therefore, contribute to either build or revitalize local economies. Because immigrant populations often bring with them new skills, entrepreneurial spirit and the drive to succeed they carry many of the requisite elements needed for the revitalization or creation of neighborhood economies. Consequently, improved vitality of economic institutions brought upon by the skill and drive of immigrants whether new or existing could work to lower unemployment and, thus rates of poverty in traditionally disadvantaged areas.

An additional facet of the immigrant revitalization thesis relates to family and household structures or more specifically the ways in which immigration alters these structures to strengthen informal social control and impede crime (Ousey & Kubrin, 2009). The impact of family disruption has been long documented in the criminological literature. Simply put, areas with higher rates of single-parent households or higher rates of divorce are viewed as being more susceptible to crime and delinquency (see. Sampson 1987; Sampson & Groves 1989). The underlying assumption is that households headed by single-parents represent a breakdown of traditional family structures and, with that, experience a depletion in social capital that negatively impacts processes of informal social control (Land, McCall & Cohen, 1990; Ousey 2000; Shihadeh & Steffensmeier, 1994).

With respect to contemporary immigrant communities the segmented assimilation model, for example, suggests that the values and culture of immigrant populations help to fortify traditional intact (two-parent) family structures and support the legitimacy of parental authority norms (Martinez et al. 2004; Ousey & Kubrin, 2009). Furthermore, various scholars agree that familistic and pro-nuptial cultural traditions are more prevalent within immigrant groups than in native born populations (see. Fukuyama, 1993; Oropesa, 1996; Oropesa, Lichter & Anderson, 1994; Vega, 1990; Wildsmith, 2004; Ousey & Kubrin, 2009). Some research supports the notion of culturally influenced pro-nuptial traditions, finding that in spite of economic hardships faced by immigrant groups such as Mexican Americans who most often work against the union of marriage, these groups have marriage rates that are comparable to non-Hispanic whites (Oropesa & Landale, 2004; Oropesa et al., 1994; Ousey & Kubrin, 2009) and, additionally, place greater value on marriage than their non-Hispanic counterparts (Oropesa & Gorman, 2000; Ousey & Kubrin, 2009). Keeping in line with the position that neighborhoods with more single-parent families have higher rates of crime and delinquency, it would be appropriate to infer that to the extent immigrant families have greater pro-family cultural orientations leading to more in-tact families, that immigrant communities should not see higher rates of crime.

With regard to empirical evaluations of the immigrant revitalization thesis structural covariates that capture economic disadvantage, residential instability, ethnic heterogeneity and, labor market indexes are often stressed in tests of the thesis (Jung, 2017). Although, the covariates emphasized closely resemble the main theoretical mechanisms behind social disorganization and strain perspectives, evaluations of the immigrant revitalization thesis are distinguished because community organization and niche markets within immigrant communities are often captured in tests of the immigration-crime nexus. Moreover, because immigrant revitalization arguments rests on notions of economic revival and the strengthening of social institutions tests of the thesis would benefit from longitudinal designs and analytic artifacts that are able to capture local level variations or changes over time (Jung, 2017).

Longitudinal tests of revitalization effects are particularly important as the impact of immigrant settlement on neighborhood crime rates could vary due to differences in contextual factors of a neighborhood and, thus, a temporal element should be included to tease out of some the short-term effects. For instance, patterns of immigrant

settlement in the United States are diverse and ever changing. Accordingly, immigrants are moving into new types of neighborhoods and cities across the United States (Ramey, 2013). For this reason, immigrant communities are more spatially stratified, moving beyond established destination cities with pre-existing ethnic enclaves into new receiving areas that may consist of small and relatively new immigrant communities (Iceland, 2009; South, Crowder & Chavez, 2005). New receiving areas when compared to established destination cities likely consist of immigrant communities that are small with considerable variance in racial and ethnic make-up. Therefore, the impact of immigrant revitalization in new receiving areas may be vastly different from the effect in established destination cities. For this reason, cross-sectional designs may not accurately capture the impact of immigrant revitalization as the effects of revitalization on neighborhoods in places outside large destination cities may require more time for fruition.

The immigrant enclave thesis is, in many ways, theoretically similar to the immigrant revitalization thesis and, thus, predicts a negative relationship between immigration and crime. Although, this perspective is relatively new within the immigration and crime literature, the main constructs were presented decades ago by Donald Taft (1933) who believed that immigrant “ghettos” served a protective function by dampening culture conflict and preserving “old world” mechanisms of informal social control (Ousey & Kubrin, 2009). The immigrant enclave thesis, extends Taft’s (1933) argument, maintaining that ethnic enclaves encourage cultural preservation, help promote or maintain family ties, present employment or entrepreneurial opportunities, and bolster informal social control that, taken together, work to curtail neighborhood crime rates (Ousey & Kubrin, 2009). Furthermore, this perspective highlights the importance of geographic concentrations of immigrant communities asserting that areas with large concentrations of immigrants who share linguistic, cultural and/or ethnic backgrounds may benefit from protective factors that minimize the impact of social disorganization and, accordingly, crime (Desmond & Kubrin, 2009; Feldmeyer, 2009; Stowell & Martinez, 2007).

Placing greater focus on immigrant concentration and the extent to which co-ethnic or cultural ties within those immigrant concentrated communities impact crime is the main distinguishing element between the immigrant enclave and revitalization theses. Highlighting the impact of geographic or spatial distributions of immigrant

populations in the context of immigration and crime is of conceptual importance as such variations are to be expected in tests of the relationship. For instance, ethnically diverse communities are well established and plentiful in cities such as Los Angeles, Miami, and Chicago that have long served as entry points for new immigrants to the United States (Iceland, 2009; Massey, Durand & Malone, 2002; Portes & Rumbaut, 2006). These well-established destination cities therefore, consists of neighborhoods characterized by a heavy presence of ethnic homogeneity whether foreign or native born, within these neighborhoods residents devolved strong social and economic ties amongst one another that allows for the formulation of ethnic enclaves (Portes & Rumbaut, 2006; Vélez, 2009). By facilitating the development of social and economic ties, ethnic enclaves help new immigrants transition and incorporate themselves into the social, economic and political fabric of the receiving city, membership in conventional institutions generally act as a buffer against criminal behaviors (Massey et al., 2002; Singer, 2004). Zhou and Banskton (2006) found empirical support for the ethnic enclave thesis in their study of Vietnamese youth residing in a Vietnamese enclave in New Orleans, Louisiana. The researchers found the system of ethnic relations within this enclave provided both control and direction for young community members, helping curtail some of the negative influences usually brought upon by disorganized or marginalized environments. The study provided support for arguments of limited criminal involvement amongst illegal immigrants, demonstrating that the social support within ethnic communities does in fact curb criminal involvement (Engbersen & van der Leun, 2001).

Although the protective factors of ethnic enclaves have been demonstrated in the literature, it is important to note that not all cities are equal with regard to the and, thus, the context of reception encountered by new immigrants is expected to differ depending on the settlement city selected. Well-established immigrant destinations are adequately equipped with the economic and social institutions that are required to address potential social issues that accompany large concentrations of immigrants (Ramey, 2013). For instance, well-established destination cities are experienced in dealing with large waves of new immigrants and, therefore, the appropriate organizations both governmental and non-governmental are in place to assist with essential services that help new residents integrate (Ramey, 2013). Bilingual services, legal advice, and dense, interconnected social and labor market ties are often available in well-established destination cities,

these factors help open doors to potential jobs and encourage civic participation (Martínez, 2002; Sampson, 2008; Vélez, 2009). Additionally, large segments of the labor market in established destinations are composed of ethnic businesses and firms for this reason new immigrants may experience less discrimination and, relatedly, fewer barriers to hiring allowing for more opportunities to develop strong connections to local economic and political networks (Portes & Rumbaut, 2006; Ramey, 2013). For these reasons, neighborhoods in established destination cities are able to benefit from extended immigrant labor markets and political connections that allows for the facilitation of both informal and formal social control (Martínez 2002, 2006; Portes & Rumbaut 2006; Vélez 2009; Ramey, 2013).

On the other hand, newer destination cities or areas with little or no co-ethnic or foreign-born residences may not be equipped with the means or experience required to help new immigrants incorporate into the social fabric of a new city (Portes & Rumbaut 2006; Singer 2004). Because these cities have smaller or relatively newer immigrant populations, new immigrants are less likely to settle into ethnic enclaves and more likely to settle into disadvantaged neighborhoods where native-born whites or African Americans comprise the majority racial/ ethnic group (Portes & Rumbaut 2006; South et al., 2005; Ramey, 2013). Accordingly, new immigrants who settle in these cities are likely to encounter obstacles that are otherwise curtailed in more established destination cities. Because of smaller and weaker co-ethnic communities, new arrivals tend to obtain less information on the livability or safety of a community, coupled with limited resources new immigrants are susceptible to settlement in highly disadvantaged ethnically heterogeneous communities, two elements that increase the possibility of criminal involvement (Shihadeh & Barranco, 2010; Ramey, 2013).

Ramey (2013) also notes that smaller immigrant communities and greater dispersion in new destinations hinders the ability of immigrants to significantly influence neighborhood organizations that impedes efforts of local governmental and non-governmental organizations to meet the needs of new immigrant communities. The result is a lack of influence in local social intuitions, such that immigrant communities in less-established destination cities may face both direct exclusionary or oppositional governmental policies and potential discrimination (Ramey, 2013). Taken together, immigrants who settle into newer destination cities where immigrant concentrated areas are non-existent or sparse may not benefit or benefit to a lesser extent from the

protective factors characteristic of well-established enclaves that consists of greater immigrant concentrations. For this reason, scholars have called for greater consideration of immigrant concentrations as this factor provides indication of the extent to which ethnic enclaves preserve old world mechanisms of social control through network formation, information sharing, and symbolic representations of shared identities from the source country all of which help buffer communities from crime (Jung, 2017).

In addition, scholars have argued that the structural framework or foundation by which an ethnic enclave is formed ought to be considered in assessments of how immigrant concentrations protect communities from crime (Jung, 2017). This argument is premised on the belief that some enclaves are geographical expressions of deliberate and voluntary settlement choices and, thus, these communities should be distinguished from immigrant-concentrated areas that are formed as “ghettos” of last resort due to segregation, economic deprivation, and/or social exclusion (Jung, 2017; Walks & Bourne, 2006; Logan, Zhang & Alba, 2002). Here, the underlying assumption is that communities established from deliberate settlement choices are more likely than communities that act as a last resort for immigrants to have better community cohesion, collective efficacy, social capital, and community engagement, elements that help protect against crime (Walks & Bourne, 2006; Logan et al., 2002). From an empirical perspective, evaluations of the immigrant enclave thesis would require the operationalization of measures that capture the relative size of immigrant concentrations along with the corresponding concentration of cultural or linguistic homogeneity for the geographic area of study (Jung, 2017). Furthermore, the addition of longitudinal studies in different contexts would be beneficial in tests of the immigrant enclave thesis as these assessments would highlight whether the impact of immigrant concentration varies across time and space.

Lastly, another explanation that promotes the crime reducing effects in places with greater concentrations of immigrant’s hones on the notion of immigrants as a self-selecting group (Kubrin, 2017). This explanation is premised on the belief that individuals who choose to immigrate are different from others in their respective countries and, thus, are not completely representative of their countries’ people. Van Hook and Bean (2009) elaborate that individuals who have chosen to immigrate and travel to the United States generally do so in pursuit of employment opportunities and a better life for themselves and their family (Kubrin, 2017). Accordingly, immigrants are motivated toward

establishing a better life in their new country and, so, generally work harder to achieve this goal. Immigrant selective effects have been captured in the literature, results often show that immigrants have lower criminal propensities when compared to their native-born counterparts as such, areas with greater concentrations of immigrants are expected to show lower rates of crime (see. Kubrin & Ishizawa, 2012; Stowell et al., 2009).

2.1. Immigration and Crime: Macro-level research

Most prevalent in the immigration and crime literature are macro-level tests in the U.S context of the relationship. Accordingly, macro-level explanations of immigration and crime are diverse within the literature. Some scholars assert that changes in immigration indirectly increase aggregate levels of crime by reducing economic opportunities of native-born Americans (Borjas, 1987; Catanzarite, 2004; Johannson & Shulman, 2003; Shihadeh & Barranco, 2010; Stewart & Hyclak, 1986; Waldinger, 1997). Other scholarly works (see. Rosenfeld and Tienda, 1999; Catanzarite, 2004 and Johannsson & Shulman, 2003) have also elaborated on the issue of reduced economic opportunities in secondary job markets for a distinguished segment of the native-born population, primarily African Americans and Latinos brought upon by an increase in immigrant workers (Aydemir et al., 2017). Generally, the underlying premise rests on the notion that increases in immigrant populations lead to the displacement of native-born workers, and because the native-born have been forced out of legitimate labor markets, they are pushed into illegitimate forms of work (Adelmana et al., 2017).

This perspective is based on the assumption that increases in immigration lead to significant changes in the opportunity structures available to non-immigrant workers, especially those demographics with limited social and human capital which then drives this population to offend (Adelmana et al., 2017). It should be noted that although this perspective is widely used in the immigration-crime literature, Zhou and Kim (2001) make an important point of noting that the social and economic status of immigrants are not homogenously low, and that variance exists within immigrant populations making it important to broaden the operationalization of immigration measures to account for these differences. As such, assertions at the aggregate-level that increases in immigrant populations lead to decreases in legitimate opportunities for native-born workers and, therefore, increase their involvement in crime may be inaccurate given the heterogeneity of economic backgrounds of immigrants.

Similarly, the immigrant revitalization and enclave theses further elaborate on macro-level economic-based explanations, contending that immigrants improve local labor markets that reduce aggregate levels of crime (Adelmana et al., 2017). Portes and Zhou (1992) believe that immigrants are often employed in ethnically-owned niche businesses that are located in ethnic enclaves thereby circumventing the direct competition between immigrant and native-born workers. In line with the immigrant revitalization and enclave perspectives, a comprehensive body of research suggest that immigrant settlements help revitalize areas that have suffered economic disinvestment and population declines (Bluestone & Harrison, 1982; Aydemir et al. 2017).

The majority of existing studies that examine the impact of immigrant settlement whether it be revitalization that would lead to a negative immigration-crime relationship or displacement that predicts a positive relationship are conducted at the city level or with metropolitan areas and look at violent crime. Martinez and Lee (2000), for example, found in their analysis of 111 cities a negative or null effect on most types of Latino homicides, but a positive effect for felony homicides (Aydemir et al., 2017). Ousey and Kubrin (2009) found in a sample of 159 cities, a negative relationship between immigration and violent crime, in these instances the researchers attributed the negative relationship to the revitalization of traditional family structures brought on by immigration (Aydemir et al., 2017). In contrast, Shihadeh and Barranco (2010) discovered a positive relationship between the immigration of Latinos and crime amongst African Americans in the 117 cities under analysis. Results were mainly attributed to higher levels of unemployment within African American communities that resulted from increases in the hiring of Latinos in the secondary labor markets. More recently, Schnapp (2015) examined 146 cities weighted by population size and identified no relationship between immigration and homicide. Stanfield (2013) looked at both property and violent crime and in his analysis of 131 cities found no relationship between immigration and violent crime and a negative relationship between immigration and property crime.

Another prominent area of study and one that has gained traction in more recent contributions to the immigration-crime literature assess the relationship through comparisons of traditional immigrant destination cities to non-traditional, or new, destination cities (Aydemir et al., 2017). Various studies have found that newer destination cities have slightly higher rates of Latino homicide associated with increases in Latino immigration than more established destination cities. For instance, when

comparing rates of homicide victimization in 755 U.S. counties, Shihadeh and Winters' (2010) found that within those counties, newer destinations had elevated rates of Latino homicide. The results found by Barranco (2013) also revealed increased rates of Latino homicides in newer destination cities. Feldmeyer (2013) compared traditional and newer destination cities in California, New York, and Texas, with results showing that in traditional destination cities the relationship between Latino immigration and violence are negatively correlated as is the relationship between Latino immigration and white or African American violence. However, the results in new destination cities demonstrated higher levels of violence amongst Latino and African Americans. Lastly, Ramey (2013) found in his analysis of integrated neighborhoods in both new and established destination cities that rates of violence were much higher in new destinations than more established settlement cities.

Cities are without doubt, an important unit for macro-level analysis, these studies are prevalent in the immigration-crime literature and have cultivated a robust body of findings, most of which agree that places, especially neighborhoods with higher concentrations of immigrants exhibit comparatively lower crime rates (Davies & Fagan, 2012). However, because cities are large macro-units, important variations between neighborhoods, if they exist, are masked and, thus, interpretations of neighborhood crime rates as they relate to immigrant concentrations may be void of crucial information. Moreover, because studies at the aggregate-level treat immigrant populations as homogenous variances across different groups of immigrants are completely lost in these analyses, fundamental differences across groups of immigrants are unaccounted for (Kubrin, 2018). With regard to the immigration and crime literature the identification of variation across immigrant groups is crucial to the development of this literature as this information allows for a more nuanced interpretation of the relationships tested. By masking variations across groups of immigrants, researchers run the risk of conveying an inaccurate or incomplete perception of the relationships tested. That is, without accounting for variances between different groups of immigrants, findings are unable to show whether the immigration-crime relationship varies across these groups and, accordingly, unable to identify whether certain groups exhibit crime inhibiting or crime enhancing effects on neighborhoods. Equally important, void of analyses that account for group differences it is difficult to assert whether the immigration-crime relationship is truly generalizable or robust for all immigrant groups, something that is crucial especially

in policy considerations. Furthermore, in spite being traditionally built into theories of crime in neighborhoods, the immigration and crime literature consists of relatively few neighborhood-level studies, presenting an additional literary gap to be filled. Although the criminological literature is rich in studies examining dynamics of crime rates across neighborhoods there is still progress to be made with respect to empirical research on the effect of immigrants on changes in neighborhood crime rates (MacDonald et al., 2012).

2.2. Neighbourhood-level studies on immigration and crime

Cities are an important unit for macro-level analysis. However, because cities are relatively large units of analysis, important variations between neighborhoods, if they exist, are masked and, thus, crucial information may be lost. Martinez and Lee (2002) sought to evaluate a fundamental premise of social disorganization theory that immigration and ethnic heterogeneity weaken social control and increase community levels of crime. Disorganization theorists assert that social processes such as immigration, internal migration, and ethnic heterogeneity could adversely affect the ability of neighborhood institutions to control the behavior of their residents (Martinez & Lee, 2002). Contemporary empirical works have placed much focus on the notion that social control is affected by both internal and external social processes, and that disorganization is a main contributor of neighborhood level crime (Bursik & Grasmick 1993).

Contributing to this literature, Martinez and Lee (2002) investigate the relationship between the most recent wave of immigration and community levels of black homicide in the northern part of the city of Miami, an area that has received a large number of recent arrivals from Haiti and contains an established African American community (Martinez & Lee, 2002). Furthermore, the authors sought to provide a visual representation of the immigration-homicide nexus by incorporating spatial analyses in order to present the geographic distribution of homicide events relative to neighborhood boundaries, a representation that cannot be adequately expressed in statistic work (Lee, Martinez, & Rosenfeld, 2001). Specifically, maps are used to explore spatial issues surrounding immigration and black homicide in two northern neighborhoods in the city of Miami by focusing attention on an understudied immigrant group — Haitians — relative to native-born African Americans (Martinez & Lee, 2002, p. 364).

The authors cite two contradictory views of "ghettos" and "slums" both of which are contextually important with respect to the geographic area selected for evaluation in the current study. Supporters of the social disorganization perspective argue that the heterogeneous slums in which immigrants settle provide an ideal environment for the flourishing of crime and disorder (Martinez & Lee, 2002). Proponents of the concentrated disadvantage perspective argue for higher levels of crime in homogeneous ghetto areas that suffer from long-standing economic deprivation (Martinez and Lee, 2002). Lastly, scholars who support the recently emerging immigration revitalization perspective would lend support to the latter perspective, though research has yet to establish the benefits that ghetto residents may derive from the "enclave economies" that have revitalized some immigrant slums (Portes & Rumbaut 2001).

Spatial analyses were used to conduct direct tests of these competing perspectives. Using spatial analytic techniques, the authors examine the extent to which maps of two predominantly black neighborhoods (Liberty City and Little Haiti) support the predictions of the social disorganization, concentrated poverty, or immigration revitalization models (Martinez & Lee, 2002). Additionally, with the use of maps, Martinez and Lee (2002) attempt to replicate the findings from an earlier study, where recent immigration did not increase the presence of group-specific (i.e., African-American or Latino) homicide at the census tract level in five of six regression models (see, Lee et al., 2001). The only model to demonstrate a positive coefficient for the recent immigration measure was the model for black homicide in San Diego. Although the recent immigration measure was not positively related to either African-American or Latino homicide levels in Miami, there were a number of variables in the African-American models that were consistently positive throughout the analyses (see, Lee et al., 2001). Specifically, the number of black residents, the level of black poverty, and the level of black male joblessness demonstrated a positive and significant effect on black homicide across all census tracts. In addition to the measure for recent immigrants, residential instability, the percentage of black female-headed families, the percentage of young black males, and a spatial autocorrelation term that captured the levels of black homicide in surrounding tracts were all insignificantly related to black homicide in Miami (see, Lee et al., 2001).

Martinez and Lee (2002) also sought to further investigate the impact of immigration and ethnic heterogeneity on homicide levels in various intra-city communities in Miami and believed that the use of a different analytic tool would provide

insights that could otherwise be overlooked in traditional statistical methods. The researchers opted to use spatial analysis as opposed to standard statistical tools and, so, maps were utilized to compare and contrast characteristics of areas in which large numbers of Haitians had recently settled with an adjacent African American community. Also, because poverty was a statistically significant predictor of black homicide in their previous work, these researchers present a spatial analysis of a limited number of tracts to uncover patterns in the distribution of poverty in areas with high black homicide levels and in which a recent immigrant group has settled (Martinez & Lee, 2002).

Martinez and Lee (2002) note that although scholars have presented compelling evidence for the consistency of structural covariates of homicide across units of analysis (see. Land, McCall, and Cohen 1990) the utility of disaggregating by race and place has also been advocated for in the literature (see. Hawkins, 1999; Lauritsen & White, 2001). Because important variations are masked by methods that aggregate, for example the aggregation of all black homicides across Miami would obscure within group differences and differences across neighborhoods, thus the use of aggregated data could lead to a loss of information that is of theoretical and practical importance. Additionally, because recent immigrants are commonly a diverse group who often reside in a single neighborhood in larger urban areas, Martinez and Lee (2002) contend that researchers ought to consider moving beyond city-wide analyses as failing to do so would be at the expense of unique opportunities for theoretical elaboration and refinement (Martinez & Lee, 2002). Accordingly, Martinez and Lee (2002) aimed to contribute to the methodological debate over racial and spatial disaggregation.

With respect to the analytic strategy, the immigration-homicide relationship is evaluated using maps of two northern Miami neighborhoods. The authors are testing social disorganization theory and, as such, clearly specified propositions, as well as circumstances under which those propositions operate and, therefore, conducted a version of the single case study method known as the critical case (Yin, 1994). Martinez and Lee (2002) assert that if social disorganization is operating as theoretically expected, its effects should be clearly evident in the current sample of tracts, because the neighborhoods selected are both high-poverty black neighborhoods with similar levels of structural disadvantage while differing greatly in the key variable of interest. The results are presented in five different maps that taken together provide information on

tract-level (and within-tract) geographic distributions of black homicide that would otherwise be difficult to convey with traditional quantitative methods.

Results for group-specific homicide rates show the homicide rate for African American's to be significantly higher (almost four and a half times higher) than the Haitian rate (Martinez & Lee, 2002). These findings demonstrate that Haitian's who have recently settled in northern Miami are less involved in homicide incidents than native-born African Americans in the same area (Martinez & Lee, 2002). With respect to the variable of interest, immigration results for the spatial distribution of Black homicide and Haitian immigration reveal that the total black homicide rate systematically decreases as the Haitian presence increases (Martinez & Lee, 2002). Furthermore, according to the spatial distribution of levels of black homicide, the presence of Haitian immigrants did not appear to have the disorganizing effect predicted by social disorganization theory (Martinez & Lee, 2002). Martinez and Lee (2002) note that although the maps do not statistically control for other structural covariates of homicide they provide a visual sense of the spatial distribution of immigration and homicide that could not otherwise be accounted for by tract levels of one prominent predictor. Lastly, results from the hot spot map technique demonstrates the relationship between homicide victimization and settlement patterns. More specifically, these maps reveal that despite some overlap between African American and Haitian homicides, African American homicides are clearly clustered in the northwest corner of Liberty City, while Haitian homicide are almost exclusively in the Little Haiti section of this area (Martinez & Lee, 2002).

With the use of maps, Martinez and Lee (2002) were able to move beyond the "black/white dichotomy" that has formed the basis of many large-scale quantitative studies of race and crime. With regard to the immigration/homicide relationship, analyses of the maps produced did not conform to the theoretical tenants that underlie social disorganization theory. Namely, Black homicide was inversely related to immigration, Haitians had much lower rates of homicide involvement than similarly located African Americans, despite comparable levels of poverty and other social hardships. Although, theoretical expectations predict a positive relationship between immigration, ethnic heterogeneity and homicide levels; however, in this case, findings were opposite of expectations that could indicate that the perspective is overdue for reformulation (Martinez & Lee, 2002).

Nielsen, Lee and Martinez (2005) sought to examine the impact of social disorganization, the main theoretical tenants of the perspective, including recent immigration, on community counts of African American and Latino motive-specific homicides in Miami and San Diego. These researchers disaggregated homicide for the years 1985 to 1995 into escalation, intimate, robbery and drug-related motives, with the intent to create an analytic strategy that would facilitate a better understanding of the nuances that influence different types of homicide. Because the criminological literature consists of studies that provide advanced insights into the processes that underlie violence, such as the victim/offender relationship, as well as general motives that shape homicides (see. Parker, 1989; Parker & Smith, 1979; Smith & Parker, 1980; Williams & Flewelling, 1988) these authors sought to extend the literature by examining the processes that underlie various types of homicide. The authors note that variations exist with respect to the motivations behind different forms of homicide and, yet, only few scholars to date have examined refined motive categories particularly at the community level (for example see. Kubrin & Wadsworth, 2003; Kubrin & Weitzer, 2003b; Rosenfeld, Bray, & Egley, 1999).

Accordingly, this gap in the literature places constraints on knowledge regarding the social and economic mechanisms that shape various types of killings. Moreover, studies on variations in homicide have overlooked the role played by race and ethnicity in motivations, a gap that warrants empirical attention. Immigration has altered the ethnic and racial composition of the United States and, therefore, the landscape cannot be accurately captured as a black/white dichotomy. For this reason, the authors consider Latino populations, one of the largest ethnic minority groups in the United States, in their model as it is important to consider the impact of Latino structural locations relative to whites and African Americans as well as group differences in violence (Rennison, 2002). Furthermore, Nielsen et al (2005) consider immigration as one of their main measures of interest because immigrant concentrations are long thought to shape neighborhood crime (Shaw & McKay, 1942: 1969).

According to social disorganization theorists, areas that are highly concentrated with new immigrants may have higher levels of homicide since these groups often settle in disorganized communities (Nielsen et al., 2005). To this point, the authors believe that effects of immigration will impact Latinos more than other groups give immigrants in recent decades largely originate from Spanish-speaking countries (Martinez, 2002). To

address these issues, Nielsen et al. (2005) simultaneously examine motive- and racial/ethnic specific community-level homicides in San Diego and Miami, two cities that have experienced sustained waves of immigration. The cities under analysis consist of structural characteristics that lend well to this area of research as they're both ethnically diverse and major entry points for immigrants, yet are distinguished in their levels of disadvantage, immigrant reception, and homicide making them ideal candidates for comparison. Furthermore, Nielsen et al. (2005) believed that the structural and cultural aspects of social disorganization theory along with segmented assimilation and processes associated with immigration, would be well represented in these two cities and, thereby, help to account for variations in race, place and motive. At the time this article was written studies that concurrently disaggregated homicides by motive, race/ethnicity were absent from the literature, as such these authors were the first to test social disorganization measures on disaggregated homicide types at the community-level. More specifically, the primary goal of this article is to determine whether predictors of homicide are consistent or whether they vary across motives while also taking into account ethnic differences within and between San Diego and Miami.

The authors hypothesize that all motive-specific homicides are impacted by social disorganization and other neighborhood conditions, although the effects of predictors will likely vary somewhat by motive, race, and place (Nielsen et al., 2005). The motives under analyses are categorized into two groups, expressive types (Miethe & Drass, 1999) and instrumental types, each category consists of two homicide types (Nielsen et al, 2005). The expressive types are escalation homicides, meaning killings that resulted from an argument or long standing dispute, and intimate homicides, those involving current or previous sexually intimate relationships (Nielsen et al, 2005). The instrumental types are, robbery- and drug-related killings.

The authors predict that expressive motives are likely to be influenced by economic factors because severely disadvantaged and disorganized neighborhoods are often marked by cultural support for the use of violence in settling disputes related to reputation and personal responsibility (Anderson, 1999; Kubrin, 2003; Kubrin & Weitzer, 2003b). Residential stability is predicted to influence this type of homicide, given the importance of stable networks for achieving and maintaining status (Horowitz, 1983; Kubrin, 2003; Kubrin & Wadsworth, 2003); neighborhood instability is predicted to have an inverse effect on such killings, because the more private nature of intimate violence

make them less susceptible to the influences of neighborhood characteristics when compared to other motive-specific killings (Miles-Doan, 1998; Peterson & Krivo, 1993). Even so, empirical support demonstrates that disadvantage has implications for intimate violence (Kubrin, 2003; Kubrin & Wadsworth, 2003; Miles-Doan, 1998), at the community level for both whites and African Americans (see, for example, Woolredge & Thistlethwaite, 2003).

Homicides that are instrumentally motivated are also expected to be influenced by social disorganization measures. For instance, drug-related activity could be promoted in disorganized neighborhoods with poor economic conditions because legitimate opportunities may be lacking or unavailable in these environments and, so, it should be expected that more homicides are instrumentally motivated (Anderson, 1999; Blumstein, 1995; Zatz & Portillos, 2000). By a similar token, the authors also expect robberies to be motivated to social disorganization (Nielsen et al., 2005).

Turning to ethnic-specific outcomes, these authors anticipate group differences in homicides by motive, considerations of group differences concerning homicide motives could provide insight into differences in predictors across groups something that had not been assessed in existing studies (Nielsen et al., 2005). Furthermore, given that local context influence violence, the authors expect differences across places in the effects of social disorganization measures on motive and ethnic-specific outcomes (Nielsen et al., 2005). Specific considerations of place effects on racial/ethnic differences lead Nielsen et al. (2005) to predict that disadvantage has a greater impact on escalation and drug homicides for Latinos and African Americans in San Diego, as neither group benefits from an ethnic economy, and for African Americans in Miami (compared to Latinos), who, as a group, are excluded from the Cuban ethnic economy (Portes & Stepick, 1993).

Lastly, with respect to recent immigration, a measure that has received little attention in the motive-specific homicide literature, the authors offer two competing predictions. Recent immigration should be positively related to homicide types most affected by neighborhood characteristics, all but intimate types if recent immigration undermines social organization and the ability to exert social control (Nielsen et al., 2005). Moreover, if the opportunity for economic incorporation is unavailable to recent immigrants, segmented assimilation into the underclass (Portes & Zhou, 1993) would suggest that greater concentrations of recent immigrants would be related to more

violence, especially escalation, robbery and drug homicides (Nielsen et al., 2005). Alternately, although this emerging perspective offers no predictions about types of homicides, the immigration revitalization perspective (Lee & Martinez, 2002) purports that immigration should stabilize communities and, as such, have a negative or null effect on homicide in general (Nielsen et al., 2005).

Results for escalation and intimate homicides in Miami and San Diego show the importance of disaggregating by race/ethnicity, motive and local context. Findings for escalation killings reveal that the disadvantage index is a positive and significant predictor of black victims in San Diego and Miami and of Latino victims in Miami. Residential instability is positively related to escalation victims for African Americans and Latinos in San Diego and for African Americans in Miami. The effects of this predictor are significantly greater for African Americans than for Latinos in San Diego and for African Americans in San Diego than African Americans in Miami. The percentage of recent immigrants is negatively and significantly related to black victims in Miami but has no impact on escalation killings for Latinos in Miami or for either group in San Diego. The effects of the percentage of recent immigrants is statistically larger for blacks than Latinos in Miami. Lastly, the size of the black and Latino populations in both cities is associated with group-specific killings, though the effects are significantly larger for blacks than for Latinos in San Diego and for blacks in San Diego than in Miami (Nielsen et al., 2005).

Results for intimate homicides show that contrary to expectations the social disorganization measures are significantly related to some of the outcomes. The disadvantage index is positively associated with black intimate homicides in both settings and with Latino intimate killings in San Diego. Residential instability is positively related to black homicides in San Diego, with its effects greater for blacks in this city than Miami and greater for blacks than Latinos in San Diego. In Miami, the percentage of recent immigrants is negatively associated with black intimate homicides but is positively related to Latino intimate victims. In contrast, recent immigrant concentration is not related to intimate killings in San Diego (Nielsen et al., 2005).

With regard to instrumental homicide types, robbery and drug-related killings, these results also project the importance of race/ethnicity, motive, and local context. For robbery homicides, the disadvantage index is positively associated with the outcomes for

blacks in both San Diego and Miami but not with Latino killings in either city. The size of the coefficient for black disadvantage is significantly greater than that for Latinos in Miami. Residential instability is not related to any of the robbery outcomes, while percentage of recent immigrants is negatively associated with robbery killings for blacks in Miami. Results for drug-related killings show that the disadvantage index is positively related to black homicides in Miami and San Diego, but not to Latino killings in either city. Residential instability is positively associated with Latino victims in San Diego. While the percentage of recent immigrants is negatively related to black drug-related homicides in Miami but positively related to such black killings in San Diego. Overall, results from the current study demonstrate the importance of disaggregating homicide data into refined motive categories and by race/ethnicity to examine the processes underlying different types of lethal outcomes as this type of disaggregation provides insight into the role of various significant predictors (see Block, 1993; Williams & Flewelling, 1988). Furthermore, in spite of similarities across cities for some predators of homicide types, important differences were unearthed indicating the need to take context-specific characteristics into account (Nielsen et al., 2005).

Stowell and Martinez (2007) also contribute to the neighborhood-level immigration-crime literature. In this article, the researchers aimed to build on existing scholarships in two important ways. The first is empirical, as the authors employ more specific measures of immigration including measures of ethnicity, indicators that contain information about both nativity and country of origin, measures that have rarely been used in existing research. The intent of using more specific measures of immigration, such as ethnic-origin allows for insight into the differential impacts of immigration on levels of violent criminal offending. The second contribution relates to the use of more comprehensive indicators of crime, including measures of non-lethal violence that allows the authors to test the degree to which the impact of immigration on violence varies across crime types.

These researchers examine the relationship between immigration and crime with the mechanism of social disorganization theory in mind. However, the aim of the article was not to test the perspective, *per se*, but to cast a new light on the hypotheses advanced by social disorganization theorists. To achieve this, two aspects of the immigration-crime relationship that have yet to be explored in extant research are addressed in this study. The first pertains to the classification of foreign-born populations

in neighborhoods according to their ethnic origins, the intent here is to observe whether the impact of crime demonstrates variance across groups. The categorization of foreign-born populations according to ethnicity, permits a more nuanced understanding of the immigration-crime relationship. Theoretically, there are reasons to expect non-uniformity in the effect of immigration on the social structural characteristics of an area. The ecological perspective argues that because new immigrants often lack the human and social capital often required to reside in organized neighborhoods that they are essentially sorted into disorganized communities. However, over time immigrants may develop social capital, and once conventional success is achieved immigrants are able to relocate to more socially organized neighborhoods. Stowell and Martinez (2007) believed that if the premises of this argument are accepted then social disorganization theory would expect areas comprised primarily of older immigrant populations to be more structurally stable, and thus, have lower levels of violent crime (Stowell & Martinez, 2007).

Additionally, in order to test the proposition that immigration has differential effects on various types of crime, the authors include three substantively distinct measures of violence in their analyses. The immigration and crime literature is abundant with studies that look at the relationship in relation to lethal-violence, however, rarely evaluated are non-lethal forms of violence. These authors attempt to close some of the empirical gaps that are notable in existing studies and, in doing so, provide new insight into the intricacies of a relationship that is still not well understood by criminologists.

Patterns of violent crime are analyzed in two cities where foreign-born individuals comprise substantial portions of their total populations: Houston, Texas and Miami, Florida. Neighborhood-level data gathered from two administrative sources. The crime data are obtained from official police department records between 1999 and 2001, while information regarding the structural characteristics of neighborhoods were extracted from the 2000 Census Summary (Stowell & Martinez, 2007).

Multiple measures of immigration are included in this study, as to provide a more comprehensive test on the impact of immigration, on social structure. The first is an inclusive conceptualization of immigration, measured as the percent of the total tract population who are recent immigrants. By convention, recent immigration is defined as the number of foreign-born individuals who have been in the United States for fewer than

ten years (Stowell & Martinez, 2007). Additionally, the authors also develop analytic models that include measures of immigration for specific immigrant ethnic populations. For Miami, Cubans, Nicaraguans, Hondurans, and Haitians are the ethnic groups that were examined. Similarly, models including the percent of foreign-born for Mexicans, Salvadorans, Chinese, and Vietnamese will be run for the city of Houston. With regard to results on the immigration-violent crime link, results demonstrate a clear, negative pattern of association as significant results were found in four of the five ethnic groups tested. These results are contrary to theoretical expectations of social disorganization theory that predict increases in immigration are associated with heightened rates of violence in neighborhoods. Furthermore, the impact of immigration on violent crime is not homogenous across groups, disparate from the four other ethnic groups tested increases in the concentration of foreign-born Haitian's is unrelated to criminal violence (Stowell & Martinez, 2007).

Results, therefore, highlight the importance of using specific measures of immigration to allow variances if they exist, in the relationships tested to surface between groups. Alternately, results did not support the assertion that the effect of immigration varies by crime type, the concentration of foreign born residents was not related to higher levels of property-based violence. The relationship between immigration and instrumental-violence for each for the five ethnic groups tested was either null or negative (Stowell & Martinez, 2007).

Findings for Houston indicate that immigration does not significantly impact levels of violent crime (Stowell & Martinez, 2007). Furthermore, similar to the results for Miami, the disaggregation of violent crime types did not uncover any significant differences across groups for the relationships tested. Therefore, these results do not support the argument that immigration differentially impacts various forms of criminal violence (see. Hagan & Palloni, 1999).

In sum, the systematic test by Stowell and Martinez' (2007) for ethnic variations in the association with various forms of criminal violence produced some important inferences for the immigration-crime literature. The inclusion of ethnic-specific measures of immigration enabled a more nuanced understanding of the immigration-crime nexus as important differences within immigrant populations were addressed. More specifically, the current study found the immigration-crime to vary by ethnic group and, thus, future

research ought to explore this avenue by including more narrow interpretations of immigration. Currently, a bulk of the literature consists of studies that have only used broad definitions of immigration, for this reason, any variances amongst immigrant groups are lost in the analyses.

Nielsen and Martinez (2009) revisited the community-level literature on immigration and crime, examining the impact of community-level factors, including immigration for Latino- and Black-specific homicides and suicides in Miami, Florida. To examine the contexts under which ethnic-specific lethal violence occurs at the census tract level, these authors used data from the medical examiner on violent deaths from 1985-1995 along with Census data from 1990. The body of literature that examines the immigration-crime relationship is relatively comprehensive and findings have been rather consistent in demonstrating a negative or null relationship between high immigrant concentrations and violence at the community-level (see. Martinez & Lee, 2000; Reid, Weiss, Adelman, & Jaret, 2005; Lee, Martinez, & Rosenfeld, 2001; Martinez, Stowell, & Cancino, 2008; Morenoff, Sampson, & Raudenbush, 2001; Nielsen, Lee, & Martinez, 2005; Stowell & Martinez, 2007). Results that demonstrate a null or negative relationship between immigration and violent crime is contrary to theoretical expectations, as scholars assume a positive association given that ethnic minorities and new immigrants often settle in disorganized neighborhoods characterized by poverty, high proportions of immigrants, substandard housing, high crime rates, and other social problems (Shaw & McKay, 1942). Nonetheless, the literature remains underdeveloped when considering the role of immigration on various types of violent deaths, especially for black and Latino dominated communities (Nielsen & Martinez, 2009). For this reason, these authors seek to fill this gap in knowledge by focusing on the role of immigration in homicide and suicides in neighborhoods.

With this article, Nielsen and Martinez (2009) sought to answer two questions. The first pertains to whether immigration impacts homicide and suicide in similar ways. The authors note that although the immigration\violent crime link has been empirically tested in the literature it is still not clear how, or if, immigration influences community levels of suicide (Nielsen & Martinez, 2009). The second question relates to whether Black and Latino violent deaths are similarly related to immigration. With the exception of Kubrin et al. (2006), little attention has focused on macro-level factors associated with racial/ethnic differences in suicide or in homicide and suicide. Accordingly, Nielsen and

Martinez (2009) examine the relationship between immigration, net of other economic and social conditions, and Latino and Black lethal violence in Miami, Florida, communities. Additionally, because research often examines suicide and homicide as analogous forms of lethal violence (Henry & Short, 1954; Pokorny, 1965), these authors strive to determine whether immigration specifically effects homicide and suicide, forms of violence often examined separately but which may have common underlying causes (see for example. Baller, Shin, & Richardson, 2005; Henry & Short, 1954; Kubrin et al., 2006).

Nielsen and Martinez (2009) note that current empirical contributions on homicide and suicide support the notion that pre-existing social conditions, including immigration, are linked to violence. Even so, knowledge on this relationship is not comprehensive, and requires greater attention if important aspects are to be uncovered. Finally, even though theoretical predictions lead to the assumption that disorganized communities should have a similar effect on violence for different racial groups (see. Sampson & Wilson, 1995), existing research has shown that predictors do vary across groups, prompting the question of whether racial invariance exists for macro-level factors for homicide and suicide (Nielsen & Martinez, 2009). For these reasons, the authors aim to move beyond existing evaluations and, in doing so, examine community-level relationships amongst immigration and Latino and Black violence. More specifically, this study attempts to empirically evaluate when ethnic-specific predictors are significantly related to homicide and suicide, and also the role of immigration on these forms of violent deaths.

In line with other studies on violence, Nielsen and Martinez (2009) used negative binomial regression. Turning to the regression results for suicide, findings show that for black suicides the number of black residents is significantly and positively related to suicides (Nielsen & Martinez, 2009). Therefore, on average, the count of black suicides is greater in tracts that have greater concentrations of black residents. Findings for all measures capturing community characteristics, including immigration, were insignificantly related to black suicides. Results for Latino suicides reveal that areas with greater Latino disadvantage have greater numbers of Latino suicides. Additionally, areas with greater concentrations of young Latino males have fewer victims, while areas with greater Latino residents have on average more suicides (Nielsen & Martinez, 2009). Results from the suicide models do not indicate significant variances with respect to the

effects of predictors for black and Latino suicides, implying that the variables tested do not play statistically different roles for the groups tested.

The models for homicide provide more support for social disorganization measures than those evaluated for suicide. Results for the black homicide count demonstrate significance for two social disorganization measures: percentage immigrants and black economic disadvantage. Simply put, black homicides are, on average, more prevalent in neighborhoods with lower immigrant concentrations and higher disadvantage. Results from the Latino model for homicide further indicate the significance of social disorganization measures. Neighborhoods with greater percentages of immigrants and greater levels of residential stability have fewer Latino homicides, while greater disadvantage is positively related to homicides. Furthermore, the number of Latinos and spatial lag terms are significant and positively related to homicide. Overall, findings from this model indicate that more Latino homicides occur in disorganized areas. Furthermore, results for violence types within racial/ethnic groups, indicate that for blacks only the effect of percentage immigrants is different for suicide than for homicide, whereas for Latinos percentage of immigrants and number of persons are significantly different for the two types of violent death. That is, for both groups the effects of immigrant concentration are larger for homicide than for suicide (Nielsen & Martinez, 2009).

In sum, the authors examined the role of community-level factors on Latino- and black-specific homicides and suicides in Miami. Results highlight the role of immigrant concentration in neighborhoods and violent deaths for black and Latino residents. Specifically, greater concentrations of immigrants lead to significantly lower instances of black and Latino homicide and, therefore, new immigrants are not disrupting communities or undermining social integration. However, the same effect was not found for suicide as immigrant concentrations did not significantly impact counts of Latino or black suicides, these results run contrary to existing findings particularly with the limited suicide and social integration research (see. Baller & Richardson, 2002). Results that are relatively in line with existing studies were found for the relationship between immigration and violent deaths.

Martinez, Stowell and Lee (2012) explored the impact of immigration on neighborhood-level homicide trends in the city of San Diego, California. The study

utilizes a combination of racially/ethnically disaggregated homicide victim data and community structural indicators collected for three decennial census periods and, thus, accounts for potential changes over time. Theoretically, these researchers note that although the immigration-crime literature has come to rely on the mechanisms identified in social disorganization theory in the form predicted by Shaw and McKay (1942; 1969) for theoretical guidance, contemporary scholarships coupled with the changing landscape of immigration may call for revisions to the original propositions of the theory. Therefore, alternative perspectives such as the immigrant revitalization thesis are gaining traction amongst some researchers (see. Lee & Martinez, 2002; Lee & Martinez, 2009; Sampson, 2008; Sampson, Morenoff, & Raudenbush, 2005). Accordingly, studies are showing that immigration, ethnic heterogeneity, and residential instability often are associated with reduced crime rates as opposed to increased rates as predicted by social disorganization theory. This so-called immigrant paradox has captured the attention of researchers in a variety of other fields, such as, health, mental health, and education (see. Rumbaut, 1999). Similarly, criminologists are taking greater empirical interest in the myriad of ways in which immigration in the modern era has paradoxically strengthened institutions of social control, fostered economic development, and sparked a revival of previously high-crime, inner-city neighborhoods (Martinez et al., 2012).

Accordingly, Martinez and colleagues (2012) devise this study in part as a response to recent calls by scholars to consider contemporary communities and changes in the landscape of immigration into considerations of the immigration-crime nexus. The researchers emphasize that the intent of their study is to advance the communities and crime literature using longitudinal analyses to explore a series of hypotheses drawn from the immigration and social disorganization literatures that shed new light on the processes behind ecological variations in crime. More specifically, the researchers aim to investigate the consequences of changing levels of immigration on community violence over time. Five hypotheses are tested in this study.

The first pertains to whether ecological structures vary over time and across neighborhoods, Martinez et al. (2012) assert that ecological structures such as immigration, economic disadvantage, and residential stability will vary over time. The second hypothesis relates to the stability of the relationships tested and so the researchers posit that immigration is associated with instability. The third hypothesis is influenced by principles of the immigrant revitalization thesis and predicts that controlling

for other structural covariates of homicide immigration is predicted to decreased homicide over time. Fourth, the question of racial/ethnic invariance is addressed and, so, the researchers hypothesize that the effects on homicide of all structural factors except immigration are racially/ethnically invariant over time. Lastly, the researchers address the issue of the temporal ordering of the relationships tested and include a temporally lagged count of homicides to the final set of total and group-specific models, the hypothesis tested here is that the immigration effect remains robust despite the inclusion of a temporally lagged count of homicides.

A fixed-effects analytic procedure is used to estimate the data, allowing the panel structure of the data to be adequately tested and, very importantly, allows the authors to introduce a temporal dimension by modeling the effect of change. Multivariate results show that observed patterns of lethal violence are shaped by changes in the broader neighborhood social structural composition. Socioeconomic disadvantage is positively related to the number of homicide victims, a finding that corresponds to existing literature as well as, theoretical expectations. The proportion of the labor force involved in professional occupations was found to be significant and negatively related to the number of homicides, a finding that is in-line with previous research as involvement in the professional sector acts as a buffer against criminal involvement (see Wilson, 1987). Residential stability did not have a significant effect on homicide; however, the size of adult population relative to children was significant and positively associated to community-levels of homicide. Immigration, the most substantively interesting measure was found to be significant and negatively related to overall levels of homicide, a finding that is consistent with the immigrant revitalization perspective and, accordingly, the third hypothesis introduced by the authors. Given that fixed-effects regression analysis were used the researchers interpret the negative effect of immigration as illustrating that increases in the size of the neighborhood foreign-born population over time lead to decreases in levels of lethal violence. Martinez et al. (2012) were able to identify the temporal ordering of the relationships tested which is a key to understanding the dynamic forces driving processes of urban disorganization and revitalization.

With respect to the fourth hypothesis concerning the racial/ethnic invariance of the factors associated with homicide, the regression models were estimated using racially/ethnically disaggregated homicide data. Results indicate strong similarities across groups with the exception of immigration and, therefore, support was found for

the fourth hypothesis. Moreover, for each group tested, structural disadvantage had a significant and positive impact on homicide victims, a finding that corresponds to the social disorganization as well as other theories that link deprivation to crime. Turning to the results for immigration, findings reveal that an increase in the concentration of foreign-born individuals is inversely related to the number of white and Latino homicide victims. The effect for immigration is positively related to increases in black homicide victims, albeit findings did not reach statistical significance, which is consistent with existing studies (see. Lee, 2003; Lee, Martinez & Rosenfeld, 2001; Stowell & Martinez, 2007). Results from test of the fifth hypothesis that relate to the impact of immigration on changes in lethal violence, do not change the substantive pattern of findings for any models.

The primary aim of Martinez and colleagues (2012) was to provide an empirical demonstration of the temporal links in neighborhoods between immigration and crime, accounting for contemporary changes in the structural composition of neighborhoods along with changes in the demographics of new immigrants. Results from this study illustrated that over time the negative immigration-crime relationship remained steady and, therefore, increases in immigrant concentration leads to fewer overall homicides in neighborhoods. With respect to tests of the racial/ethnic invariances of factors associated with homicide, results were relatively robust, indicating that increases in immigration are associated with fewer non-Latino white and Latino homicides in San Diego communities, although immigration was not significantly related to black homicide. Therefore, the researchers demonstrated that causes of crime are not necessarily racially/ethnically invariant.

Another important element from this study pertains to the longitudinal approach, because the immigration effect remained robust even in the set of regression models that included a temporally lagged count of previous levels of homicide these results support the notion that immigrants are not simply moving into low-homicide areas. For this reason, findings may support the immigrant revitalization perspective, as increases in immigrant concentrations could halt and may even reverse some of the disorganization–crime–disorganization spiral that unfolds throughout long periods of time and is thought to play a central role in the creation of permanently high-crime neighborhoods (Schuerman & Kobrin, 1986; Martinez, et al., 2012). These researchers were able to move beyond previous conceptions of social disorganization that up until

this point were conceived with results from cross-sectional studies and, thus, unable to explore the “nonrecursive aspects” of the theory (see. Bursik, 1988).

In the same year, Davies and Fagan (2012) investigated the immigration-crime relationship using data from New York City. The authors strived to address a number of important issues that remained underdeveloped in the immigration-crime literature. As noted in the Martinez et al. (2012) article, the disaggregation of immigration is scarce amongst existing studies and, although the use of total immigration is prevalent within existing scholarships this measure does not account for the heterogeneity of immigrant populations. Davies and Fagan (2012) sought to provide an empirical extension to this point and used data from New York City, where the population of immigrants is highly diverse to evaluate patterns of crime among racial and ethnic subgroups in immigrant neighborhoods. These authors cite that little empirical evidence exist at the neighborhood level to support the negative association between immigration and crime that is often found at the aggregate-level in more contemporary assessments of the relationship.

At a minimum, contemporary findings call into question theoretical perspectives that assert a positive correlation between immigration and crime. Even so, the immigration-crime literature is still limited and a number of important issues remain unaddressed (Davies & Fagan, 2012). Of these issues, is a lack of diversity in instances where ethnic/racial groups are disaggregated, much of the current literature focuses on Latino immigrants, very few studies if any, include racial and ethnic effects for African, West Indian, and Asian populations. For this reason, the current study focuses on the criminogenic effects of immigration across a wider spectrum of groups. The authors elaborate that most current research show that immigration is either unrelated to, or mitigates, neighborhood crime. However existing studies only include a small number of neighborhoods and, most often, consider only violent crimes, such as, homicide. To fill these gaps the present study includes a wider range of neighborhoods and crimes in their analyses. Moreover, the authors also take an ethnic specific approach in examining the immigration-crime nexus, the intent here is to demonstrate ethnic/racial variance if they exist, of the relationships tested as immigrant populations are not homogenous in make-up.

Another unique contribution of this study pertains to the systematic testing of immigrant settlement patterns. The authors state that for new immigrants, the choice of residential locations is not random but rather, immigrants self-select into neighborhoods. If immigrant settlement patterns have diverged from traditional patterns, that is settlement in highly disadvantaged areas characterized by high levels of poverty, racial heterogeneity, mobility, and crime than past theoretical explanations of immigration, namely explanations based on social disorganization ought to be revisited. As such, the current study investigates the social, economic, and crime conditions that affect the self-selection process for immigrants. In addition to the theoretical implications, investigations into the non-random self-selection process for residential settlement of new immigrants poses important methodological implications as well. Biases that result from self-selection have not been adequately addressed in the immigration-crime literature and failing to account for these biases may lead to inaccurate results. To address concerns related to selection bias, the authors use a generalized propensity score (GPS) approach to control for selection bias in the analysis of immigration and crime.

To test the proposed research questions regarding the effects of immigration on crime and enforcement, these authors use the concentration of foreign-born populations in NYC neighborhoods for the years 2004 to 2008. Results regarding immigrant settlement patterns show that ethnic groups tend to sort into neighborhoods that consist of like individuals, those who physically look alike and have similar resources. White immigrants (61 percent) are more likely than other immigrants to settle in areas that are predominately white. Similarly, black immigrants (55 percent) tend to settle into neighborhoods that are predominantly black. Although, Latino immigrants also settle in areas that are largely Latino, the distribution of race/ethnic groups is more even as Latinos are more likely than the other groups tested to reside near whites and Asians. Asian immigrants are distinguished in that they that reside in primarily white neighborhoods as opposed to Asian dominated areas, the authors believe that this could be attributed to them having greater financial resources and, thus, are less constrained in terms of choice of residential neighborhood.

With regard to the neighborhood characteristics of places where ethnic groups settle, results reveal some distinguishing factors amongst these characteristics. Black immigrants, when compared to other groups, often settle in neighborhoods that have the

highest rates of poverty, public assistance, unemployment, and female-headed households. Similarly, black immigrants also reside in neighborhoods with much higher levels of homicide and assault than the comparison groups. Latino immigrants tend to settle in neighborhoods marked by high levels of social and economic disadvantage; however, these places are less economically isolated than the places where black immigrants settle. Conversely, white immigrants settle in neighborhoods with greater access to wealth and, hence, the areas occupied by these immigrants are characterized by low levels of structural and socioeconomic disadvantage. Asian immigrants settle in areas that are not as well-off as those occupied by white immigrants; however the neighborhoods where they reside are structurally similar to white neighborhoods more so than any other group.

Results from the GPS models conform to those found in the descriptive statistics as the large effect found for immigrant concentration show that immigrant neighborhoods remain stable as reception contexts for new arrivals in NYC. In addition to the effect of immigrant concentration, results show that the effects of wealth and safety are significant predictors of areas for immigrant settlement. More specifically, results for total immigration demonstrate the skew toward wealth or less disadvantage for white immigrants as immigrant concentration is higher in neighborhoods with fewer indications of disadvantage and for places that have less crime. GPS results for the immigration-crime relationship using measures of total and recent immigration reveal that immigration acts as a protective factor for both total crime and three specific categories of crime. Total immigration shows a significant effect for all crime categories. The preventive effects of immigration are less pronounced for recent immigrants, as significant negative coefficients are found only for total and drug crime rates. Immigration effects are also distinguished by crime type along with racial/ethnic classifications. White immigrants primarily from Russia and other Eastern European countries, provide strong insulating effects against crime. As previously mentioned, white immigrants are most likely to settle in neighborhoods with low crime and higher access to wealth, the strong negative parameter indicates that white immigration provides a protective barrier against crime, beyond other crime reducing factors. Furthermore, total and violent crime rates are found to be lower in neighborhoods that have high concentrations of foreign-born persons of African descent. The impact of Asian and Latino immigration on crime was

found to be insignificant, the authors believe this could be due to the heterogeneity of residential settlement of these groups.

Overall, Davies and Fagan (2012) make several important contributions to the immigration-crime literature, demonstrating that in NYC immigration exerts a protective effect against neighborhood crime. Therefore, these authors provide additional support by evaluating the relationship from a different contextual backdrop, various ethnic enclaves in NYC. Although these authors did not engage in theory testing, per se, results showing that immigration in some instances protects against crime thereby lends support to the immigrant revitalization thesis. Support for the immigrant revitalization thesis is further substantiated with the use of disaggregated measures of immigration. Tests of the immigration-crime relationship using measures that categorize immigrants by ethnicity/race, these authors were able to demonstrate that immigrants are a heterogeneous group and, accordingly, immigration experiences and contributions to lower rates of neighborhood crime vary across racial and ethnic groups. Furthermore, because immigrants are a distinguished group and, thus, exhibit a number of group differences, whether in terms of settlement areas or effects on rates of neighborhood crime it could be inferred that each group has contributed to the revitalization on the city in varying ways.

The inferences here are valuable to the scholarship given that most studies in this area have used total immigration as a proxy for immigration and, thus, unable to identify important differences in immigration effects across groups. This work demonstrates the importance of accounting for group differences and, thus, future researchers should be encouraged to do the same when testing for immigration effects on crime.

The same year MacDonald, Hipp and Gill (2013) published a paper that investigates the extent to which immigrant concentrations are associated with reductions in neighborhood crime rates in the City of Los Angeles. Consistent with previous research, these researchers believe that more recent lines of empirical research on the immigration-crime relationship provide grounds for the reconsideration of sociological processes that link immigrant settlements to neighborhood crime rates (see, for example, Morenoff & Astor 2006; Martinez et al., 2010). MacDonald and colleagues (2012) draw attention to the changing landscape of immigration and, relatedly, immigrant

characteristics and immigration settlement patterns. For instance, in many U.S cities neighborhood patterns of poverty and residential segregation are now associated with more diverse immigrant populations, thereby altering the long-standing racial or ethnic disparities in income and housing segregation (Cutler et al., 2008). Because population composition has appreciable effects on variations in crime rates at different spatial units (Land et al., 1990), understanding immigrant settlement patterns could be of fundamental importance when studying neighborhood dynamics of crime (MacDonald et al., 2013).

Additionally, labor migrants in the U.S are considered a self-selected population as the intent of immigrating is to look for work and economic advancement. For this reason, these immigrants may have greater incentives to remain law abiding and avoid interactions with the criminal justice system than similarly situated native residents living in neighborhoods of concentrated poverty that are part of a stable underclass (Wilson, 1987; Massey & Denton, 1993; Sampson & Wilson, 1995; MacDonald et al., 2013). Also, these authors suggest that settlement patterns affect social networks, cultural norms, and informal social control mechanisms that could actually produce meaningful changes in neighborhood dynamics. For these reasons, the authors assert that the dynamics of immigrant settlement and crime reflect issues of spatial (Massey, 1985) and segmented assimilation (Portes & Zhou, 1993) that contrast with the experience of America's underclass (cf. Wilson 1987). Therefore, it is appropriate that scholars assess the impact of immigrants on changes in neighborhood crime rates (see. Sampson et al., 2005; Morenoff & Astor, 2006; Desmond & Kubrin, 2009; Martinez et al., 2010).

However, although important, this segment of the immigration-crime literature is rather underdeveloped when compared to empirical evaluations of crime rates across neighborhoods. As such, these researchers aim to fill this gap in knowledge and examine the effect of immigrant concentration on recent changes in neighborhood crime rates in the city of Los Angeles (LA). To circumvent some of the methodological concerns related to the simultaneity that will likely bias estimates of the association of immigrant concentrations and neighborhood crime rates, the authors use a potential outcomes framework. The authors purport that the incentives for economic advancement that often draw immigrants to the U.S., and the transitional nature of arrival and assimilation into ethnic enclaves, could be expected to produce net reductions in neighborhood crime rates, holding other relevant neighborhood attributes constant.

Furthermore, they posit that immigrants are more likely to settle into areas with other immigrants. Taken together, the hypothesis posed is that even after taking into account immigrant settlement patterns that immigrants will lead to greater reductions in neighborhood crime rates. The authors looked to the immigrant assimilation literature (Morenoff & Astor, 2006) for theoretical guidance and, accordingly, used the predictions of this perspective to formulate their hypothesis.

The data used to examine the relationship between immigrant concentrations and crime are official crime statistics and demographic data for census tracts ($n = 835$) located in the City of Los Angeles for years 2000–2005. The crime data include homicide, robbery and aggravated assault, all of which were reported to police for the years 2000–2005. To capture immigrant concentration, the authors used census estimates of the proportion of residents in each census tract who are of Hispanic/Latino (proportion Latino) ethnicity and the proportion of residents born outside the United States (proportion foreign born) in 1990 and 2000.

In order to assess within-neighborhood changes in crime these authors computed the 6-year changes in crime outcomes for each neighborhood. The conceptual approach used allowed for the explicit estimation of immigration selection into neighborhoods with pre-existing immigrant populations. Thereafter, the effect of immigrant concentration on observed yearly changes in neighborhood crime rates were estimated. Here the authors applied a potential outcomes causal model (see. Rubin, 1974; Angrist & Krueger, 2001; Angrist, Imbens, & Rubin, 1996) as the method for identifying the immigrant concentration effect, or the difference between the expected changes in crime observed among neighborhoods with a significant concentration of immigrants and the outcomes that would have been observed had those same neighborhoods not had a concentration of immigrants.

Results from the first stage regression estimates show a strong relationship between neighborhood concentrations of immigrants in 1990 and 2000, suggesting that prior levels of immigration may provide a suitable instrumental variable (Z) to address the problems of endogeneity (selection). Accordingly, results demonstrate that the concentrations of immigrants (Hispanics/Latinos and foreign-born) in the year 2000 in LA neighborhoods were at least in part, a function of pre-existing patterns of settlement measured in 1990. The authors do note, however, that some of the dispersion of

immigrant settlements in LA neighborhoods in 2000 are not accounted for by 1990 levels; to account for this the authors leverage estimates of the treatment effect of immigrant concentration on changes in crime rates. The reduced form estimates of the relationship between pre-existing levels of immigrant concentration and changes in total crime and violent crime reveal that the level of immigrant concentration in 1990 is negatively related to changes in neighborhood crime rates.

The second-stage estimates from the 2SLS regression models demonstrate that higher predicted concentrations of immigrants are related to greater than expected reductions in total reported criminal offenses and violent crimes, a finding that corresponds to expectations. With regard to the selection effects, the 2SLS estimates show that the effect of current levels of immigrants on changes in crime is approximately twice as strong as the reduced form equations estimate, suggesting a strong selection effect. Overall, these findings convey that predicted concentrations of immigrants is strongly related to decreases in neighborhood crime, net the effects of poverty indicators, residential stability, population density, age structure, and regions of the city. Additional tests were conducted that adjust standard errors for observations being clustered within stratum as well as tests that estimate the potential heterogeneity in the treatment effects of immigrant concentration on changes in crime. Taken together, results from the regression models estimated reveal a substantial marginal net reduction in neighborhood crime rates that are associated with higher concentrations of immigrants to Los Angeles neighborhoods during this observation period.

This empirical piece provided evidence in support of propositions that suggest increases in immigrant concentrations reduce neighborhood-level crimes. More specifically, the authors were able to demonstrate, through a series of sophisticated statistical models that in the context of immigrant neighborhoods within the city of LA, an increase in the concentration of immigrants, on average, leads to reduction in total and violent crime, even after taking into account that immigrants are likely to select into neighborhoods with their existing co-ethnics (MacDonald et al., 2012). These authors, therefore, contribute to the immigration-crime literature by demonstrating that at the neighborhood-level immigrant settlement patterns have an appreciable relationship with neighborhood changes in crime, even after controlling for the selection of immigrants into particular areas, something that is rarely accounted for in existing studies. Beyond the methodological and theoretical contributions of the paper, this study provides

evidence to dispel a common belief that immigrants, particularly in the city of LA, have contributed to the social burden of crime in the city. In their tests of the relationship, the largest predicted reductions in crime to have occurred in neighborhoods are marked by concentrated poverty, those located in the Southeast and Central sections of Los Angeles, these areas have been historically linked to crime and gang violence among native Latino populations. For this reason, the authors suggest that future studies focus on unpacking the nuances that underlie the negative immigrant-crime relationship, and in this way develop a better conception of the sociological mechanisms whereby immigrant enclaves cause crime rates to lower in neighborhoods.

Continuing with neighborhood-level research that investigates the relationship between immigration and violent crime, Ramey (2013) investigates the relationship using a representative sample of neighborhoods nested within 84 large U.S cities. Ramey (2013) notes that existing studies that provide support for the immigrant revitalization thesis typically draw on findings that rely heavily on Latino or African American enclaves in “established destination cities” and, thus, results do not account for the massive dispersal of immigrants across the country. As such, existing results that show support for the immigrant revitalization process may not be representative of the situation in neighborhoods of that are comprised of different ethnic groups. Due to the immensely diverse and ever-growing immigrant population across American cities and neighborhoods, Ramey (2013) believes that tests of the immigration-crime relationship ought to consider how this relationship compares/differs across various “contexts of reception” (Portes & Rumbaut, 2006). Because certain contextual factors that may significantly impact the immigration-crime relationship are unique to places with traditionally large immigrant populations, Ramey (2013) asserts that these effects ought to be teased out in order to determine whether immigrant concentration is related to decreases in crime or whether other contextual factors are actually driving the relationship. Testing for links between factors associated with immigration and neighborhood violent crime in both new destinations of immigrant settlements along with neighborhoods in established destination cities enables the researcher to determine if the relationship varies according to the contexts of reception. Ramey (2013) draws on social disorganization theory, immigrant revitalization arguments, and an immigrant incorporation framework to test assumptions about immigrant composition and crime.

The current study relies on data from the National Neighborhood Crime Study (NNCS) database conducted by Peterson and Krivo (2006) and the Neighborhood Change Database (NCDB). The data used here consists of 8,628 white, African American, Latino, and integrated tracts in the 84 cities in the NNCS that meet the criteria for established and new destinations (Ramey, 2013). Additionally, Ramey (2013) used data from 1990 and 2000 from the NCDB database to measure recent growth and decline in immigrant composition over time. These data were analyzed with multilevel models using HLM, a technique ideal for testing neighborhood violence as a function of both neighborhood- and city-level structures in cities with different immigration experiences.

Results from separate multilevel models for each ethnic enclave under evaluation (white, African American, Latino, and integrated neighborhood) reveal a pattern of coefficients that, for the most part, correspond to theoretical expectations. In three of the four models tested, immigrant composition showed a significant and negative relationship with neighborhood criminal violence, with the exception being African American neighborhoods. Results for the effects of immigrant growth demonstrate variance across neighborhood type, where significant relationships were found exclusively for white and integrated neighborhoods. More specifically, results show that a one-standard-deviation difference in immigrant growth is associated with a 10-percent-lower violent crime rate.

For integrated neighborhoods, such a difference is associated with approximately a 5-percent-lower level of criminal violence per 1,000 population. After controlling for neighborhood-level immigrant composition and growth, results show that rates of violence in white, African American, and Latino neighborhoods are not influenced by the type of destination city. Violent crime rates for integrated neighborhoods, however, are significantly higher in new destinations than in established destinations, on average integrated neighborhoods in a new destination city is expected to have a violent crime rate that is 78.3 percent higher than the rate for established destinations. Furthermore, the new destination variable is the only city-level measure to show a significant relationship for integrated areas.

Overall, these results demonstrate that immigrant concentration at the local and city-levels are associated with violent crime in some neighborhoods but not others,

thereby, revealing variances across neighborhoods for the relationships tested. Furthermore, city-level classifications, whether as a new or existing immigrant destination is also important to consider in test of the immigration-crime relationship, as results here show violent crime rates are significantly lower in established destinations. In short, these results reveal that context matters with respect to the immigration-violent crime relationship at both the neighborhood and city levels. The generally suggestion being that larger and faster-growing immigrant populations are likely revitalizing neighborhoods by helping lower violent crime rates, with the exception of African American neighborhoods, these results provide support for the immigrant revitalization thesis. Moreover, the context of reception also matters for new immigrants as results conform to the notion that established immigrant destinations provide a receptive context in which immigrant composition and immigrant growth serve to revitalize communities and prevent criminal violence (see. Portes & Rumbaut, 2006). In contrast, statistical significance was not found for the relationship between immigrant composition or immigrant growth and violent crime for the majority of neighborhoods tested in new immigrant destinations. As such, Ramey (2013) suggests that future research examine how the relationship between neighborhood immigrant populations and neighborhood crime varies across differentially situated new destination cities.

Stansfield, Akins, Rumbaut and Hammer (2013) assessed the effects of recent immigration on serious property crime in Austin, Texas. This article is distinguished because the immigration-crime relationship is tested in the context of community-level property as opposed to violent crime, something that is sparse in existing works. In addition to extensive examinations of the immigration-violent crime relationship (see. Akins, Rumbaut & Stansfield, 2009; Hagan, Levi, & Dinovitzer, 2008; Lee, Martinez, & Rosenfeld, 2001; Martinez, Stowell, & Cancino, 2008; Mears, 2001; Nielsen, Lee & Martinez, 2005; Sampson, 2008) a majority of the literature consists of studies that principally focus on traditional immigrant gateway cities, such as Los Angeles, Miami, and San Diego (Stansfield et al., 2013). These authors note that although empirical considerations in the context of established immigrant destinations as those mentioned above offer empirical value many of these areas have reached saturation levels in certain employment areas, prompting foreign-born workers to relocate to newer or less established destination cities (Castillo, 2004; Light, 2006).

As such, it is important to look into the impact of recent immigration on crime in the context of newer destination cities, where co-ethnic communities that provide networks for employment opportunities that buffer the potentially disorganizing effects of immigration (Portes & Rumbaut, 2006; Telles & Ortiz, 2008) may be less prevalent. For this reason, Stansfield et al. (2013) examine the immigration and crime nexus in Austin, Texas, a pre-emerging immigrant gateway in the United States. Taken together, the contributions of this study are twofold: the authors contribute by looking at the effect of immigration on serious property crimes, which at the time of this study had only been evaluated three times prior in a new immigrant destination at the tract-level, something that had not been empirically considered in existing works. Theoretically, the authors reference Stain theory which most generally refers to the discrepancy between blocked opportunities and aspirations, and those who experience strain such as new immigrants, are on average more likely to engage in crime, specifically, economic crimes. At the community level, it is expected that areas with large immigrant settlements experience higher levels of property crime (Hagan & Palloni, 1999; Portes & Rumbaut, 2006). The expectation that neighborhoods with higher concentrations of immigrants will experience increased property crime is premised on the notion that immigrants commonly face economic barriers and blocked opportunities that make it difficult to abide by conventional societal norms and, thereby are more enticed by crime.

These authors note that even though Texas has been a traditional location of new immigrants, primarily Latino arrivals the city of Austin differs from Houston, Dallas, San Antonio, and other cities that have a long history of immigration from Central and South America. Unlike other major cities in Texas, Austin does not have a significant history of immigration from Central and South America thus, prompting Singer (2004) to label Austin a new urban gateway.

Results from the negative binomial regression analyses consider the effect of recent immigration on burglary, theft, and motor vehicle theft. Two separate models were created to analyze the impact of recent immigration on various property crimes: the first does not control for economic disadvantage, while the second does control for this factor. Overall results demonstrate that for all three measures of serious property crime, tracts that are proximate to crime-prone tracts experience higher levels of property crime. Findings for burglary reveal that community instability and population are both significant predictors of this type of crime. Where tracts with higher levels of community

stability are expected to have lower levels of burglary, while those with larger population size are expected to have higher rates of burglary. With respect to the immigration variable, contrary to expectations of a positive relationship, recent immigration in this instance was found to be insignificantly related to burglary regardless of the control for economic disadvantage.

Results for larceny show a positive and significant relationship for population size and the spatial lag variable; accordingly these measures predict higher rates of larceny, while tracts with higher levels of community stability had lower levels of theft. Similar to the findings for burglary, recent immigration did not increase rates of theft in Austin, even in the model that controls for economic disadvantage. Results for motor vehicle theft reveal that the spatial lag variable and the percent of young males in the tract were positively associated with crime. Disparate from the two other property crimes under evaluation, motor vehicle theft did not show a significant relationship for population size, though tracts with higher levels of disadvantage did on average show a greater rate of motor vehicle theft. What's more, geographic proximity to motor vehicle theft hotspots was also a significant predictor of auto theft, while higher levels of community stability were related to lower rates of motor vehicle theft. As with burglary and theft, the impact of recent immigration on motor vehicle theft was also insignificant. Overall findings, from the current study contribute to the immigration-crime scholarship in a number of important ways. The first pertains to investigative efforts aimed at recent immigration and the impact on various property crimes. The authors note that economic deprivation related to recent immigration has been theorized in the literature as a motivating factor related to increases in property crime (Hagan & Palloni, 1999).

However, at the time of this study, there were only three existing articles that empirically examined the effect of immigration on property crime rates, at the tract level. The second, contribution, therefore, relates to the level of analyses of the study, the authors emphasize that tract-level analyses are important as they enable an investigation of recent immigration and serious property crime rates in the context of an area of emerging immigration that in this case is Austin, Texas. Analyses at the tract-level help circumvent many of the issues related to city-level analyses, including but not limited to the problem of failing to account for or distinguish "saturated" areas of immigration, that could confound any potential direct relationship between new

immigration and crime. Lastly, this study contributes by focusing on serious property crimes, as the vast majority of the immigration-crime literature examines violent crime.

Stansfield et al. (2013) maintain that new Latino immigrants to the United States are typically motivated by their desire to achieve prosperity, a desire that is often blocked in their country of origin (Portes & Rumbaut, 2006). Because first-generation immigrants often face barriers to legitimate opportunities and, thus, face limited economic opportunities (Lee et al., 2001; Waldinger, 1993), property crimes may present a means of meeting monetary aspirations (Merton, 1938). And, for this reason, immigration should be related to increases in property crimes. However, results from the current study dispel the notion that recent immigrants are positively associated with property crime, as the three property crimes under analyses were insignificantly related to recent immigration. As such, current findings lend support to existing scholarships that demonstrate a protective effect of recent immigration community-level crime rates. Future researchers are encouraged to examine the effect of recent immigration on a range of property crimes in communities found in newer immigrant destinations as oppose to established destinations.

Kubrin, Hipp and Kim (2018) examine the immigration-crime relationship across neighborhoods in the Southern California metropolitan region. The researchers aim to provide an additional layer of insight by accounting for differences between immigrant groups, an important point that is often overlooked in aggregate-level research. Kubrin and colleagues maintain that despite having a relatively robust catalogue of empirical studies, there remains many important areas in the immigration-crime scholarship that require empirical attention. Namely, a critical issue worth addressing pertains to the narrow conceptual treatment of immigration along with the limited measures employed in studies, this void has mainly been brought upon by aggregate-level research that treats immigrants as a homogeneous population and, thus, fails to account for any significant variations across different groups of immigrants (Kubrin et al., 2018). Accordingly, the current study addresses this literary gap through an examination of the immigration-crime relationship across neighborhoods in the Southern California metropolitan region, an ethnically heterogeneous region where diversity between immigrant groups can be unpacked and empirically accounted.

The authors utilize three distinct approaches to capture the diversity between immigrant groups in this region. The first approach is to operationalize immigrant groups according to racial/ethnic categories. The second strategy is to categorize immigrant groups according to the geographic region in which the immigrants originated from. The third, is to operationalize immigrant groups according to where they co-locate upon settling in the United States. Additionally, the authors account for heterogeneity of immigrant populations by creating measures of heterogeneity that are based on each of the previously listed classification schemes. Finally, for comparative purposes, the authors use the classification approaches employed in the current study to the standard approach used in a majority of studies that combines immigrants together through a single measure of percent foreign born. The research questions addressed in the study are as follows: Does the relationship between immigration and crime vary across particular immigrant groups? If so, which groups exhibit crime reducing or crime enhancing effects on neighborhoods? And given the findings, what might be the most appropriate method of categorizing immigrant populations in future research?

Four different approaches were used to conceptualize the presence of immigrants in the tracts of the study. The first measure corresponds to existing literature where the percentage of the tract population that is foreign born is calculated to create a measure of percent immigrants, here immigrants are assumed to be a homogenous group. The second measure captures some variation between immigrant groups and, thus, immigrants are categorized according to race/ethnicity, the measures created here capture percentage of the tract population that is Asian immigrants, percent black immigrants, percent white immigrants, and percent Latino immigrants. The third approach classifies immigrants according to the geographic location or region of the world from which they originate. Accordingly, the authors categorize immigrants from 92 countries into 18 world regions based upon the definition of world region from the United Nations Division of Statistics (2014) and, thereafter, computed the percentage of the tract population composed of immigrant groups from each of these regions. The rationale that underlies this approach is quiet appropriate for this line of research, being that immigrants who originate from a similar region of the world might share cultural values and/or language, similarities that create more social cohesion and, thus, generate more neighborhood social control when such immigrants reside in the same US

neighborhoods. The final approach categorizes immigrant groups based on where they ultimately settle in the Southern California region.

The authors believe that co-location in space amongst immigrant groups could provide some latent tendency towards similarity, whether similar values, cultural cues, or something else, this inductive approach is used to draw out these groups. To create these measures Kubrin et al. (2018) took the 33 largest immigrant groups in the Southern California region, and conducted a principal-component factor analysis. The resulting factors capture the tendency of certain immigrant groups to spatially co-locate in Southern California.

The first Poisson regression model served as the baseline, where the immigration measure under evaluation conforms to the standard measure of immigrant concentration, percent of the tract population that is foreign born. Results from this model show that immigrant concentration is not a significant predictor of neighborhood violent crime, however, tracts with higher concentrations of immigrants are found to have significantly lower property crime rates than other tracts, when controlling for other measures in the model. These findings, therefore, are consistent with existing literature that finds immigrant concentration has a null or negative relationship with neighborhood crime rates.

The next set of results account for racial/ethnic differences between various immigrant groups as immigrants are classified into: Hispanic/Latino immigrants, white immigrants, black immigrants, and Asian immigrants. These groups are then compared to non-immigrants. Results for violent crime demonstrate a clear distinction amongst immigrant groups, namely neighborhoods with a higher percentage of Latino immigrants have higher violent crime rates, holding constant the other measures in the model. Alternately, neighborhoods with a higher percentage of black or Asian immigrants have lower violent crime rates, controlling for the other measures in the model. Results for property crime also reveal differences between immigrants of differing racial/ethnic backgrounds. As such, neighborhoods with higher percentages of Asian immigrants are associated with less property crime.

The next set of results test the immigration-crime relationship using measures that disaggregate immigrant groups according to the 18 global regions in which they

originate. This set of results demonstrate considerable distinction in the relationships tested amongst various immigrant groups. For instance, four groups from different origins were found to have significant negative relationships with violent crime rates. Specifically, the largest significant negative relationship was found for immigrants that originate from West Africa, the second largest are immigrant groups originating from North America, the third for immigrants from North Africa and the fourth largest negative relationship was found for immigrants originating from South Asia. On the other hand, three immigrant groups were found to have significant positive relationships with violent crime, those from Western Europe, Eastern Europe and Central America.

The pattern of coefficients for property crimes also highlight group differences as three different immigrant groups are negatively related to neighborhood property crime, while two groups were found to have positive associations with property crime rates. Findings show that neighborhoods with more immigrants from West Africa are associated with lower property crime rates. As well, neighborhoods with a greater concentration of immigrants from East Asia and South-east Asia also have modestly lower property crime rates. Conversely, neighborhoods with more immigrants from Southern Europe and the Caribbean experience higher rates of property crime.

The final set of results that disaggregate immigrant groups based on their observed geographic clustering in the Southern California region also reveals some distinction amongst the groups analyzed. For violent crime, three of the groups are positively associated with violent crime rates, whereas one is negatively associated with violent crime rates. More specifically, neighborhoods with more immigrants in the group classified as “Chinese” have lower violent crime rates while neighborhoods with more immigrant clusters from Mexico, from the countries in the “Jewish” group and from countries in the “Central American asylum seekers group” have higher rates of violent crime. Results for the property crime models show that two of the groups are associated with lower property crime rates and one is associated with higher property crime rates. Accordingly, neighborhoods with more immigrants from the countries associated with the “Chinese” group have lower property crime rates as do neighborhoods with more immigrants from the countries in the “Central American asylum seekers” group. Immigrants however, from the “New World” group (Italy, Cuba, Ecuador) have higher property crime rates.

In reviewing these set of results for the immigrant neighborhoods and crime relationship, the authors note that the differential conceptualization of immigrant groups resulted in substantively similar findings. More importantly, all three alternative approaches out-performed the standard approach of including a single percent foreign born measure. As such, the current study lends support to the use of a more multidimensionality approach to the conceptualization of immigrant groups as the standard unitary conceptualization of immigration masks some of the important variations between immigrant groups as relates to neighborhood crime. The current study provides considerable insight into group differences as all three immigrant categorization strategies revealed variances between immigrant groups in relation to both violent and property crime rates at the neighborhood level and, thus, demonstrate the utility of disaggregation when conceptualizing immigration. Furthermore, the use of disaggregated measures of immigration helped bolster our knowledge and provided a more nuanced interpretation of the immigration-crime relationship, insights that are important yet lost in analyses that consider immigrants as a homogenous group. For these reasons, Kubrin and colleagues (2018) encourage future empirical evaluations of the immigration-crime nexus to move beyond the unitary view of all immigrant groups as undifferentiated, as doing so will facilitate a more nuanced understanding of neighborhood crime rates that are related to immigration.

The most recent cross-national contribution to the neighborhood-level immigration-crime literature, Sydes (2017), evaluates the immigration-crime relationship in an Australian context. Sydes (2017) is one, of only a few scholars, to acknowledge the gap in literature stemming from a void in neighborhood-level analyses of immigration-crime relationship from a context outside of the United States. Currently, much of what we know about the immigration-crime nexus is derived from empirical studies that are based on data drawn from the United States. For this reason, Sydes (2017) argues that findings in the literature may not be entirely representative of the immigration-crime relationship as these results are based on contextual factors that may be unique to the United States and, thus, produce distinct outcomes for immigration and crime that do not hold elsewhere. As such, the current study aims to test the impact of immigration on violent crime in a country with a greater mixture of ethnic groups and where immigration policy is focused on recruiting skilled immigrants, Australia. More specifically, Sydes

(2017) examines the effect of immigration on violent crime across 882 neighborhoods located in two Australian cities, Brisbane and Sydney.

Empirically, the immigration-crime relationship has received little assessment outside of the United States and, thus, results from studies abroad have been much less consistent. For this reason, Sydes (2017) believes that the immigration-crime literature could benefit from evaluations in differing context as this would provide evidence on the generalizability of the primarily negative relationships that have been found in the United States. Accordingly, the article examines the effect of immigration on violent crime across 882 neighborhoods located in two Australian cities: Sydney, an established immigrant gateway, and Brisbane, a relatively new immigrant destination (Singer, 2004). These data enable the author to test the two key theories of immigration and crime, namely social disorganization theory and the immigration revitalization thesis (Sydes, 2017). Sydes (2017) further contributes to the literature by conducting a longitudinal analyses of the relationship, using nine years of official census data. This analytic technique demonstrates the recognition of immigration as a social process that unfolds over time and, therefore, requires longitudinal assessment. Lastly, most immigration-crime studies have considered the impact of immigrant concentration over time on crime within a unit (see, e.g., Martinez et al., 2010; Ousey & Kubrin, 2009) or how static levels of immigrant concentration are associated with more or less crime between units (see e.g., Stowell & Martinez, 2009; Velez, 2009). However, Sydes (2017) asserts that examining the impact of changes in immigrant concentration is inherently different from looking at the impact of high levels of immigrant concentration. Therefore, each process can differentially impact crime. As such, the analytic strategy employed in this study, a hybrid modeling technique that enables the estimation of both within and between neighborhood effects, captures both the impact of changes in immigrant concentrations as well as, the impact of high immigrant concentrations.

The data used in this study were obtained from two cities, Sydney and Brisbane, both cities were chosen for comparative purposes as they present different contexts of reception for immigrants. Sydney is considered an immigrant gateway city and has served as a key entry point for new immigrants entering Australia since 1940. Currently, Sydney has the largest foreign-born population of any city in Australia. Brisbane, on the other hand, is a relatively new immigrant destination city (Singer, 2004). When compared to Sydney, Brisbane's immigrant population is much less linguistically diverse

(41 percent speak a language other than English), with fewer immigrants practicing non-Christian religions (Sydes, 2017). For this reason, when compared to Sydney, Brisbane is expected to have far fewer or even lack ethnic geographic clusters and established immigrant networks both of which are factors that help bolster social bonds and, thus, revitalization for new immigrants (Sydes, 2017).

The unit of analysis for this study is the state suburb/neighborhood, based on certain selection criteria the study includes a total neighborhood sample of N=302 (Brisbane) and N=580 (Sydney). Data on the sociodemographic features of neighborhoods, including various measures of immigration were obtained from census waves for the years 2001, 2006, and 2011. Crime data were extracted from two separate sources: The New South Wales Bureau of Crime Statistics and Research provided data on crime in Sydney and the Queensland Police Service allowed access to crime data for Brisbane.

The independent variables consist of various immigration measures. The broad measure of immigrant concentration that captures the share of the total population who are foreign-born across each neighborhood is included in the first model, this measure is identified as percent immigrant. Additional immigration measures that are more group specific and intended to capture the effects of ethnicity were included in later stages of modeling these measures are: percent Chinese, percent Indian, and percent Vietnamese. The group specific immigration measures are aimed at tests of the immigrant revitalization thesis. Alternately, measures of immigrant diversity are included to tests mechanisms of social disorganization theory. These measures include a language diversity index that is comprised of nine broad language groups. Language diversity rather than country of birth diversity was chosen as it best taps into the potential for communication barriers among residents. Lastly, the contextual variables include a disadvantage factor, percent at a different address five years ago and percent renters, percent Indigenous, percent males aged 15–24 years, percent residential and Population density (Sydes, 2017).

This study utilizes a hybrid modeling approach that allows for the examination of both within and between neighborhood effects by including both community specific mean variables (for the between effects) and mean-deviated variables (for the within

effects). The modeling strategy used here fills the empirical gaps that are left by studies that use either fixed effects or random effects models for longitudinal analyses.

Results from the first model where immigrant concentration is analyzed against violent crime the within-group effects component of the model reveals a significant negative relationship between immigration and crime in Sydney neighborhoods. Results from the between-group effect component of the model does not reach statistical significance. These set of results suggest that the process of change in immigrant concentration rather than static levels of concentration are more impactful in protecting communities against violent crime. Therefore, neighborhoods experiencing greater change in the concentration of immigrants will experience less violent crime over time. The set of results for Brisbane indicate a similar scenario as found in Sydney, where the within-effects component reached significance with a negative parameter, while the between- effects component was not statistically significant.

Subsequent models include sociodemographic and environmental measures of neighborhoods. Even after accounting for neighborhood contextual factors, the within-effects component of the model continued to demonstrate a significant and negative relationship between changes in immigrant concentration in Sydney and violent crime over time. Again, even after controlling for neighborhood context, the between-effects component of the model remained insignificant.

Results for Brisbane reveal a similar pattern of coefficients that were found for the initial models, those without the neighborhood contextual measures. Accordingly, the within-effect component for Brisbane that tests the relationship between changes in immigrant concentration and violent crime over time remains statistically significant and negative, even after the appropriate neighborhood controls are included. These results indicate that in despite being a newer immigrant destination city and, thus, having of fewer established networks and resources for immigrants upon arrival in comparison to Sydney, increased immigration in Brisbane neighborhoods is also linked to less violent crime. Findings for the between-effect component demonstrates no statistical significance in the relationship between immigrant concentration and violent crime across Brisbane neighborhoods. Results for the models that include contextual control measures generally show that changes in immigrant population matter more for predictions of violent crime in neighborhoods for both Sydney and Brisbane over time

(indicated by the significant findings for the within-effect component of the model) than the population density of immigrants in neighborhoods (indicated by the lack of significance found for the between-effect component of the model).

The models that test group specific effects of immigration, namely for the three largest non-white groups living in Australia: Chinese, Indian, and Vietnamese immigrants are well suited for tests of the immigration revitalization thesis in the Australian context. Sydes (2017) also includes a measure of language diversity that allows for the central tenets of social disorganization theory to be accounted for. As such, including both measures of diversity and concentration in the same model allows for a direct test of the two theories.

Results for the model that tests the diversity and concentration measures demonstrate ethnic differences with regard to the immigration-violent crime relationship. In Sydney, the within-effects components of the model suggest the presence of Chinese immigrants is significantly and negatively linked to violent crime over time. Similarly, changes in the Indian population are linked to lower violent crime. However, changes in the Vietnamese population are not significantly linked to violent crime in Sydney. Moreover, in Sydney, increasing diversity is not associated with increased violence. Results from the between-effect component show that, on average, a greater presence of Chinese immigrants is related to fewer counts of violent crime across neighborhoods, the presence of Vietnamese and Indian immigrants were found to have no effect on crime. With respect to language diversity, the positive and significant results indicate that areas with higher levels of language diversity experience more violent crime.

Results from Brisbane show a slightly different pattern of effects for the within-effect component of the model. Here tests show that changes in the concentration of Indian immigrants is significant and negatively related to rates of violent crime over time. Changes in the Chinese and Vietnamese population had no significant effect on neighborhood violence. Contrary to the results found for Sydney, increasing language diversity over time is associated with less violent crime. Findings from the between-effects component of the model in Brisbane indicate a negative and significant relationship between each ethnic group and violent crime. The addition of sociodemographic and environmental features lead to some substantive changes in the results. For example, the addition of contextual measures lead to a negative and

significant relationship between changes in the Vietnamese immigrant population and violent crime, the relationship was insignificant in the initial model. Furthermore, accounting for neighborhood contextual factors washed out the significant relationship that was initially found for changes in the Indian population. In the between-effects component of the model, the inclusion of contextual measures reveal that neighborhoods with a greater average concentration of Vietnamese immigrants are negatively associated with violent crime once context is considered, the relationship was insignificant in the initial model. In Brisbane, most of the relationships found in the initial model held even after controlling for neighborhood context. The exception however, relates to changes in changes in language diversity and violent crime as this relationship was no longer significant when including controls in the model. In the between-effects component of the model, only the presence of Vietnamese immigrants continues to have a significantly negative effect on violent crime once accounting for context. Lastly, holding other contextual features constant, areas with a higher average level of language diversity experience more violent crime.

In short, the current article contributes to the immigration-crime literature through examinations of the relationship in a context outside of the United States and, thus, tests whether theories of immigration and crime derived from the United States experience translate well to other settings. Findings from the Australian context suggest that ethnic group concentration is not linked to more violence but instead increases in ethnic group concentration may actually operate as a protective shield against neighborhood violence. Therefore, results from the current study lend support to findings obtained from the United States. However, the author notes that the processes that underlie the similarity in findings is still unclear. More specifically, whether the process of revitalization is responsible for the negative association between immigrant concentrations and violent crime requires further investigation, as the measures included here do not directly test the effect of immigrant concentration on the neighborhood social processes important for the regulation of crime (Sydes, 2017). Accordingly, future research should contextualize and include measures that tap into neighborhood social processes or other measures that could differentially effect neighborhood life and, thus, crime. Table 1. Summarizes the progression from early to more contemporary studies of immigration and crime

Table 2-1. Summary of the immigration-crime literature

	<u>Early Research</u>	<u>Established</u>	<u>Contemporary Research</u>
			<u>Emerging</u>
Research focus	<u>Whether</u> immigration and crime are related	<u>How</u> are immigration and crime related	<u>Why</u> are immigration and crime related Causal processes/mechanisms: Micro-level mediating and macro-level moderating factors
Theoretical perspectives	<u>Classical social disorganization theory</u> (+ prediction)	<u>Social disorganization theory</u> <u>Immigrant revitalization</u> <u>Immigrant enclave</u>	<u>Social theories:</u> Self-selection; Ethnic enclave; Immigrant revitalization; Family structure; Downward/Segmented assimilation (explain (-) predictions)
Research design	Analytic design: <u>cross-sectional</u> Units of analysis: <u>larger areal units</u> cities and metropolitan areas	Analytic design: <u>longitudinal</u> Units of analysis: <u>smaller areal</u> units neighborhoods	<u>Analytic design: longitudinal; spatial; multi-level</u> Units of analysis: <u>micro-level</u> , individual and neighborhood-level <u>Macro-level of analysis:</u> City-level
Measures	Immigration: <u>single dimension</u> Crime: <u>violent crime</u>	Immigration: <u>multi-dimensional</u> constructs Crime: <u>violent & property crime</u>	Immigration: <u>disaggregated multi-dimensional, groups specific constructs</u> Crime: <u>disaggregated violent and property crime</u>
Context	U.S context	U.S, some international examples	U.S & emerging international research Australian, Canadian, European examples

Research findings	No compelling/systematic evidence at city/metropolitan level	Ousey and Kubrin (2018) Meta-analysis: <u>immigration-crime association is negative—but very weak</u>	Immigration effects on crime <u>highly context dependent</u> Divergent findings result of variation in empirical design and measures
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Chapter 3.

Geographies of immigration and property crime in Vancouver, 2003 and 2016

Abstract

We empirically evaluate the distribution of spatial patterns at the census tract (CT) level for various immigration and property crime measures in Vancouver, British Columbia, 2003 and 2016, using a spatial point pattern test that identifies significant similarities, or otherwise, in the spatial patterns of: (a) multiple measures of immigration (b) various property crime classifications (c) immigration and crime patterns together. Results show local-level variations in the spatial concentration of immigration in Vancouver CTs. The use of multiple measures of immigration showed substantive variations of immigrant settlement at the local-level. Moreover, results reveal that while immigrant concentration patterns are stable over time and, thus, demonstrate ecological stability, property crime patterns shift from year to year. The spatial analytic approach utilized in this study provide support for the use of local-level spatial models and the multi-dimensional operationalization of the immigration variable. There is heterogeneity among immigrant groups, an important yet often overlooked aspect in assessments of immigration effects on crime.

Keywords: immigration; crime; spatial patterns, local point pattern test

3.1. Introduction

Immigration associations with crime have become a prominent topic in the criminological literature, particularly the geography of crime (see, for example, Chavez & Griffiths, 2009; Davies & Fagan, 2012; Desmond & Kubrin, 2009; Graif & Sampson, 2009; Kubrin, Kim & Hipp, 2018; Lee & Martinez, 2002; MacDonald, Hipp, & Gill, 2013). Findings from this research have demonstrated considerable consistency regarding this relationship at several levels of aggregation (e.g. neighborhood, sub-national states/provinces). This research has shown that immigration is either unrelated to, or mitigated, neighborhood crime.

Despite generally consistent research findings on the immigration–crime relationship, substantial gaps remain in the literature. For example, is the negative or null immigration-crime relationship generalizable to all immigrant groups (Kurbín et al., 2018). A large part of this uncertainty is attributed to a majority of the studies that used overly broad measures of immigration in empirical assessments of the immigration-crime relationship (Davies & Fagan, 2012; Kurbín et al., 2018; Martinez et al., 2010). Usually, the immigration variable consisted either of a single measure of immigrant concentration, total immigrants or a combination of several measures to create an immigrant concentration index.

In this paper, we explore disaggregated measures of immigration and crime. While some of the recent literature reviewed below illustrates the importance of incorporating more narrowly defined measures of immigration, the current analysis also examines this relationship from a spatial perspective. Specifically, we investigate the similarity of the spatial patterns of various, substantively distinct, measures of immigration. We demonstrate that distinctive patterns at the local level are evident. This means that even when global statistical measures do not indicate an issue with data reduction techniques, the exclusion of particular variables, or the use of aggregated measures, local models could provide otherwise. Therefore, the use of traditional global analytic strategies and, relatedly, data reduction techniques could lead to important spatial variations being completely masked, eliminated or overlooked.

3.2. Related literature

Aggregated measures of immigration are limited primarily because immigrants are not a homogenous group, but instead represent highly diversified and heterogeneous cultural subgroups (Sydes, 2017). In effect, aggregated, broad measures of immigration ignore potentially crucial between-ethnic group differences regarding respective crime trends. Accordingly, results from these studies run the risk of oversimplifying the immigration–crime relationship or otherwise perpetuate incomplete inferences on the state of the relationship. These validity limitations have potential real-world negative implications involving both public perceptions and related unfair policy consequences (Sydes, 2017). Not surprisingly, most researchers have argued for more complex and theoretically valid operationalizations of the immigration concept, (Davies & Fagan, 2012; Martinez et al., 2010; Desmond & Kubrin, 2009; Kubrin et al., 2018; Ousey & Kubrin, 2009).

Most recently, Kubrin et al. (2018) asserted the importance of accounting for variations across immigrant groups. The first factor mentioned involved variations in the motivating reasons for migration typically dependent country of origin or factors such as race/ethnicity based fundamentals, and, often, structural economic, economic, political discriminations (Kubrin et al., 2018). Such differences in migration motives have been associated with differences in successful adaptation versus criminality (Lee et al., 2001). Second, immigrant subgroup populations obviously differ in terms of race, ethnicity, language, culture and nationality. These inherent cultural differences, therefore, constitute another facet of complexity with respect to the aggregated classification of all immigrants. For example, cultural variation across immigrant groups can impact how in-moving immigrants interact with existing residents in a neighborhood regarding the realization of common goals and values and engaging in informal neighborhood social control. The latter factor has been long asserted as crucial for mitigating crime opportunities especially in immigrant neighborhoods. In addition, immigrants historically and typically preferred, at least initially (first generation), to move to culturally familiar communities for obvious adaptability cultural related and social capital motives (Shaw & McKay, 1931; 1942; Sampson & Groves, 1989; Kubrin et al., 2018).

Third, Kubrin et al. (2018) explicated further on the importance of immigrant heterogeneity in the immigration-crime literature. Most critically and contentiously, they challenge the key a social disorganization perspective hypothesis that immigrant

heterogeneity has been consistently associated with increased neighborhood crime rates (Kubrin, 2000; LaFree & Bersani, 2014; Shaw & McKay, 1931; 1942). Instead, Kubrin et al. (2018) asserted that more contemporary research reported an inverse effect of immigrant heterogeneity on crime (see. Graif & Sampson, 2009; LaFree & Bersani, 2014; Lee & Martinez, 2002). The Graif and Sampson (2009) study of immigration, diversity, and homicide, for example, found that diverse immigrant populations buffered crime in neighborhoods. In other words, both the heterogeneity of immigrant populations (i.e. between-immigrant group differences) and neighborhood level of crime need to be examined in order to more validly assess the relationship between immigration and crime.

As mentioned above briefly, immigration-crime literature theoretical perspectives necessarily have focused on the numerous barriers faced by new or recent immigrants as one basis for or set of motivations for immigrant criminality. The social disorganization theoretical framework traditionally hypothesized that immigrants had limited access to social and economic capital and were compelled to settle in high crime areas or socially disorganized neighborhoods where inexpensive housing options were typically most available (Shaw & McKay, 1931; 1942). Another key theme in social disorganization theory was that immigrants were not direct correlates of crime, because high crime rates did not follow immigrants who with economic and other social capital eventually moved to more structurally socially stable or organized neighborhoods. Furthermore, Shaw & McKay (1931, 1942) found that crime patterns in socially disorganized and transient neighbourhoods were stable over time, even after subsequent sets of immigrants moved away. In other words, this perspective asserted a staged process associated with neighbourhood crime trends: first, recent immigrant generations were most likely to reside in higher crime areas or higher crime areas had higher concentrations of new immigrants; and second, first- and second-generation immigrants who, on average, had spent more time in a host country were are expected to move and reside in lower crime areas, when compared to recent immigrants. This process occurred over time once immigrants obtained the social and economic capital needed to move out of disorganized neighborhoods into more structurally stable lower crime neighbourhoods.

Economic based theories of crime such as strain theory too focused on immigration effects on crime; new immigrants historically were characterized by unequal access to legitimate economic, social, and political means to achieve legitimate and

commonly sought life style goals, which significantly heightened the risk of crime by new immigrants as a means to obtain these goals. Several studies demonstrated the increased susceptibility of new immigrants to unemployment especially during the first five years of arriving to a new country (McDonald & Worswick, 1997; Picot & Sweetman, 2012). Social disorganization theory, strain theory and other economic based models of crime predicted that that neighborhoods with greater concentrations of increasing populations of recent immigrants had greater rates of crime.

Several themes emerge from this literature. The immigrant revitalization thesis also provides support for a multidimensional operationalization of the immigration concept. Lee and Martinez (2002) pioneered this thesis based on the hypothesis that immigration, ethnic heterogeneity, and residential instability were associated with reduced crime rates. They asserted the positive economic contributions of immigrants often resulted in the redevelopment and revitalization of urban areas that were neglected and deemed undesirable for residential living. And, further that immigrant populations often imported new skill sets, entrepreneurial spirit, and the drive to succeed, which were requisite elements needed for the revitalization or creation of stable neighborhood economies and residences. These positive contributions lowered unemployment and poverty in once traditionally disorganized areas. The revival of neighborhood economies subsequently institutionalized opportunities for legitimate work, especially for new immigrants, which, in turn reduced neighborhood crime especially economically motivated crime such as property crime.

3.3. Materials and methods

The data used in the analyses are for the city of Vancouver in British Columbia, Canada. Vancouver is part of the 2.55 million population of the Metro Vancouver region, the third largest population metropolitan area in Canada. Vancouver is considered one of the 'gateway' centers for immigration into Canada with the second largest immigrant population after Toronto, also one of the highest in the world (Hou & Bourne, 2006). As part of the Pacific Rim countries and historical immigration links to south Asia, substantial increases in immigrants from these regions occurred throughout the latter part of the 20th century and in the initial near two decades of this century.

3.3.1. Crime data

In the analyses below, crime incident data for the City of Vancouver were obtained from the Vancouver Open Data Catalogue.¹ Property crime, residential burglary, commercial burglary, theft of vehicle, theft from vehicle and other theft are analyzed. The related variable categories include the location (one-hundred block), date, time, location, and year of the crime incident. The crime data are available from 2003 to 2018, but the 2003 to 2016 crime incident data are utilized in order match it with the most recent available census data. All of the crime data are provided with geographic locations, including latitude and longitude coordinates. These coordinates are not specific to the address, but to the center of the respective street segment, or 100-block. However, because the study data involves spatial units of analysis larger than the street segment, census tracts, there are no concerns for data accuracy.

The crime and ecological data for Vancouver used in these analyses are measured in the years 2003 and 2016 at the census tract level. Census tracts are relatively small and stable geographic areas that tend to have a population ranging from 2500 to 8000, with an average of 4000 persons. For each year, the 105 census tracts in the City of Vancouver from the 2001 Census of Population are used to facilitate a panel analysis. Subsequent censuses (2006, 2011, and 2016) resulted in increases in the number of census tracts, but census tracts are always divided in a consistent manner so that they can be aggregated to the boundary definitions from a previous census. As such, the 2001 census tract boundaries are the most recent boundaries from Statistics Canada's Census of Population that can be used for the crime data available, 2003 - 2016.

3.3.2. Immigration data

All immigration and ecological variables in the analysis are from Statistics Canada's Socio- Economic Information Management System (CANSIM) for the years 2003 and 2016. We use ten different immigration measures that capture five primary distinctions between immigrant groups are represented within this set of variables. Specifically, the

¹ <https://data.vancouver.ca/datacatalogue/crime-data.htm>

immigrant categories include: total immigrants, recent immigrants, long-term immigrants, immigrants who arrived at a very young age, and multiple measures of heterogeneity.

Consistent with existing research total immigrants, the percentage of total immigrants within each census tract in Vancouver is included in the variable set. This facilitates the comparison of current results to prior studies. Additionally, a measure of recent immigrants is defined by the percentage of immigrants within a census tract who have been in Canada for five years or less. The next category of immigrants consists of the percentages of immigrants within a census tract who have been in Canada for 10+, 20+ and 30+ years, capturing assimilation. Relatedly, we also measure those immigrants who arrived in Canada at a very young age (five years old or younger). This captures those immigrants who have the most immediate assimilation because of their immigration being before they begin grade school. The final immigration dimension consists of several forms of heterogeneity: ethnic heterogeneity, visible minorities, immigrant heterogeneity, and recent immigrant heterogeneity. Even though measures of ethnic heterogeneity and visible minorities alone are not direct proxies of immigration, they measure important ethnic components of neighborhoods. For example, social disorganization theory asserted that high levels of neighborhood ethnic heterogeneity predicted higher levels delinquency and crime, especially property offences (Cahill & Mulligan, 2003; Sampson & Groves, 1989; Shaw & McKay, 1931, 1942). All ethnic heterogeneity variables are measured using the Blau (1977) Index that ranges in value from zero to one hundred, with zero representing no ethnic mix and one hundred representing a perfectly even mix of ethnic groups.

3.3.3. Spatial point pattern test

Despite the extensive studies on immigration-crime, few examined theoretically important spatial factors explicitly at the local level (Lee & Martinez, 2002). These authors first explicated the theoretical potential of spatial analysis and its analytic techniques to assess the relationship between immigration and crime such as the spatial stability of immigration and crime patterns or local-level spatial variations of these relationships. Nonetheless, spatial analytic techniques remained uncommon in the immigration-crime literature. This article utilizes the methodology developed by Andresen (2009), which consisted of an area-based point pattern test. This method

facilitated the identification of local patterns or spatial variations in these patterns by estimating the degree of similarity among spatial patterns in two or more data sets.

This spatial point pattern test involves two important objectives in spatial analytics. First, this technique identifies the stability of spatial patterns over time and, therefore, the ecological stability of the patterns tested. Its second objective focuses on spatial comparisons between the measures tested through the identification of spatial similarities among these measures. Accordingly, researchers are able to identify patterns of significant spatial similarities or differences in the measures tested, which then facilitates spatial inferences regarding how measures are spatially related or otherwise unrelated. The information obtained through this branch of the test is utilized to better understand the spatial state of the relationships tested. This understanding is important both to guide future hypotheses concerning these patterns and for data reduction purposes. Moreover, because the test is local in nature, the output can be mapped, providing visual representation of where spatial differences are present (Andresen & Malleson, 2011).

To date, Andresen's (2009) spatial point pattern test has been used in a variety of disciplinary contexts. In criminology, temporal changes in crime patterns over time, seasonal changes in crime patterns and changes in crime patterns based on days of the week have been common applications (Andresen, Linning, & Malleson, 2017; Andresen & Malleson, 2011, 2013, 2015; Linning, 2015; Pereira, Mota, & Andresen, 2016; Vandeviver & Steenbeek, 2019). In addition, spatial differences in the distribution of disaggregated crime types both property and violent have been investigated using the spatial point pattern (Andresen & Linning, 2012; Melo, Matias, & Andresen, 2015; Vaughan, Hewitt, Andresen, & Brantingham, 2016). In several studies this methodology further identified: the spatial distribution of crime after police interventions (Andresen & Malleson, 2014; Hodgkinson, Andresen, & Farrell, 2016); differences in drug activity as measured by police calls versus EMS data (Hibdon, Telep, & Groff, 2017); estimates of the amount of error introduced via aggregating police incidents (Tompson, Johnson, Ashby, Perkins, & Edwards, 2015); and, the overlap of proactive policing and reported crime locations (Wu & Lum, 2017; Wheeler et al., 2018).

Two key themes of this paper are to assess whether these immigration measures are significantly similar with regard to the spatial distribution of their point patterns in

Vancouver CTs and whether any spatial patterns of immigration and property crime overlap in Vancouver CTs. More specially, the identification of significant similarities and differences in the settlement patterns of various immigrant populations along with similarities in the spatial distribution of immigrant settlement and property crime patterns in Vancouver CTs are assessed. The spatial point pattern test maps the output and creates visualizations at the CTs level of where immigrant concentration and property crime patterns converge or diverge in Vancouver. This focus on local level insight into the spatial distribution of immigration and property crime patterns over time (2003, 2016) facilitates a more detailed explication the ecological stability of these patterns in Vancouver CTs.

Accordingly, the current study looks to empirically evaluate the following hypotheses:

Hypothesis 1 (H1)

At the census tract level, over time immigration patterns in Vancouver exhibit spatial stability.

Hypothesis 2 (H2)

At the census tract level, over time property crime patterns in Vancouver do not exhibit spatial stability.

Hypothesis 3 (H3)

At the census tract level, over time the spatial distribution of the various immigration measures tested vary significantly.

Hypothesis 4 (H4)

At the census tract level, the spatial distribution of immigrant settlement patterns and property crime patterns over time in Vancouver significantly differ.

This test identifies possible statistically significant similarities amongst two or more point patterns, without the need to satisfy statistical requirements for randomness, uniformity, and clustering. The point pattern test assesses variability in both datasets, in this case data from 2003 and 2016 through a bootstrap with replacement (Steenbeek et al., 2018). This allows for a confidence interval to be created for each spatial unit, comparing the base and test data sets, comparing immigration (base) and crime (test) patterns, for

example—see Andresen (2016) and Steenbeek et al. (2018) for further details of the test. The test output is comprised of two parts.

The first part is a global parameter that ranges from 0 (no similarity) to 1 (perfect similarity): the index of similarity, S , is calculated as:

$$S = \frac{\sum_{i=1}^n s_i}{n} \quad (1)$$

where s_i is equal to one if two property crimes or immigrant concentration indexes are similar in spatial unit i and zero otherwise, and n is the total number of spatial units (Andresen, 2009, 2016). Accordingly, the S-Index represents the proportion of spatial units that have a similar spatial pattern within both datasets. Based on the literature considering multicollinearity in a regression context (see, for example, O'Brien 2007), generally an S-Index value of 0.80 is considered to indicate that two spatial point patterns are significantly similar. Second, the spatial point pattern test is able to generate mapped output, providing a visual representation of where statistically significant similarities occur at the local level. More detailed information about the spatial point pattern test is available in Andresen (2009, 2016) and Steenbeek et al. (2018). The current article uses the Spatial Point Pattern Test. R package version (0.1.5, 0.1.6). URL: Spatial Point Pattern Test in R.

3.4. Results

The correlation matrix for the set of ten immigration measures are shown in Table 1. The correlation coefficients for immigration measures that are hypothesized to differentially identify varied characteristics of immigrant populations indicate significant and high correlation coefficients, i.e. greater than 0.80. For example, high correlations coefficients are evident between total immigrants and immigrants who have been in Canada for 10 years or greater, visible minorities and immigrant heterogeneity. As well, measures of heterogeneity such as, ethnic heterogeneity, visible minorities, immigrant/recent immigrant heterogeneity also have significant and high correlation coefficients. This pattern of correlations exists among some of the immigration measures, particularly the heterogeneity measures, suggest multi-dimensional grouping reduction techniques (e.g.

principle component analysis, cluster analysis) need to be considered to avoid potential multicollinearity issues in any additional analyses.

The S-Indices regarding the degree of similarity in spatial point patterns between ten different immigration variables for the years as well as the six property crime types for 2003 and 2016 period are reported in Table 2, the results from Table 1 and Table 2 together illustrate whether immigration and crime patterns in Vancouver neighborhoods for 2003 and 2016 are ecological stable. The S-Indices for immigration measures for 2003 and 2016 are displayed in Table 3 and Table 4 respectively. These results convey either significant similarities or otherwise differences between the spatial patterns of various immigration measures in Vancouver neighborhoods. Finally, the S-Indices for property crimes compared to immigration variables for 2003 and 2016 are presented in Table 5 and Table 6, which indicate either significant similarities or differences in spatial patterns between various property crime types and immigration variables. Disparity in the distribution of spatial patterns of immigration and crime measures would indicate the need for the disaggregation of measures.

Table 3-1. Bivariate correlations, Immigration Variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Total immigrants, %, X_1	1	0.57***	0.90***	0.64***	0.34***	0.49***	0.75***	0.96***	-0.78***	-0.67***
Recent immigrants, %, X_2		1	0.37***	-0.04	-0.19***	0.21***	0.37***	0.49***	-0.28***	-0.25***
Immigrants, 10 years +, %, X_3			1	0.54***	0.20***	0.39***	0.67***	0.87***	-0.71***	-0.59***
Immigrants, 20 years +, %, X_4				1	0.89***	0.39***	0.52***	0.69***	-0.73***	-0.61***
Immigrants, 30 years +, %, X_5					1	0.33***	0.24***	0.37***	-0.49***	-0.44***
Immigrants arrived 5yrs or <, %, X_6						1	0.31***	0.49***	-0.39***	-0.42***
Ethnic Heterogeneity, X_7							1	0.83***	-0.59***	-0.51**
Visible minorities, X_8								1	-0.81***	-0.66***
Immigrant heterogeneity, X_9									1	0.83***
Recent immigrant heterogeneity X_{10}										1

Table 3-2. Spatial change, immigrant variables, 2003 – 2016

	S-Index
Total immigrants, %, X_1	1.00
Recent immigrants, %, X_2	0.98
Immigrants, 10 years +, %, X_3	0.99
Immigrants, 20 years +, %, X_4	1.00
Immigrants, 30 years +, %, X_5	1.00
Immigrants arrived 5yrs or <, %, X_6	1.00
Ethnic Heterogeneity, X_7	0.94
Visible minorities, X_8	0.92
Immigrant heterogeneity, X_9	0.85
Recent immigrant heterogeneity X_{10}	0.63

The results from the spatial point pattern test for the various immigration variables indicate a majority of the index values generated are well above the 0.80 threshold for similarity. In effect, findings show that little change at the CT-level in the distribution of spatial point patterns for a majority of the immigration variables tested in Vancouver for 2003 and 2016. More specifically, the S-Indices for nine of the ten immigration measures tested were over the 0.80 threshold for similarity— recent immigrant heterogeneity being the exception with an S-Index value of 0.63. This pattern demonstrates a high degree of consistency in similarity amongst variables from year to year, which is essential for both the spatial analysis of any given year of data and inferential statements on the theoretical processes or development of criminal justice policy (Andresen et al., 2017). We found remarkable similarity from year to year.

Table 3-3. Spatial change, property crime types, 2003 – 2016

	S-Index
Property crime	0.39
Break and Enter, residential	0.50
Break and Enter, commercial	0.60
Theft from vehicle	0.58
Theft of vehicle	0.80
Theft	0.59

However, spatial point pattern test results for different classifications of property crime indicate far less consistency with respect to the stability of their respective spatial patterns in Vancouver neighborhoods from year to year. Of the six property crime types under analysis, only theft of vehicle reached the 0.80 threshold for similarity, i.e. the spatial patterns of theft from vehicles are rather stable from year to year. In contrast, the S-Indices for the remaining crime types ranged from 0.39-0.60, all below the 0.80 threshold for similarity. The spatial patterns for property crime, residential break and enter, commercial break and enter, theft from vehicle and theft changed significantly from 2003 to 2016. Inferentially, therefore, with the expectation of theft from vehicle, property crime patterns in the city of Vancouver do not demonstrate spatial stability. Importantly, these study results confirm the Hodgkinson et al. (2016) and the Andresen and Hodgkinson (2018) findings, that also found significant year to year shifts in spatial crime patterns.

Table 3-4. Immigration variables, S-Index values, 2003

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Total immigrants, %, X_1	1	0.94	0.99	0.98	0.91	0.99	0.95	0.89	0.41	0.31
Recent immigrants, %, X_2		1	0.89	0.89	0.88	0.99	0.93	0.92	0.69	0.64
Immigrants, 10 years +, %, X_3			1	0.99	0.94	0.99	0.92	0.90	0.39	0.33
Immigrants, 20 years +, %, X_4				1	0.99	0.99	0.89	0.84	0.72	0.49
Immigrants, 30 years +, %, X_5					1	0.99	0.89	0.81	0.94	0.79
Immigrants arrived 5yrs or <, %, X_6						1	0.99	0.99	0.97	0.98
Ethnic Heterogeneity, X_7							1	0.78	0.46	0.37
Visible minorities, X_8								1	0.29	0.17
Immigrant heterogeneity, X_9									1	0.87
Recent immigrant heterogeneity X_{10}										1

Regarding the Indices of Similarity for the 2003 immigration variables, a distinctive spatial pattern of immigration variables that capture immigrant heterogeneity is evident involving both immigrant heterogeneity and recent immigrant heterogeneity. The index values in Table. 3 indicate high degrees of similarity in the spatial patterns of immigrant settlement in Vancouver; the S-Indices for eight of the ten variables are substantially above the 0.80 threshold for similarity, the range being 0.81 to 0.99. In other words, as hypothesized, the multi-dimensional or multi-indicator conceptualization of the key immigration construct central to this study generally is supported by the spatial point pattern test results i.e. the settlement patterns of these different immigrant populations are generally very homogenous, but spatial variations were found at the local-level. The two measures that showed differential spatial patterns are immigrant heterogeneity and recent immigrant heterogeneity, both having relatively low similarity indices with the range from 0.29 to 0.72

Furthermore, the spatial patterns of immigrant heterogeneity and recent immigrant heterogeneity are significantly different from spatial patterns of ethnic heterogeneity and visible minorities. Although conceptually similar, measures of immigrant heterogeneity can be inferred to be elements of immigrant settlement concept more broadly and, therefore, distinct from the narrower concept of ethnic differences. In other words, ethnic heterogeneity and visible minorities are conceived as places that are heterogeneous with respect to immigrant settlement yet distinct from those places that are ethnically heterogeneous. As such, the distinctive spatial pattern of immigrant heterogeneity and recent immigrant heterogeneity when compared to the spatial distribution of all other immigration measures is exemplified in Figure 1. The overall pattern found in the mapped output show that in Vancouver CTs located in the North West and North East have a greater degree of total immigrants, recent immigrants, immigrants who have been in Canada for various durations of time (10, 20, 30+ years), visible minorities, and more ethnically heterogeneous.

Spatial point pattern test output, 2003

- Immigrant heterogeneity > recent immigrant heterogeneity
- Immigrant heterogeneity < recent immigrant heterogeneity
- Insignificant difference

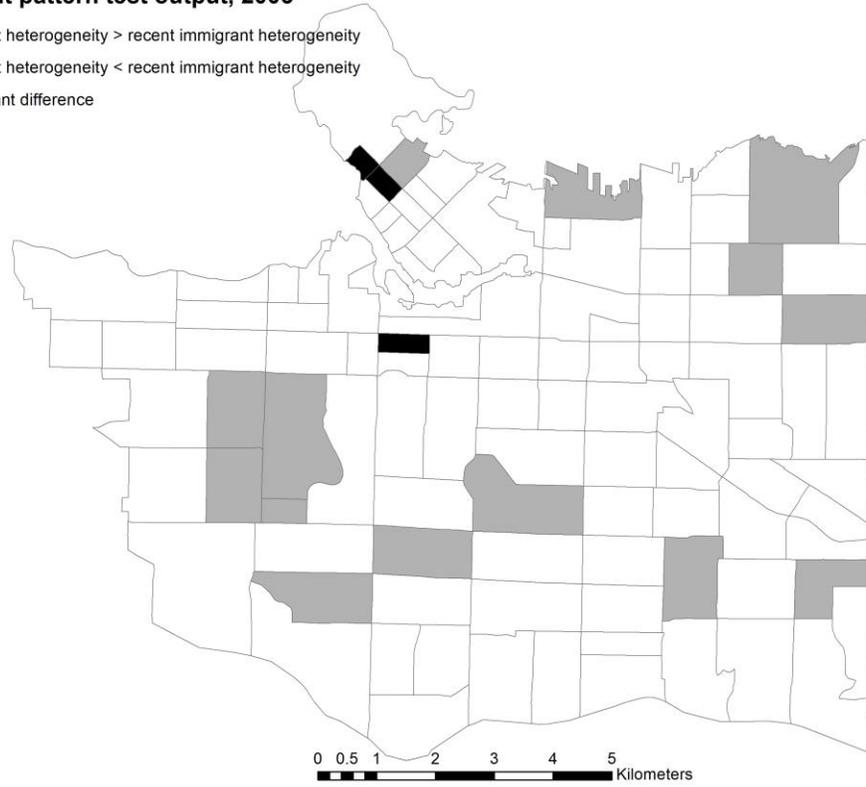


Figure 3.1. Spatial point pattern test output, immigrant heterogeneity – recent immigrant heterogeneity

Table 3-5. Immigration variables, S-Index values, 2016

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Total immigrants, %, X_1	1	0.99	0.99	0.99	0.99	0.99	0.96	0.93	0.31	0.22
Recent immigrants, %, X_2		1	0.97	0.96	0.93	0.99	0.98	0.93	0.83	0.72
Immigrants, 10 years +, %, X_3			1	0.99	0.99	0.99	0.98	0.96	0.34	0.25
Immigrants, 20 years +, %, X_4				1	0.99	0.99	0.96	0.95	0.37	0.30
Immigrants, 30 years +, %, X_5					1	0.98	0.94	0.91	0.51	0.43
Immigrants arrived 5yrs or <, %, X_6						1	0.97	0.95	0.33	0.23
Ethnic Heterogeneity, X_7							1	0.84	0.38	0.28
Visible minorities, X_8								1	0.23	0.22
Immigrant heterogeneity, X_9									1	0.83
Recent immigrant heterogeneity X_{10}										1

Spatial point pattern results for the immigration variables, 2016, reveal a similar pattern to the 2003 data; the Indices of Similarity for all measures with the exceptions of immigrant heterogeneity and recent immigrant heterogeneity are above the 0.80 threshold for similarity, with a range of 0.83 to 0.99. When compared to the 2003 data, the most notable difference in the 2016 data involves changes in the degree of similarity between the spatial distribution of immigrants who have been in Canada for 30 years or longer and immigrants who arrived in Canada at the age of 5 or younger and immigrant heterogeneity and recent immigrant heterogeneity.

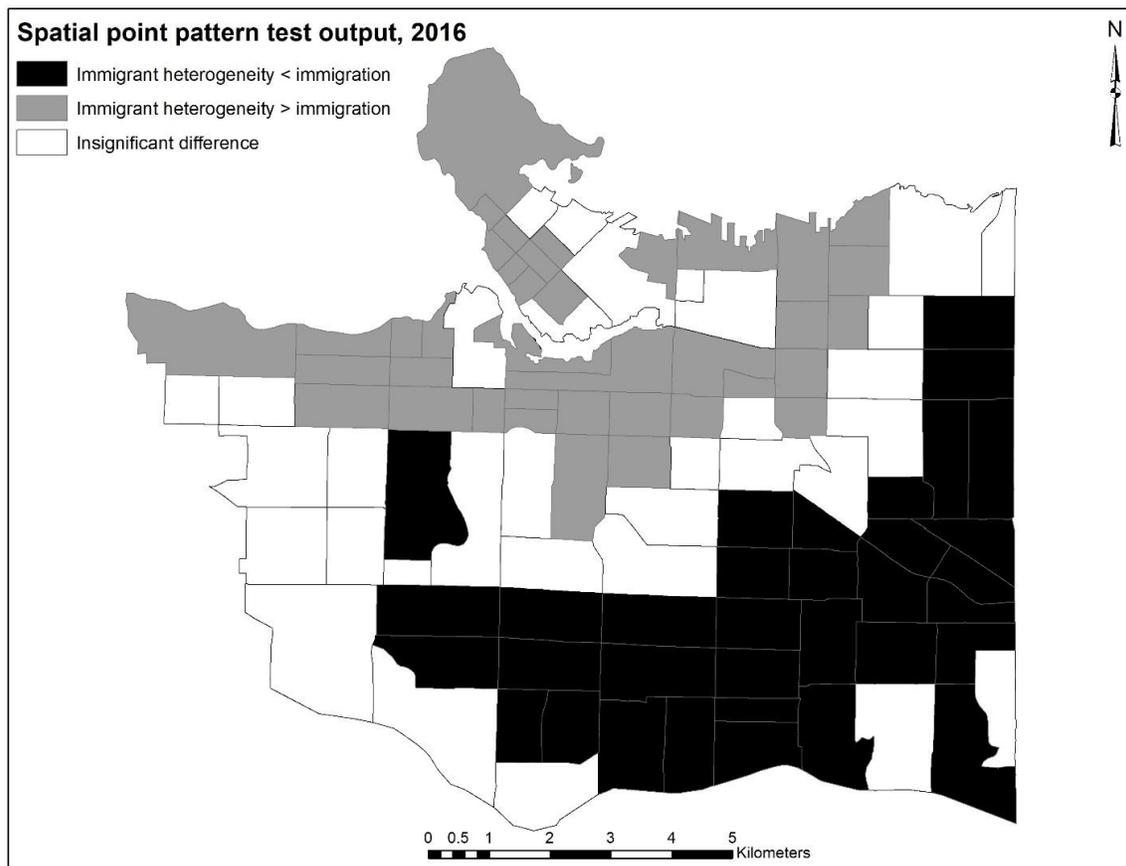


Figure 3.2. Spatial point pattern test output, immigrant heterogeneity – immigration

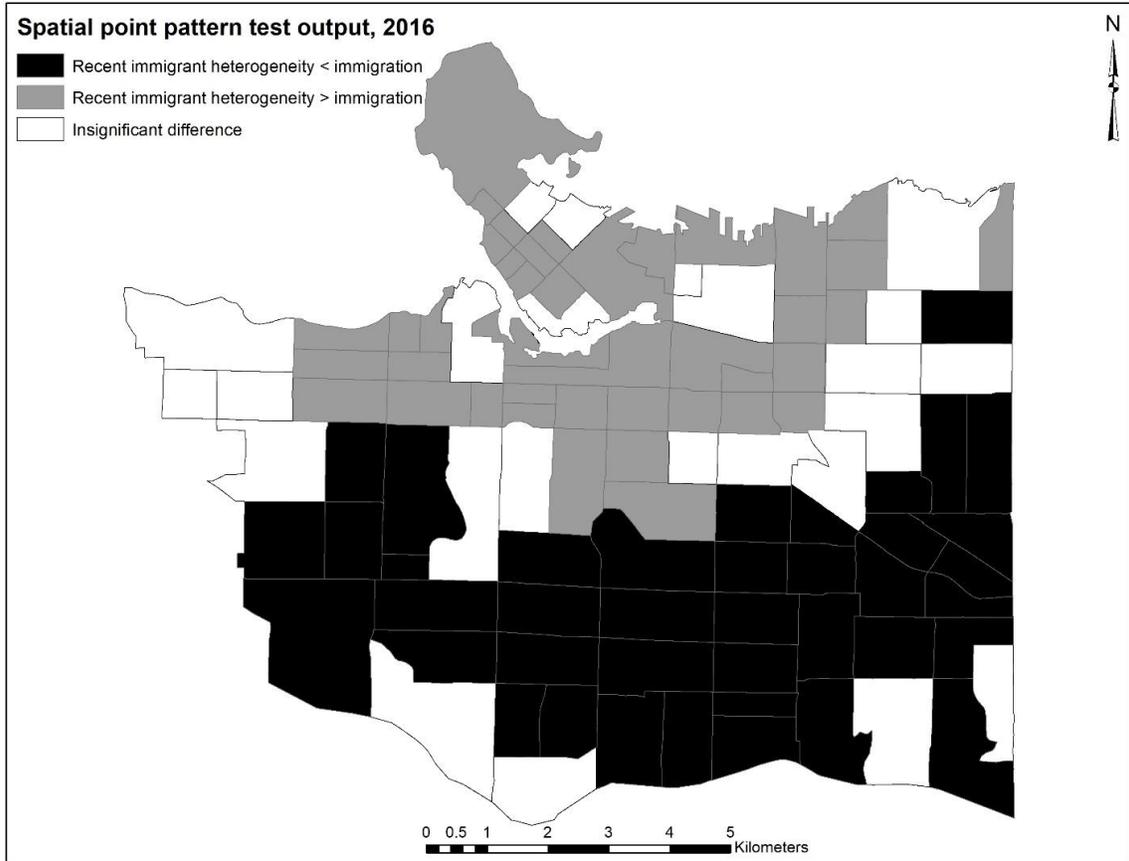


Figure 3.3. Spatial point pattern test output, recent immigrant heterogeneity – immigration

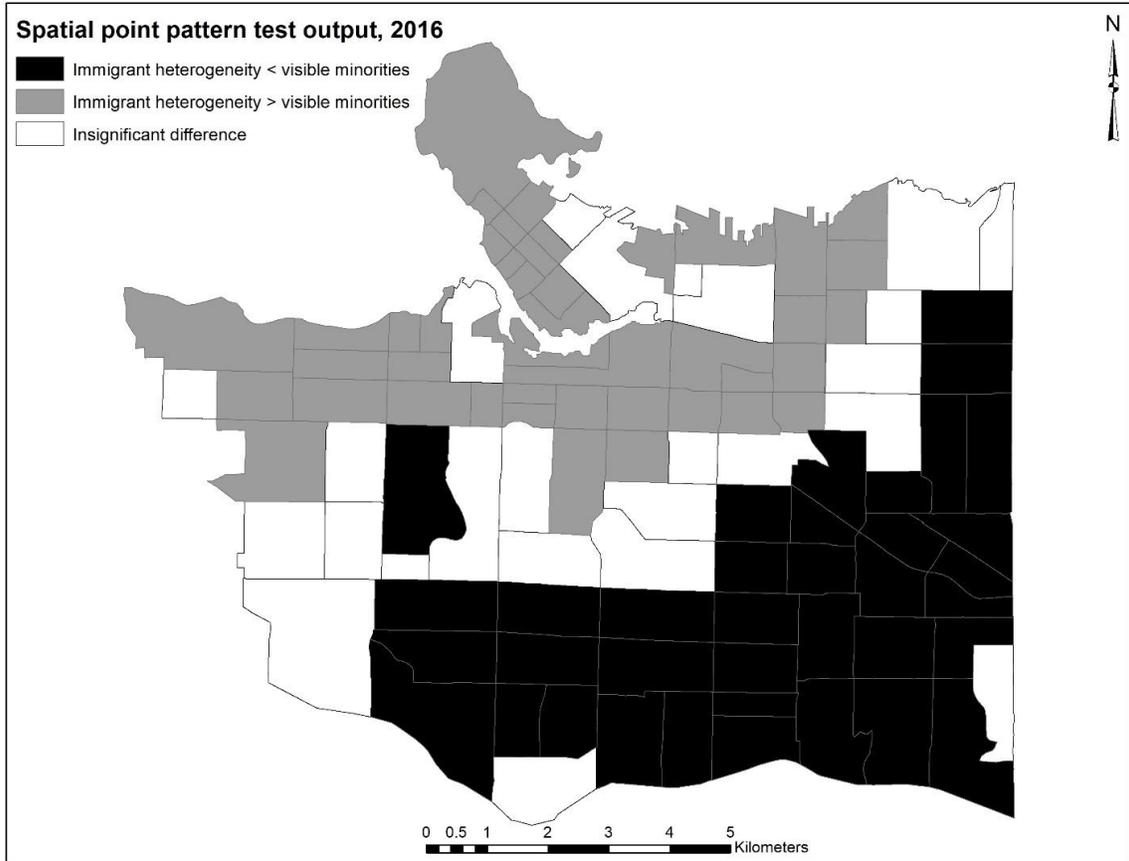


Figure 3.4. Spatial point pattern test output, immigrant heterogeneity – visible minorities

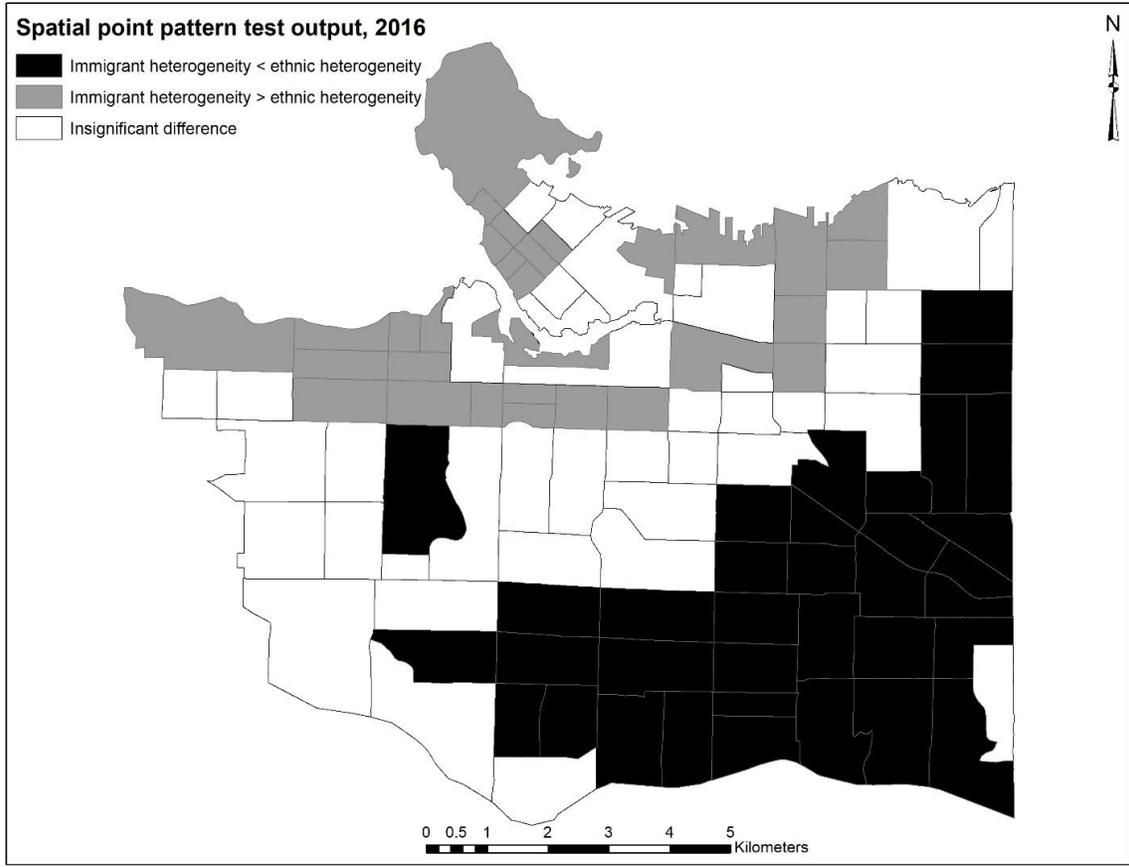


Figure 3.5. Spatial point pattern test output, immigrant heterogeneity – ethnic heterogeneity

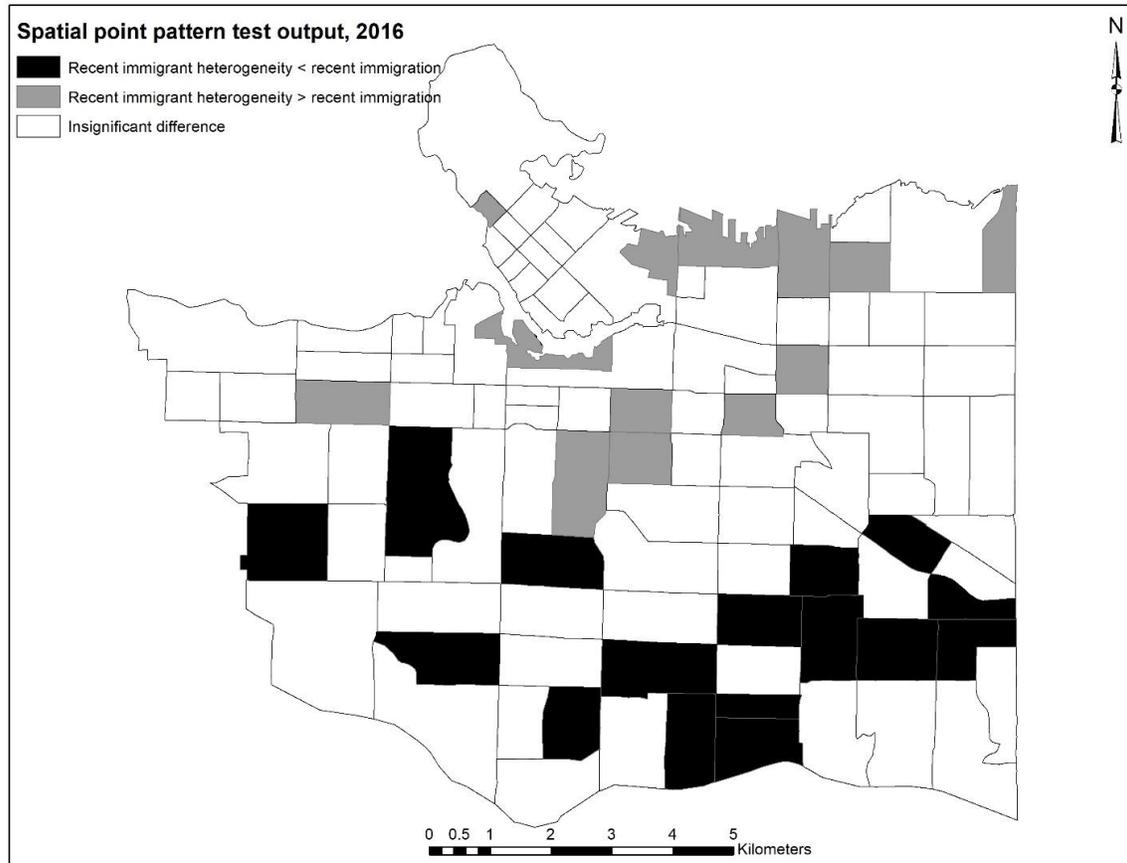


Figure 3.6. Spatial point pattern test output, recent immigrant heterogeneity – recent immigration

Overall, a greater diversity of immigrants and recent immigrants is evident in CTs located in the Northwest and Northeast regions of the city while CTs in the Southeast and Southwest regions have a greater degree of total immigrants (Figures 2 and 3). Similar areas are also distinguished by greater concentrations of visible minorities (Figure 4) and more ethnic heterogeneity (Figure 5). Figure 6 reveals significant spatial differences in concentration patterns of recent immigrants and recent immigrant heterogeneity. While there is a greater degree of recent immigrant heterogeneity in CTs generally located in the northern regions of Vancouver, a more homogenous pattern of recent immigrant settlement was found in CTs located in south and west Vancouver. In general, little substantive change is evident from 2003-2016, however, the index-values for several of the 2016 immigration variables change though only slightly, provided these changes do not represent significant spatial shifts i.e. from similar to dissimilar or vice versa, not mentioned previously.

Table 3-6. Spatial comparison of property crime and immigration variables, 2003

	Property	BNE, residential	BNE, commercial	Theft from vehicle	Theft of vehicle	Theft
Total immigrants, %, X_1	0.25	0.44	0.30	0.26	0.45	0.16
Recent immigrants, %, X_2	0.26	0.67	0.51	0.57	0.71	0.36
Immigrants, 10 years +, %, X_3	0.28	0.51	0.28	0.24	0.44	0.16
Immigrants, 20 years +, %, X_4	0.41	0.71	0.38	0.36	0.64	0.19
Immigrants, 30 years +, %, X_5	0.66	0.83	0.54	0.52	0.72	0.30
Immigrants arrived 5yrs or <, %, X_6	0.91	0.96	0.85	0.90	0.93	0.77
Ethnic Heterogeneity, X_7	0.24	0.44	0.26	0.23	0.43	0.19
Visible minorities, X_8	0.14	0.25	0.27	0.13	0.25	0.20
Immigrant heterogeneity, X_9	0.37	0.63	0.37	0.17	0.51	0.20
Recent immigrant heterogeneity X_{10}	0.44	0.47	0.36	0.32	0.47	0.15

The next results delineate the degree of similarity in spatial patterns between various property crime classifications and immigration variables for 2003 (Table 6) and 2016 (Table 7). Unlike the above findings, the S-Indices for this analysis demonstrate considerable variability. Given substantial differences in spatial patterns of immigrant settlement and property crime, the degree of variability found is expected: few index-values are above the 0.80 threshold for similarity. The values above the 0.80 threshold range between 0.83 and 0.96 involves an isolated pattern of spatial similarity: the immigration variable captures immigrants who arrived very young (<5 years old) and, property crime (0.91), residential break and enter (0.96), commercial break and enter (0.85), theft from vehicle (0.90) and theft of vehicle (0.93). The corresponding inference is that areas where immigrant populations who arrived in Canada at a young age reside are similar to areas where property crime, residential break and enters, commercial break and enters, theft from vehicles and theft of vehicles occur.

Of all the different immigrant classifications included in the analyses, only places occupied by immigrants who arrived very young display consistency in spatial similarity to places with high concentrations of various property crimes. These findings provide a foundation for future spatial investigations into why this may be the case. Moreover, the only other index-value to fall above the 0.80 threshold is found for immigrants who have been in Canada for 30+ years and residential break and enter (0.83). In effect, spatial similarities in areas where older immigrants reside and areas where residential break and enters occur suggest older immigrants reside in areas where they are at greater risk of being victim to break and enters. Subsequent research might extend these findings with local level analyses that help explain the spatial overlap between immigrants who arrived very young, older immigrants and property crime.

Table 3-7. Spatial comparison of property crime and immigration variables, 2016

	Property	BNE, residential	BNE, commercial	Theft from vehicle	Theft of vehicle	Theft
Total immigrants, %, X_1	0.24	0.61	0.26	0.29	0.55	0.13
Recent immigrants, %, X_2	0.70	0.76	0.51	0.75	0.83	0.38
Immigrants, 10 years +, %, X_3	0.25	0.61	0.27	0.33	0.54	0.16
Immigrants, 20 years +, %, X_4	0.31	0.67	0.26	0.32	0.60	0.15
Immigrants, 30 years +, %, X_5	0.41	0.76	0.31	0.40	0.65	0.21
Immigrants arrived 5yrs or <, %, X_6	0.24	0.61	0.27	0.28	0.55	0.14
Ethnic Heterogeneity, X_7	0.16	0.56	0.24	0.21	0.60	0.11
Visible minorities, X_8	0.17	0.52	0.18	0.23	0.44	0.12
Immigrant heterogeneity, X_9	0.40	0.36	0.31	0.45	0.57	0.13
Recent immigrant heterogeneity X_{10}	0.27	0.33	0.37	0.31	0.57	0.19

When compared to 2003, the 2016 immigration-crime spatial pattern show substantially fewer places with spatial overlap; only the recent immigrants and theft of vehicle has the magnitude of the S-Index over the 0.80 threshold for similarity (0.83). The spatial pattern of recent immigrant concentration, therefore, is similar in 0.83 places to those where thefts of vehicle occur. The remainder of index values range from 0.13 to 0.76, indicating a lower degree of spatial similarity between the rest of the immigration variables and property crime types.

3.5. Discussion

The spatial distribution of immigrant concentration in Vancouver CTs is ecologically stable over time as indicated by consistently high S indices (0.63-1.00) for 2003 and 2016. These findings pertain to Hypothesis 1; over time the spatial distribution of immigrant concentration patterns are relatively stable. Property crime patterns in Vancouver, however, diverge significantly over time, indicated by rather low S indices (0.39-0.80) and, therefore, they are not ecologically stable in this context. This pattern supports previous research in Vancouver (see. Hodgkinson et al., 2016; Hodgkinson & Andresen, 2019; Andresen & Hodgkinson, 2018). The ecological instability of spatial patterns related to various property crime classifications at the CT-level in Vancouver address Hypothesis 2. The current findings regarding the spatial stability of immigration patterns and, the spatial instability of property crime patterns at the CT-level tend support the development of theory and the application of policy.

The set of immigration measures tested in current analysis are disaggregated to capture recent immigrants, immigrant heterogeneity, duration of time spent in Canada, age of arrival in Canada. Along with more distinct measures of immigration, we include a measure of total immigration—the most commonly used proxy for immigration in existing research. Results from the spatial point pattern test reveal that the spatial patterns for a majority of the immigration measures tested are stable between 2003 and 2016. The primary exceptions are the spatial patterns for immigrant heterogeneity and recent immigrant heterogeneity, which implies that, from a spatial perspective, these two measures tap into different phenomena from the other immigration measures. These findings contradict the inferences regarding measure similarity drawn from the correlation matrix in Table 1 and lend support to Hypothesis 3.

With reference to the correlation matrix in Table 1, for example, omitting variables that are highly correlated this would lead to a substantial reduction of our immigration variables—many correlations are over the 0.80 threshold for multicollinearity. However, reliance on this technique would have resulted in immigrant heterogeneity and recent immigrant heterogeneity (correlation coefficient 0.83) being excluded from the analysis through some form of data reduction or variable exclusion. This is problematic. Of the ten immigration variables tested, immigrant heterogeneity and recent immigrant heterogeneity are the only two measures that significantly differ with regard to the spatial distribution of concentration patterns. In effect, the exclusion of these variables results in the loss of important theoretical and policy information, particularly if these data are used in post hoc tests of immigration effects on crime.

Because the spatial point pattern test is local in nature, it is possible to map what we believe to be the most noteworthy results. Having visual representations of these findings provide an additional layer of inference with respect to the spatial divide between measures of immigrant heterogeneity and all the other immigration measures tested. For example, the mapped output displayed in Figure 2 and Figure 3 compares the spatial concentration of total immigration to immigrant heterogeneity and recent immigrant heterogeneity, respectively. The mapped output provides a clear illustration of differences in spatial pattern between total immigrants and the immigrant heterogeneity measures. In terms of Vancouver CTs, the mapped output show that areas located to the north of the city, that include places with high concentrations of people, such as the central business district (Downtown Vancouver), the Downtown Eastside (adjacent to the central business district) and Kitsilano have greater concentrations of immigrant and recent immigrant heterogeneity. On the other hand, southern neighborhood areas such as, Victoria-Fraserview, Killarney, Oakridge, Marpole and Kerrisdale are more residential, with less mixed land and commercial use have a greater degree of homogeneity with regard to the spatial concentration of immigrants. The spatial results outlined for immigrant and recent immigrant heterogeneity compared to immigration 2016, are generally consistent over time and when compared to other immigration measures.

Finally, regarding the Hypothesis 4 propositions involving the spatial comparison of property crime patterns and immigrant settlement patterns in Vancouver CTs, the spatial point pattern test demonstrates the utility of disaggregating immigration and

property crime measures. For the two years under analysis, 2003 and 2016, a high degree of similarity between immigration measures when compared to one another is evident. As predicted, however, a different pattern emerges when spatial patterns of immigration are compared to those of property crime. Accordingly, from a spatial perspective, it is important to disaggregate immigration and crime measures as demonstrated by the variance in similarity between any given crime type and all the immigration measures. For property crime, results from the spatial point pattern test show that the spatial pattern for property crime when compared to patterns for total immigrants only overlapped in 0.25 of places in Vancouver. On the other hand, when comparing spatial patterns for property crime and the immigration measure for those who arrived in Canada at the age of <5, there is spatial overlap/similarity in 0.90 places. This substantial variance in similarity for spatial patterns when comparing immigration measures to different classifications of property crime provides additional justification for the separation of measures. Again, studies that employed broadly defined and aggregated immigration measures ignored key nuanced factors whether spatial or more general, whose variations have, at least, potential differential associations with crime patterns.

3.6. Conclusion

The current study reveals the applicability and utility of spatial analytics in the evaluation of immigration and crime patterns. However, this study has several limitations. First, the inability to gain access to violent crime data resulted only property crime classifications included in the study. Second, the study data rely solely on police reports with limitations that have been long recognized (Sherman, Gartin, and Buerger, 1989). Third, while the current study is informative with regard to understanding spatial trends of immigration and property crime patterns across Vancouver CTs, findings do not provide in depth answers regarding why immigration and crime patterns are occurring in these places or why spatial property crime patterns have shifted from 2003 to 2016. Fourth, we only use one spatial scale because of data availability. As such, we must acknowledge the modifiable areal unit problem (Openshaw, 1984).

Moving forward, we believe that additional explorations into the urban geography of immigration and crime patterns at the local level would offer additional substantive and empirical insights into immigration effects on crime. The current analysis though

informative raises a number of questions that ought to be considered in subsequent research. Future directions for spatial research should first include further replication. Replications of this study or study replications in general, are very important in empirical research, especially if these results are to be generalizable. Second, and related to the last limitation, it would be instructive for replications of the current study to investigate the changes in the spatial distribution of immigration and crime measures different levels of aggregations. And third, future research should include investigations into why these spatial patterns exist in certain areas but not others. As such, future assessments in different contexts that correspond to the ones undertaken here could help bolster our understanding of how neighborhood dynamics impact immigration effects on crime. Gaining inferences such as these, could help advance the immigration-crime scholarship by providing an alternate perspective by which immigration effects on crime are considered. Furthermore, research that aims to better understand spatial patterns of immigration and crime contribute to the theoretical and practical development of this literature.

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Chapter 4.

The immigration-crime relationship: Evidence across and within Vancouver neighborhoods 2003-2016

Abstract

We empirically evaluate the immigration-crime relationship in a Canadian context at the neighborhood-level using multiple measures of immigration. Using a panel of 105 census tracts in Vancouver, British Columbia, Canada for the years 2003-2016, we use a decomposition model that enables the simultaneous estimation of between and within neighborhood effects of disaggregated immigration measures and multiple control variables drawn from social disorganization theory on various classifications of property crime. Immigration effects on neighborhood property crime vary by crime type and immigration measure tested. Overall, for all crime models under analysis, immigration measures in the between neighborhood component reached statistical significance far more often than immigration measures in the within-neighborhood component. The use of multiple measures of immigration, a robust set of structural control variables along with a statistical model capable of separating within and between neighborhood effects provided important insights into the subtleties of the relationship between immigration and property crime in Vancouver. Specifically, expectations, whether theoretical or empirical with regard to immigration effects on crime should not be monolithic but rather context considerate.

Keywords: Immigration; crime; neighborhood-level analysis; panel data; decomposition model

4.1. Introduction

Few topics have more criminological significance and public policy salience than understanding the impact of immigration on crime (Light & Miller, 2018). As such, considerable dialogue amongst public, political, and academic circles have centered on the many polarizing issues that relate to immigration. Social and political discourses often hone in on trepidations related to security and safety, whereas academics are dedicated to the systematic testing of issues that relate to immigration. Currently, empirical inquiries into the immigration-crime relationship at various levels of aggregation have led to two general conclusions. First, either no association or a negative relationship between immigration and crime; second, partial support has been found for social disorganization theory as the impact of social structural characteristics such as, poverty and residential instability have been found to have a significant and positive influence on crime.

However, despite empirical evidence that shows negative associations between immigration and crime, advocates for restrictive immigration policies continue to premise their arguments on the notion that immigrants are inextricably crime prone and, thus, pose substantial safety and security risks to native populations (Ousey & Kubrin, 2018). These ideals have, accordingly, filtered into the public consciousness on a global scale, cultivating negative sentiments and intolerance toward open immigration policies and immigrants. Consequently, as negative sentiments gain traction and develop into nationalistic/isolationist rhetoric, anti-immigration movements take hold, influencing political agendas and public perceptions of immigration. Therefore, the consequences that stem from the wide spread characterization of immigrants as criminogenic are non-trivial, as demonstrated in political and social actions that oppose immigration and immigrant populations (Ousey & Kubrin, 2018). Because sentiments and beliefs regarding the crime tendency of immigrants have real-world implications, systematic explorations of this relationship are all the more important. However, despite substantial empirical attention, there remain particularities of the immigration–crime relationship that warrant further examination (Kubrin, Hipp & Kim, 2018).

Theoretically, the immigration-crime literature is most often set within the social disorganization framework (Shaw & McKay, 1931; 1942). However, social disorganization theory does not explicitly identify immigration or immigrants as direct

correlates of crime, instead changes in immigration are indirectly linked to crime by weakening networks and informal social control (Shaw & McKay, 1931; 1942). Moreover, Shaw and McKay (1931; 1942) elaborate that crime does not follow immigrants who eventually relocate into more structurally stable neighborhoods and, therefore, crime stems from the structural properties of disorganized neighborhoods—patterns remain stable even after old immigrants move out and a new set of immigrants move into the neighborhoods. Therefore, in the context of immigration and crime, it is important to provide empirical distinctions of immigrant groups that, at the very least, parse out new immigrants from long-time immigrants.

Theoretically, recent immigrants are expected to reside in higher crime areas due to initial financial constraints—this narrative is changing with different economic statuses of immigrants. Over time, immigrants who have spent more time in a host country are expected to reside in lower crime areas, when compared to new immigrants, with the assumption being that over time immigrants obtain the social and economic capital required to move out of disorganized neighborhoods and, accordingly, into lower crime areas. As such, the inclusion of measures that categorize immigrants according to the duration of time spent in Canada would allow research to empirically assess these theoretical insights. Such findings would not only help inform policies/programs directed at immigrant populations, but provide insight for future research aimed at theoretical refinement or testing.

In an effort to address this issue, the current study employs ten disaggregated measures of immigration that account for some of the heterogeneity amongst immigrant populations. Included in this set of immigration measures are temporal disaggregation's of immigrant groups that capture the duration of time spent in Canada (recent immigrants 5 years or less, immigrants who have been in Canada for 10 , 20 and 30+ years, immigrants arriving in Canada at 5 years old or <). The underlying rationale in providing temporal distinctions between immigrants according to the length of time spent in Canada is theoretically influenced. Additionally, we measure various categories of immigrant heterogeneity: visible minorities, ethnic heterogeneity, immigrant heterogeneity, and recent immigrant heterogeneity. The multiple measures of immigration included in this study are, therefore, aimed at capturing variations in immigrant populations that could lead to differential effects on crime, moving beyond the unitary view of all immigrant groups as undifferentiated in order to facilitate a more

nuanced understanding of neighborhood crime rates that relate to immigrant concentrations.

Methodologically, the immigration-crime literature suffers from a paucity of longitudinal contributions. Though the central question examined in most studies feature the implicit assumption of immigration as a social process and, thereby, the assumption of change over time, with few exceptions (see. Ferraro, 2016; Sydes, 2017), most studies have relied on cross-sectional analyses to examine this relationship (Light, 2017). Cross-sectional designs, while appropriate for examining the impact of stock effects or whether stable features are correlated with one another, are not suitable for the examination of questions that involve the process of change (Light, 2017). Accordingly, the current paper employs a longitudinal methodology, whereby panel data are analyzed with the decomposition model to test the immigration-crime relationship. In addition to deficiencies that pertain to longitudinal assessments of the immigration-crime relationship, the literature is limited with regard to neighborhood-level assessments. Although immigration is a macrosocial process, immigration effects, particularly in the context of crime, are important to consider at the neighborhood level. Methodologically, smaller-units of analysis are important when investigating relationships that rely heavily on neighborhood-level theories for guidance, such as the immigration-crime relationship. Examinations that consider smaller-units of analysis are able to identify important variations in the relationships tested, variations that would otherwise be concealed when using aggregate units of analysis, for instance city-level analysis (Stansfield, 2014).

The current paper fills these empirical and methodological gaps and, accordingly, provides a systematic test of the immigration-crime nexus. Using Canadian Census data for 2003-2016 for census tracts in the City of Vancouver, British Columbia, Canada, we consider how changes in multiple immigration measures (10 total) impact various classifications of property crime over time, within and between neighborhoods. In Canada, Toronto, Vancouver and Montreal have long been considered the “gateway” centers for new immigrants, with the highest concentrations of immigrants residing in Toronto, followed by Vancouver then Montreal (Hou & Bourne, 2006). For this reason, the economic and sociodemographic impact of immigration flows should be most strongly felt in these three metropolitan areas (Hou & Bourne, 2006). As such, we expect that immigration effects, including impact on crime are most prominent in these major Canadian cities, particularly in Toronto and Vancouver, as with other gateway cities in

the developed world (Hou & Bourne, 2006). Therefore, the current paper provides an opportunity to evaluate whether immigration effects in Vancouver neighborhoods are comparable to those established in other gateway cities, primarily those that have been assessed in the United States.

4.2. Neighborhood-level studies on immigration and crime

Cities are relatively large units of analysis, with analyses at this level potentially missing important variations across neighborhoods; hence the long history of ecological studies of crime. Martinez and Lee (2000) sought to evaluate a fundamental premise of social disorganization theory that immigration and ethnic heterogeneity weaken social control and increase community levels of crime. Using spatial analytic techniques, the authors examine the extent to which two predominantly black neighborhoods (Liberty City and Little Haiti) that have experienced a recent wave of immigration support the predictions of the social disorganization, concentrated poverty, or immigration revitalization models in the context of homicide (Martinez & Lee, 2000). These researchers use spatial analysis techniques to compare and contrast characteristics of areas in which large numbers of Haitians had recently settled, with an adjacent African American community.

Results for group-specific homicide rates show the homicide rate for African American's to be significantly higher (almost four and a half times higher) than the Haitian rate (Martinez & Lee, 2000), demonstrating that Haitian's who have recently settled in northern Miami are less involved in homicide incidents than native-born African Americans in the same area (Martinez & Lee, 2000). Moreover, the presence of Haitian immigrants did not appear to have the disorganizing effect predicted by social disorganization theory, despite comparable levels of poverty and other social hardships (Martinez & Lee, 2000).

Nielsen, Lee and Martinez (2005) examine the impact of social disorganization on African American and Latino motive-specific homicides in Miami and San Diego--escalation, intimate, robbery and drug-related motives. This is important because much of the research on variations in homicide have overlooked the role played by race and ethnicity in motivations. And because immigration has altered the ethnic and racial composition of the United States, the landscape cannot be accurately captured as a black/white dichotomy. For this reason, the authors consider Latino populations, one of

the largest ethnic minority groups in the United States, in their model as well as immigration as one of their main measures of interest because immigrant concentrations are long thought to shape neighborhood crime (Shaw & McKay, 1942, 1969). As such, the primary goal of this article is to determine whether predictors of homicide are consistent or whether they vary across motives while also taking into account ethnic differences within and between San Diego and Miami.

Their results point to the importance of disaggregating by race/ethnicity, motive, and local context. For example, in the context of escalation killings the percentage of recent immigrants is negatively and significantly related to African American victims in Miami but has no impact for Latinos in Miami or for either group in San Diego. The effects of the percentage of recent immigrants is statistically larger for African Americans than Latinos in Miami. Results for intimate homicides show that in Miami, the percentage of recent immigrants is negatively associated with African American intimate homicides but is positively related to Latino intimate victims. In contrast, recent immigrant concentration is not related to intimate killings in San Diego (Nielsen et al., 2005). With regard to instrumental homicide types, robbery and drug-related killings, the percentage of recent immigrants is negatively related to black drug-related homicides in Miami but positively related to such black killings in San Diego. Overall, results from this study demonstrate the importance of disaggregating homicide data into refined motive categories and by race/ethnicity to examine the processes underlying different types of lethal outcomes when considering the impact of immigration on violent crime.

Stowell and Martinez (2007) examine the relationship between immigration and crime, also considering social disorganization theory. They expand the literature through a classification of foreign-born populations in neighborhoods according to their ethnic origins, permitting a more nuanced understanding of the immigration-crime relationship, considering both lethal and non-lethal violence. They consider two cities where foreign-born individuals comprise substantial portions of their total populations: Houston, Texas and Miami, Florida. Stowell and Martinez (2007) consider overall recent immigration, but also measures of immigration for specific immigrant ethnic populations. For Miami, Cubans, Nicaraguans, Hondurans, and Haitians are the ethnic groups that were examined, and for Houston the percent of foreign-born for Mexicans, Salvadorans, Chinese, and Vietnamese. Overall, their results demonstrate a clear, negative pattern of association for the immigration and crime link as significant results were found in four of

the five ethnic groups tested. In sum, the systematic test by Stowell and Martinez (2007) for ethnic variations in the association with violence led to a more nuanced understanding of the immigration-crime nexus.

Nielsen and Martinez (2009) examine the impact of community-level factors, including immigration, for Latino- and Black-specific homicides and suicides in Miami, Florida. With regard to suicides, immigration was not found to be statistically significant for Latino or African American suicides. The models for homicide found that black homicides are, on average, more prevalent in neighborhoods with lower immigrant concentrations. For Latinos, neighborhoods with greater percentages of immigrants have fewer Latino homicides. As such, greater concentrations of immigrants lead to significantly lower instances of African American and Latino homicide and, therefore, new immigrants are not disrupting communities or undermining social integration.

Investigating homicide trends in the city of San Diego, California, Martinez et al. (2010) utilize a combination of racially/ethnically disaggregated homicide victim data and community structural indicators to account for any consequences of changes in the levels of immigration on community level violence. They found that immigration is significant and negatively related to overall levels of homicide, a finding that is consistent with the immigrant revitalization perspective. Specifically, they found that an increase in the concentration of foreign-born individuals is inversely related to the number of white and Latino homicide victims; the effect for immigration is positively related to increases in black homicide victims, albeit findings did not reach statistical significance, which is consistent with existing studies (see. Lee, 2003; Lee, Martinez & Rosenfeld, 2001; Stowell & Martinez, 2007).

Investigating the immigration-crime relationship using data from New York City, Davies and Fagan (2012) strived to address a number of important issues that remained underdeveloped in the immigration-crime literature. First, they focus on the criminogenic effects of immigration across a wider spectrum of groups. Second, they consider immigrant settlement patterns, acknowledging that immigrants self-select into neighborhoods. This is important because non-random self-selection processes may lead to bias and inaccurate results. To address concerns related to selection bias, the authors use a generalized propensity score (GPS) approach to control for selection bias in the analysis of immigration and crime. Their results reveal that immigration (total and

recent) acts as a protective factor for both total crime and three specific categories of crime: total immigration shows a significant effect for all crime categories, but the preventive effects of immigration are less pronounced for recent immigrants, as significant negative coefficients are found only for total and drug crime rates. Tests of the immigration-crime relationship using measures that categorize immigrants by ethnicity/race, these authors were able to demonstrate that immigrants are a heterogeneous group and, accordingly, immigration experiences and contributions to lower rates of neighborhood crime vary across racial and ethnic groups. Furthermore, because immigrants are a distinguished group and, thus, exhibit a number of group differences, whether in terms of settlement areas or effects on rates of neighborhood crime it could be inferred that each group has contributed to the revitalization on the city in varying ways.

MacDonald et al. (2013) examine the effect of immigrant concentration on recent changes in neighborhood crime rates in the city of Los Angeles, using two-stage least squares to address the simultaneity related to immigrant concentrations and neighborhood crime rates. These authors found that higher predicted concentrations of immigrants are related to greater than expected reductions in total reported criminal offenses and violent crimes. With regard to the selection effects, the 2SLS estimates show that the effect of current levels of immigrants on changes in crime is approximately twice as strong as the reduced form equations estimate, suggesting a strong selection effect. Overall, these findings convey that predicted concentrations of immigrants is strongly related to decreases in neighborhood crime, net the effects of poverty indicators, residential stability, population density, age structure, and regions of the city.

Continuing with neighborhood-level research that investigates the relationship between immigration and violent crime, Ramey (2013) investigates the relationship using a representative sample of neighborhoods nested within 84 large U.S cities. He uses multilevel models, a technique ideal for testing neighborhood violence as a function of both neighborhood- and city-level structures in cities with different immigration experiences. Results from separate multilevel models for each ethnic enclave under evaluation (white, African American, Latino, and integrated neighborhood) reveal a pattern of coefficients that immigrant composition showed a significant and negative relationship with neighborhood criminal violence, with the exception of African American neighborhoods. Moreover, a city being a new destination for immigrants is the only city-

level measure to show a significant relationship for integrated areas, showing the importance of spatially disaggregated data.

Stansfield, Akins, Runbaut and Hammer (2013) assessed the effects of recent immigration on serious property crime in Austin, Texas, a new destination immigrant city. They found that recent immigration variable was insignificantly related to burglary, theft, and motor vehicle theft. This is an important result given that new Latino immigrants to the United States are typically motivated by their desire to achieve prosperity, a desire that is often blocked in their country of origin (Portes & Rumbaut, 2006). But because first-generation immigrants often face barriers to legitimate opportunities and, thus, face limited economic opportunities (Lee et al., 2001; Waldinger, 1993), property crimes may present a means of meeting monetary aspirations (Merton, 1938). However, results from the current study dispel the notion that recent immigrants are positively associated with property crime, as the three property crimes under analyses were insignificantly related to recent immigration.

Kubrin, Hipp and Kim (2018) examine the immigration-crime relationship across neighborhoods in the Southern California metropolitan region, providing an additional layer of insight by accounting for differences between immigrant groups. The authors utilize three distinct approaches to capture the diversity between immigrant groups in this region: operationalize immigrant groups according to racial/ethnic categories, categorize immigrant groups according to the geographic region in which the immigrants originated from, and operationalize immigrant groups according to where they co-locate upon settling in the United States. Additionally, the author's measure heterogeneity based on each of the previously listed classification schemes. Finally, for comparative purposes, the authors use the classification approaches employed in the current study to the standard approach used in a majority of studies that combines immigrants together through a single measure of percent foreign born. Their results lend support to the use of a more multidimensionality approach to the conceptualization of immigrant groups as the standard unitary conceptualization of immigration masks some of the important variations between immigrant groups as relates to neighborhood crime. They find considerable insight into group differences as all three immigrant categorization strategies revealed variances between immigrant groups in relation to both violent and property crime rates at the neighborhood level and, thus, demonstrate the utility of

disaggregation when conceptualizing immigration—some groups have positive and others negative relationships with crime.

The most recent international contribution to the neighborhood-level immigration-crime literature, Sydes (2017), evaluates the immigration-crime relationship in an Australian context: the effect of immigration on violent crime across 882 neighborhoods located in two Australian cities, Brisbane (a new immigrant destination) and Sydney (an established immigrant gateway) (Singer, 2004). Measuring crime over time, Sydes (2017) not only considers the total population who are foreign-born, but also group specific measures of: percent Chinese, percent Indian, and percent Vietnamese. Sydes (2017) also considers measures of immigrant diversity and a language diversity index that taps into the potential for communication barriers among residents. Using a hybrid modeling approach that allows for within- and between neighborhood effects to be identified, Sydes (2017) finds that the within-neighborhood effect is statistically significant and negative for violent crime in both cities, whereas the between-neighborhood effects are always statistically insignificant. This shows that places experiencing increased in immigrant populations can expect to have decreases in crime, but the percentage of immigrants in a neighborhood does not contribute to the spatial pattern of crime in either city. With regard to ethnic differences, Chinese and Indian immigrants are significantly and negatively linked to violent crime in Sydney, whereas the Vietnamese population are not significantly linked to violent crime. Curiously, with regard to language diversity, a positive and significant result indicate that areas with higher levels of language diversity experience more violent crime, harking back to the theoretical expectations with social disorganization theory. In Brisbane, increasing language diversity is associated with less violent crime. And only Vietnamese immigrants are negatively and significantly associated with violent crime. Findings from this Australian context suggest that ethnic group concentration is not linked to more violence but instead increases in ethnic group concentration may actually operate as a protective shield against neighborhood violence.

4.3. Data and Methods

The data used in the analyses are for the City of Vancouver in British Columbia, Canada. The City of Vancouver is contained within Metro Vancouver, based on population is collectively the third largest metropolitan area in Canada. Vancouver is also

considered one of the “gateway” centers for immigration and, accordingly, has the second largest immigrant population after Toronto (Hou & Bourne, 2006). With a population of just over 2.55 million people, the Vancouver Census Metropolitan Area (CMA) is the largest metropolitan area in western Canada. Since 1991, the Vancouver CMA has seen significant population growth. This population growth has been linked to the 1986 World Exposition on Transportation and Communication and an increase in new immigrant settlement. The World Exposition in 1986 brought worldwide attention to the Vancouver CMA and, accordingly, international investments, subsequent development, and immigration followed. Vancouver became a favored destination for new immigrants, in part due to the exposure gained during the 1986 World Exposition on Transportation and Communication and, so, Vancouver became the second most favored destination in Canada after Toronto for immigrant settlement, resulting in a large immigrant population, one of the highest in the world (Hou & Bourne, 2006). More specific to population growth, the resident population of the City of Vancouver has increased in recent years: 546,000 in 2001, 578,000 in 2006, 604,000 in 2011, and 630,000 in 2016.

4.3.1. Crime and spatial data units of analysis

Crime incident data for the City of Vancouver were obtained from the Vancouver Open Data Catalogue.² We analyze overall property crime, residential burglary, commercial burglary, theft of vehicle, theft from vehicle and other theft. The variables in these data include the location (one-hundred block), date, and time of the crime incident; we use the location and year. The crime data are available from 2003 to 2018, but we utilized the 2003 to 2016 crime incident data to match with the most recent census data. All of the crime data are provided with geographic locations, including latitude and longitude coordinates. These coordinates are not specific to the address, but to the center of the respective street segment, or 100-block. However, because we are analyzing our data using spatial units of analysis larger than the street segment, census tracts, there are no concerns for data accuracy.

The crime and ecological data for Vancouver used in these analyses are measured in the years 2003-2016 at the census tract level. Census tracts are relatively

² <https://data.vancouver.ca/datacatalogue/crime-data.htm>

small and stable geographic areas that tend to have a population ranging from 2500 to 8000, with an average of 4000 persons; for each year, we used the 105 census tracts in the City of Vancouver from the 2001 Census of Population to facilitate a panel analysis. Subsequent censuses (2006, 2011, and 2016) led to increases in the number of census tracts, but census tracts are always divided in a consistent manner such that they can be aggregated to the boundary definitions from a previous census. As such, the 2001 census tract boundaries are the most recent boundaries from Statistics Canada's Census of Population that can be used for the crime data available, 2003 - 2016.

4.3.2. Immigration data

All immigration and ecological variables used in the analysis are obtained from Statistics Canada's Socio-Economic Information Management System (CANSIM) for the years 2003-2016. Census variables from the 2001, 2006, 2011, and 2016 censuses that are consistent across all years were used for variable selection. In order to obtain inter-census years to match with the yearly crime data, a linear interpolation was used for all variables. We use multiple measures of immigration that account for the heterogeneity between immigrant groups. Accordingly, ten different immigration measures that capture five primary distinctions between immigrant groups are represented within this set of variables: total immigrants, recent immigrants, long-term immigrants, immigrants who arrived at a very young age and, multiple measures of heterogeneity.

Total immigrants, the percentage of total immigrants within each census tract tests whether the effect of total immigration in the Vancouver context in order to be comparable to those found in existing studies undertaken in other context. Additionally, we include a measure of recent immigrants that capture the percentage of immigrants within a census tract who have been in Canada for five years or less. Theoretical perspectives that have been used in tests of the immigration-crime relationship, such as strain theory or economic models of rational criminal behavior place emphasis on the economic hardships often faced by new immigrants, hardships that increase their likelihood of criminal involvement.

The next category of immigrants used represent those who have been in Canada for relatively longer periods of time, 10+, 20+ and 30+ years. These measures are defined as percentage of immigrants within a census tract who have been in Canada for

10+, 20+ and 30+ years. This set of variables could provide insight into whether recent immigrants and long/longer term immigrants have differential impacts on property crime and, if so, these inferences could be further explored. In addition to long-term immigrants the variable set includes a measure for immigrants who arrived in Canada at five years old or younger. The underlying notion here is that immigrants who arrive at such a young age are less susceptible to some of the hardships associated with assimilation that older immigrants may encounter. Assimilation often pertains to how similar or different immigrants and their children are to native populations in terms of socioeconomic standing, residential segregation, language use, and intermarriage (Morenoff & Astor, 2006). Therefore, based on this definition, immigrant children who arrive to a host country at a very young age < 5 years are more likely to be similar to native born children, particularly in terms of linguistic patterns and cultural adaptation.

The final class of measures capture various forms of heterogeneity: ethnic heterogeneity, visible minorities, immigrant heterogeneity and recent immigrant heterogeneity. Even though measures of ethnic heterogeneity and visible minorities are not direct proxies of immigration, they are specific type of control variable for these analyses. The measurement of visible minorities (percentage of the residential population) allows for the proper identification of an immigration effect (the majority of immigrants into Vancouver during this time period are visible minorities) because we can test if the important factor is places (census tracts) that have higher levels of immigration or visible minorities. The same is true for differentiating between heterogeneity in the general population and the (recent) immigrant population. Furthermore, the relevance of heterogeneity measures are clearly articulated in social disorganization theory, that is the most prevalently used theoretical guide for studies of immigration and crime. Social disorganization theory predicts that areas with high degrees of ethnic heterogeneity often have high crime, as ethnic heterogeneity (cultural differences, language differences, etc.) make it more difficult for residents to generate social cohesion which is required to repel crime (Cahill & Mulligan, 2003; Sampson & Groves, 1989; Shaw & McKay, 1931, 1942). All the ethnic heterogeneity variables are measured using the Blau (1977) Index that ranges in value from zero to one hundred, with zero representing no ethnic mix and one hundred representing a perfectly even mix of ethnic groups.

4.3.3. Ecological data

To isolate the independent effect of the immigration variables on property crime, 13 control variables that capture various neighborhood structural characteristics including housing, income, and land use characteristics are included for analysis. The ecological data are obtained through the census and conform to measures often used in the ecology of crime literature that relate to social disorganization theory.

The general hypothesis of social disorganization theory is that social and economic deprivation, ethnic heterogeneity, and population turnover/ residential mobility led to increases in crime and delinquency rates (Shaw & McKay, 1931; 1942). As such, population turnover is measured considering the number of residents who have moved into the neighborhood within the past year, past five years and the percentage of rental units to capture the transient nature of renters when compared to owners. Additional housing characteristics are measured with percentage of dwellings under major repair and percentage of old homes (40 years+). Income measures capture social and economic deprivation, unemployment is measured as a percentage: the percentage of unemployed persons in each neighborhood, post-secondary education represents the percentage of people with a post-secondary degree/diploma/certificate, Low income is the percentage of families that are low income, government assistance is the percentage of people whose income comes from government assistance (welfare, family allowance, employment insurance, etc.), average dwelling value is the average dwelling value in thousands of 2006 dollars, average rent is the average rent in hundreds of 2006 dollars, median income is the median income in thousands of 2006 dollars, and median family income is median family income in thousands of 2006 dollars.

4.3.4. The decomposition model

Recently, scholars (see. Adelman et al., 2017; Butcher and Piehl, 1998; Stowell, Messner, McGeever, & Raffalovich, 2009; Ousey & Kubrin, 2009; Wadsworth, 2011; Sydes, 2017) who have conducted longitudinal investigations of the immigration-crime relationship have called for more longitudinal contributions to the literature, as findings from the relatively small body of existing studies show either null or negative effects over time. Although, longitudinal analyses of the immigration-crime nexus make intuitive

sense given that immigration does not occur at a stable and consistent pace, the scholarship is still rather limited.

Generally, there are two main approaches to longitudinal analysis: fixed effects and random effects. In the most simplistic form, fixed effects models estimate within-unit variation that estimate short-term relationships (Levitt, 2001). Random effect models on the other hand, assume within-group and between-group variations are the same; as such, if they are not assumed to be the same, *a priori*, random effects are inappropriate. Nonetheless, with respect to the immigration-crime literature, a majority of studies have showed preference toward fixed effects estimations (see. Martinez et al., 2010; Ousey & Kubrin, 2009, 2013; Wadsworth, 2011) resulting are findings that do not account for variances between units nor time invariant measures (Sydes, 2017).

In recognizing the importance of longitudinal analysis for this area of research but also cognizant of the limitations of the two main approaches, the current study employs a technique that addresses the limitations of fixed and random effect models while still capable of satisfying the requirements of longitudinal design. As such, the decomposition model is used to estimate the immigration-crime relationship, by providing separate estimates for the effect of a covariate on the dependent variable between units (the between-unit estimator) and for the annual effects of a covariate on the dependent variable within a particular unit (the within-unit estimator) this technique offers greater precision than fixed effects models while accounting for the potential bias that undermines the random effects approach (Sydes, 2017).

The decomposition modeling approach can be estimated using the following general specification:

$$Y_{jt} = \alpha + \sum_i^k [\beta_k X_{jk}] + \sum_i^k [\gamma(x_{jkt} - X_{jk})] + \varepsilon_{jt} \quad (1)$$

where Y_{jt} is the crime rate per 1000 residents in neighborhood j at time t , α is the common intercept, β_k is the estimated parameter for the between-effect (long-run effect) for variable X_k in neighborhood j (X_{jk}), X_{jk} is the average value for x_{jkt} , γ_k is the estimated parameter for the within-effect (short-run effect) for variable X_k in neighborhood j (X_{jk}), that is measured as deviations from its average value over the time frame of analysis (x_{jkt})

– X_{jk}). These calculations are performed for all independent variables under analysis. With 105 census tracts and 14 years of data, the sample size is $n = 1470$. All analyses are undertaken using R: A Language and Environment for Statistical Computing <<http://www.r-project.org/>>.

The hypotheses being evaluated in the current article are as follows:

Hypothesis 1 (H_1)

1). Changes in immigrant concentration within neighborhoods over time are predicted to have a negative impact on levels of property crime.

Hypothesis 2 (H_2)

2). Neighborhoods with greater concentrations of immigrants should experience lower rates of property crime.

4.4. Results

4.4.1. Descriptive and correlation analysis

The descriptive statistics for the dependent and independent variables are presented in Table 1, with correlation tables for property crimes, immigration variables, and control variables in Tables 2 – 4, respectfully. Inspection of the descriptive statistics reveal significant variance in crime rates amongst Vancouver CTs. The most prevalent property crime types in Vancouver are theft from vehicles, closely followed by theft, with residential break and enter being the least frequent. Turning to the immigration measures, notable variations exists with respect to the concentration of these immigrant populations in Vancouver CTs. The same holds true with regard to measures of socioeconomic and neighborhood/land-use characteristics as significant variation in these factors are expected, given that neighborhoods are rarely, if ever, homogenous in character.

Table 4-1. Descriptive statistics for dependent and independent variables

	Minimum	Maximum	Mean	Std. Deviation
Property crime	34.00	6445.00	333.86	517.50
Commercial break and enter	0.00	413.00	22.25	36.07
Residential break and enter	4.00	163.00	40.49	23.00
Automotive theft	0.00	331.00	25.61	26.15
Theft from vehicle	7.00	2950.00	113.38	204.63
Theft	0.00	2624.00	86.00	214.14
Total immigrants	19.39	67.14	42.98	13.09
Recent immigrants	0.95	24.42	7.01	3.23
Immigrants, 10 years +	9.43	75.30	34.68	12.53
Immigrants, 20 years +	6.91	34.92	17.58	5.80
Immigrants, 30 years +	2.66	21.05	10.28	3.91
Immigrants arrived age 5 or <	0.00	5.50	3.02	0.79
Ethnic heterogeneity	19.00	80.40	57.68	13.80
Immigrant heterogeneity	13.47	76.42	53.46	14.54
Recent immigrant heterogeneity	0.00	79.04	45.32	20.92
Visible minorities	9.17	93.11	49.11	22.89
Dwellings rented	2.97	76.04	24.13	15.98
Dwellings under major repair	0.76	10.94	3.72	2.00
Old houses (over 40 years)	0.59	60.90	21.17	11.22
Number of movers, past year	5.78	35.80	17.77	6.23
Number of movers, past 5 years	24.44	81.36	45.21	11.71
Postsecondary education	17.40	76.55	47.38	12.39
Low income (percentage of families)	6.40	69.00	20.60	8.08
% of income government assistance	1.10	45.01	9.82	5.60
Unemployment rate	2.02	21.66	6.25	2.24
Average dwelling value, thousands	166.34	3089.16	828.99	498.22
Average rent, hundreds	3.92	30.81	10.48	3.23
Median income, thousands	10.68	86.52	27.62	8.86
Median family income, thousands	14.78	215.62	70.23	23.87

Note. $n = 1470$.

Correlations for aggregated property crime with disaggregated types of property crime are exhibited in Table 2. Not surprisingly, there are positive and significant correlations amongst all property crime types under investigation. However, subsequent results demonstrate that although the correlations between the above mentioned crime types and property crime are rather high, significant differences in the results highlight the importance of disaggregation.

Table 4-2. Bivariate correlations of logged property crime counts

	X_1	X_2	X_3	X_4	X_5	X_6
Property crime, X_1	1	0.90***	0.35***	0.65***	0.97***	0.96***
Commercial BNE, X_2		1	0.29***	0.56***	0.87***	0.82***
Residential BNE, X_3			1	0.63**	0.28**	0.25**
Automotive theft, X_4				1	0.62***	0.55*
Theft from vehicle, X_5					1	0.89***
Theft, X_6						1

Notes. $n = 1470$; * refers to 5 percent statistical significance; ** refers to 1 percent statistical significance.

Similarly, correlation coefficients greater than 0.80 were also found amongst some of the immigration variables in the analysis. For example, high correlations coefficients were found between total immigrants and immigrants who have been in Canada for 10 years or greater, visible minorities and immigrant heterogeneity. Additionally, measures of heterogeneity such as, ethnic heterogeneity, visible minorities, immigrant/recent immigrant heterogeneity were also found to be significantly and positively related. Although high correlations were found between some of the immigration measures, at this point these correlations are not a cause for concern regarding collinearity because the subtle (yet important) differences between these measures facilitate natural overlaps between measures. Lastly, correlations between measures that generally capture socioeconomic and neighborhood/land-use characteristics are presented in Table 4.

Table 4-3. Bivariate correlations, Immigration Variables

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
Total immigrants, %, X_1	1	0.57***	0.90***	0.64***	0.34***	0.49***	0.75***	0.96***	-0.78***	-0.67***
Recent immigrants, %, X_2		1	0.37***	-0.04	-0.19***	0.21***	0.37***	0.49***	-0.28***	-0.25***
Immigrants, 10 years +, %, X_3			1	0.54***	0.20***	0.39***	0.67***	0.87***	-0.71***	-0.59***
Immigrants, 20 years +, %, X_4				1	0.89***	0.39***	0.52***	0.69***	-0.73***	-0.61***
Immigrants, 30 years +, %, X_5					1	0.33***	0.24***	0.37***	-0.49***	-0.44***
Immigrants arrived 5yrs or <, %, X_6						1	0.31***	0.49***	-0.39***	-0.42***
Ethnic Heterogeneity, X_7							1	0.83***	-0.59***	-0.51**
Visible minorities, X_8								1	-0.81***	-0.66***
Immigrant heterogeneity, X_9									1	0.83***
Recent immigrant heterogeneity X_{10}										1

The correlation coefficients here reveal a pattern of high association (greater than 0.80) between many of the income based measures: percentage of families classified as low income, percentage of families receiving government assistance and unemployment rate were found to be significant and positively correlated. Correlation between these income measures make conceptual sense and conform to theoretical expectations. Moreover, these are control variables and, therefore, at this point are not a cause for concern. Additionally, measures of residential mobility, percentage of residents who have moved within the past year and those who have moved within the past five years are also highly correlated, the positive correlation between these measures could be an artifact of the overlap between those who move within a year and those who move within 5 years. Overall, the descriptive and correlation results presented thus far, conform to previous research and, also to expectations for this type of ecological data set.

Table 4-4. Bivariate correlations, control variables (neighborhood characteristics)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}
Dwellings rented, %, X_1	1	0.71***	0.61***	0.77***	0.79***	0.53***	0.35***	0.01	0.17***	-0.48***	-0.24**	0.10***	-0.37**
Dwellings major repair, %, X_2		1	0.37***	-0.04	-0.19***	0.21***	0.37***	0.49***	-0.28***	-0.25***	-0.32***	0.07**	-0.27***
Old houses (40 yrs +), %, X_3			1	0.54***	0.20***	0.39***	0.67***	0.87***	-0.71***	-0.59***	-0.21***	0.05**	-0.07***
Number of movers, past year, %, X_4				1	0.89***	0.39***	0.52***	0.69***	-0.73***	-0.61***	0.06***	0.29***	-0.10***
Number of movers, past 5 years, %, X_5					1	0.33***	0.24***	0.37***	-0.49***	-0.44***	0.06**	0.31***	-0.14***
Postsecondary education, %, X_6						1	0.31***	0.49***	-0.39***	-0.42***	0.36***	0.67***	0.22***
Low income (% families), X_7							1	0.83***	-0.59***	-0.51**	-0.37***	-0.53***	-0.56***
Income government assistance, % , X_8								1	-0.81***	-0.66***	-0.55***	-0.68***	-0.55***
Unemployment rate, X_9									1	0.83***	-0.41***	-0.50***	-0.34***
Average dwelling value, 000s, X_{10}										1	0.62***	0.31***	0.56***
Average rent, 00s, X_{11}											1	0.75***	0.76***
Median income, 000s, X_{12}												1	0.77***
Median family income, 000s, X_{13}													1

Notes. $n = 1470$; * refers to 5 percent statistical significance; ** refers to 1 percent statistical significance.

4.4.2. Inferential results

Results for the decomposition models are reported separately in Tables 5-10 for each of the six crime types under evaluation. In the interest of brevity for the results, only overall patterns and immigration-related variables are discussed here.

Results for the final regression models of property crime are reported in Table 5. Overall, the immigration variables of interest provide meaningful inferences in the model results. As such, the newly operationalized measures of immigration along with total immigration retain the most statistical significance with varying signs when considering between neighborhood effects. Accordingly, results show that on average neighborhoods that are highly concentrated in immigrant populations and those that are highly heterogeneous with respect to immigrant residents have lower property crime rates. Therefore, it could be inferred from these results that higher immigrant populations as well as high levels of diversity in immigrant populations act as protective factors against property crime across neighborhoods. Alternately, findings also demonstrate that across neighborhoods, areas that on average have greater concentrations of ethnic heterogeneity, recent immigrant heterogeneity, immigrant populations who have been in Canada for 20 years or greater and immigrants who arrived in Canada at the age of five or younger, experience higher levels of property crime. Results for the within neighborhood component of the model demonstrate that as the concentration of immigrants who have been in Canada for 30 years or greater increases within a neighborhood over time, property crime within that same neighborhood decreases. On the other hand, findings show that over time within neighborhoods changes in the concentration of total immigrants, immigrants who have been in Canada for 20 years or more and recent immigrant heterogeneity, increases property crime.

Turning to results for the measures that capture neighborhood characteristics, results from both the between and within neighborhood components of the model demonstrate support for theoretical expectations. Findings for the between neighborhood component of the model reveal that on average neighborhoods characterized by higher levels of dwellings under major repair, old homes that are 40 years of age or greater and higher levels of median family income have lower rates of property crime. Neighborhoods that on average have greater concentrations of rental dwellings, residents who have moved within the past five years, residents who rely on

government assistance, higher unemployment, greater median incomes, and higher levels of post-secondary education experience more property crime. Within neighborhood changes over time in the concentration of families classified as low income and cost of average rent, decreases neighborhood property crime. However, within neighborhood changes in the number of residents who have moved within the past year, within the past five years, and increases in the concentration of residents who rely on government assistance along with increases in average dwelling value, increase neighborhood property crime.

Table 4-5. Regression results of logged property crime counts on full model

	Property Crime			
	Between neighborhood (long-run)		Within neighborhood (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	-0.06***	0.02	0.03**	0.01
Recent immigrants	0.01	0.02	0.02	0.01
Immigrants, 10 years +	0.02	0.02	0.00	0.01
Immigrants, 20 years +	0.05***	0.02	0.03**	0.02
Immigrants, 30 years +	0.00	0.02	-0.09***	0.02
Immigrants arrived 5yrs or <	0.09***	0.03	0.01	0.03
Ethnic Heterogeneity	0.02***	0.01	-0.01	0.00
Visible minorities	0.02	0.00	-0.01	0.01
Immigrant heterogeneity	-0.01***	0.00	-0.01	0.00
Recent immigrant heterogeneity	0.01***	0.00	0.01**	0.00
<i>(Neighborhood Measures)</i>				
Dwellings rented	0.01***	0.00	0.45	0.01
Dwellings under major repair	-0.03**	0.01	-0.07	0.02
Old houses (40 yrs +)	-0.03***	0.00	0.00	0.00
Number of movers, past year	0.00	0.01	0.02**	0.01
Number of movers, past 5 years	0.03***	0.00	0.02***	0.01
Postsecondary education	0.02***	0.00	0.01	0.01
Low income (% families)	-0.01	0.00	-0.03***	0.01
% income government assistance	0.03**	0.01	0.03**	0.01
Unemployment rate	0.17***	0.01	-0.01	0.01
Average dwelling value, 000s,	0.01***	0.00	0.01**	0.00
Average rent, 00s	0.00	0.01	-0.03*	0.02
Median income, 000s	0.02***	0.01	0.01	0.01
Median family income, 000s	-0.01*	0.00	0.00	0.01

Adjusted - R^2	0.65
F-Statistic	59.30***

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Results for the final regression models for commercial break and enter are presented in Table 6. Results for the between component of the model show makeable consistency to results obtained for property crime. In terms of statistical significance and direction of relationships found, between-effects for commercial break and enter are almost identical to those found for property crime, with the only exception being that total immigrants failed to reach significance here. More specifically, results show a significant and negative relationship across neighborhoods for immigrant heterogeneity. And so, on average, neighborhoods that have greater concentrations of immigrant heterogeneity over time, have lower rates of commercial break and enter. Conversely, significant and positive relationships were found across neighborhoods for immigrants who have been in Canada for 30 years or greater, immigrants who arrived in Canada at five years of age or less, ethnic heterogeneity and recent immigrant heterogeneity. Therefore, on average, neighborhoods that have greater concentrations of the above mentioned indicators are expected to have higher rates of commercial break and enter.

Findings for the within neighborhood component of the model reveal only one statistically significant measure, immigrants who have been in Canada for 30 years or greater have a significant and negative relationship with neighborhoods rates of commercial break and enter. Over time, within neighborhood changes in the concentration of residents who are classified as immigrants who have been in Canada for 30+ years, significantly decreases rates of commercial break and enters and, thus, it could be inferred that these populations provide a protective barrier against this particular type of property crime. Overall, with respect to our primary variables of interest that capture various facets of immigration, greater statistical significance was found when considering between neighborhood effects of immigration on commercial break and enter. Therefore, results from the current model indicate that static changes in various immigration measures over time are perhaps more relevant than within neighborhood changes in immigration over time.

Table 4-6. Regression results of logged commercial break and enter counts on full model

	Commercial Break and Enter			
	Between neighborhood (long-run)		Within neighborhood (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	0.00	0.03	0.02	0.02
Recent immigrants	-0.04	0.04	0.00	0.02
Immigrants, 10 years +	-0.02	0.02	0.00	0.01
Immigrants, 20 years +	-0.05	0.03	0.02	0.03
Immigrants, 30 years +	0.09***	0.03	-0.07**	0.03
Immigrants arrived 5yrs or <	0.15***	0.06	0.01	0.06
Ethnic Heterogeneity	0.03***	0.01	-0.01	0.00
Visible minorities	-0.02	0.01	-0.02	0.02
Immigrant heterogeneity	-0.03***	0.01	-0.01	0.00
Recent immigrant heterogeneity	0.02***	0.03	-0.01	0.00
<i>(Neighborhood Measures)</i>				
Dwellings rented	-0.01**	0.07	-0.02	0.02
Dwellings under major repair	0.02	0.02	-0.01	0.03
Old houses (40 yrs +)	-0.04***	0.00	-0.10	0.00
Number of movers, past year	0.03**	0.02	0.01	0.02
Number of movers, past 5 years	0.06***	0.01	0.00	0.01
Postsecondary education	0.02**	0.01	0.01	0.01
Low income (% families)	-0.01	0.01	0.00	0.01
% income government assistance	0.08***	0.02	0.04**	0.02
Unemployment rate	0.19***	0.03	-0.01	0.02
Average dwelling value, 000s,	0.01***	0.00	-9.23	0.00
Average rent, 00s	-0.11***	0.02	-0.04	0.04
Median income, 000s	0.07***	0.01	0.04**	0.02
Median family income, 000s	-0.01***	0.00	-0.01**	0.01
Adjusted - R^2				0.57
F-Statistic				43.79***

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Presented in Table 7 are results from the final regression models for residential break and enter. The pattern of coefficients for residential break and enter are distinguished from commercial break and enter, primarily with respect to the significance found for within neighborhood measures of immigration. Generally, results demonstrate distinct differences in the significance and direction of the relationships tested for the within and between components of the model, these differences thereby illustrate the importance of

testing for between and within neighborhood effects of immigration on crime. More specifically, findings from the between-effect component of the model show a significant and negative relationship for total immigrants, and immigrant heterogeneity and, hence, on average neighborhoods that see an increase in these indicators over time will see a decrease in residential break and enter. On the other hand, positive and significant relationships were found for immigrants who have been in Canada for 20 years or more, immigrants who arrived in Canada at the age of five or younger, ethnic heterogeneity and visible minorities. As such, on average, neighborhoods that experience an increase in the concentration of these measures are expected to also experience an increase in residential break and enter over time.

Results from the within neighborhood component of the model reveal a slightly different pattern of coefficients. Accordingly, immigrants who arrived in Canada 30 years ago or more and immigrant heterogeneity have a significant and negative relationship with residential break and enter. Therefore, as the concentration of these indicators decrease within a neighborhood over time, rates of residential break and enter are expected to decrease within those same neighborhoods. Alternately, within neighborhood changes in the concentration of total immigrants, immigrants who have been in Canada for 20 years or more, and recent immigrant heterogeneity have significant and positive relationships with residential break and enter. In this instance, increases in the concentration of these measures within a neighborhood over time, will lead to an increase in residential break and enters within that area.

Generally, results obtained from this model illuminate the importance of not only, measure disaggregation, but also, the importance of capturing the distinct processes that underlie between and within group effects. More specifically, results show divergence between within and between neighborhood effects when considering immigration effects on residential break and enter as demonstrated by differences in the pattern of significant coefficients and, in the direction of the relationships found for the same variables. For example, between neighborhoods, the concentration of total immigrants was significant and negative, while within neighborhoods the same measure was found to be significant and positive these findings, therefore, tell two very different stories with regard to the impact of immigration on residential break and enter.

Table 4-7. Regression results of logged residential break and enter counts on full model

	Residential Break and Enter			
	Between neighborhood (long-run)		Within neighborhoods (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	-0.05***	0.02	0.03**	0.01
Recent immigrants	-0.01	0.03	0.01	0.01
Immigrants, 10 years +	-0.01	0.02	-0.01	0.01
Immigrants, 20 years +	0.06***	0.02	0.05***	0.02
Immigrants, 30 years +	-0.02	0.02	-0.12***	0.02
Immigrants arrived 5yrs or <	0.11***	0.03	-0.02	0.03
Ethnic Heterogeneity	0.01***	0.01	-0.01	0.00
Visible minorities	0.02***	0.00	-0.01	0.00
Immigrant heterogeneity	-0.02***	0.01	-0.01**	0.00
Recent immigrant heterogeneity	0.01	0.00	0.01***	0.00
<i>(Neighborhood Measures)</i>				
Dwellings rented	-0.01	0.00	-0.02	0.01
Dwellings under major repair	0.06***	0.01	-0.01	0.02
Old houses (40 yrs +)	-0.01*	0.01	0.10*	0.01
Number of movers, past year	-0.01	0.01	0.04***	0.01
Number of movers, past 5 years	0.02**	0.01	0.03***	0.01
Postsecondary education	0.02***	0.01	0.01	0.01
Low income (% families)	0.01	0.01	-0.03***	0.01
% income government assistance	-0.02*	0.01	0.03**	0.01
Unemployment rate	0.09***	0.02	0.01	0.01
Average dwelling value, 000s,	0.01***	0.00	9.89	0.00
Average rent, 00s	0.01	0.01	-0.03	0.02
Median income, 000s	0.01	0.01	-0.01	0.01
Median family income, 000s	-0.00	0.00	0.01	0.00
Adjusted - R ²				0.41
F-Statistic				23.55***

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Results from the regression model for automotive theft are displayed in Table 8. This particular model returned significant parameters in varying signs for a majority of the immigration variables under analysis. More specifically, of the ten immigration variables tested, six significant parameters were found for the between-neighborhood component, while five significant parameters were found for the within-neighborhood component. Furthermore, findings show synchronicity between and within neighborhoods for two of

the measures tested, immigrant heterogeneity (significant and negative) and recent immigrant heterogeneity (significant and positive) something that has not been found in any of the other models.

Turning to findings for the between-neighborhood component of the model, results show that between neighborhoods, total immigrants and immigrant heterogeneity are significant and negatively related to automotive theft. As such, neighborhoods that, on average, have greater concentrations of total immigrants and/or immigrant heterogeneity are expected to have lower rates of automotive theft over time. Positive and significant relationships were found for recent immigrants, immigrants who have been in Canada for 10 years or more, immigrants who arrived in Canada at the age of five or younger, ethnic heterogeneity and recent immigrant heterogeneity, therefore, on average neighborhoods that have greater concentrations of these measures over time are expected to have higher rates of automotive theft.

Within-neighborhood findings reveal a similar story with slight deviations in terms of significant measures and direction of relationships found. Results show significant and negative relationships within neighborhoods for immigrants who have been in Canada for 30 years or longer, visible minorities and immigrant heterogeneity. And so, as these measures become more concentrated over time within a neighborhood, automotive theft decreases within that same neighborhood. Total immigrants and recent immigrant heterogeneity are significant and positively correlated with automotive theft within neighborhoods. Thus, as neighborhoods become more concentrated in immigrant populations and/or more concentrated in the heterogeneity of recent immigrants, automotive thefts increase.

Table 4-8. Regression results of logged automotive theft counts on full model

	Automotive theft			
	Between neighborhood (long-run)		Within neighborhood (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	-0.09***	0.02	0.06***	0.01
Recent immigrants	0.07**	0.03	0.02	0.02
Immigrants, 10 years +	0.07***	0.02	0.00	0.01
Immigrants, 20 years +	0.00	0.02	0.04**	0.02
Immigrants, 30 years +	0.01	0.02	-0.16***	0.02
Immigrants arrived 5yrs or <	0.13***	0.04	-0.02	0.04
Ethnic Heterogeneity	0.01***	0.02	-0.01	0.01
Visible minorities	0.00	0.00	-0.04***	0.01
Immigrant heterogeneity	-0.01***	0.01	-0.02***	0.01
Recent immigrant heterogeneity	0.01***	0.00	0.01***	0.00
<i>(Neighborhood Measures)</i>				
Dwellings rented	-0.01	0.01	0.00	0.01
Dwellings under major repair	0.03**	0.02	0.01	0.02
Old houses (40 yrs +)	-0.01***	0.00	0.01**	0.01
Number of movers, past year	-0.01	0.01	0.03***	0.01
Number of movers, past 5 years	0.03***	0.01	0.03***	0.01
Postsecondary education	-0.01**	0.01	0.01**	0.01
Low income (% families)	0.00	0.01	-0.05***	0.01
% income government assistance	0.01	0.01	0.07***	0.02
Unemployment rate	0.07***	0.02	-0.01	0.01
Average dwelling value, 000s,	0.00	0.00	0.01***	0.00
Average rent, 00s	-0.02	0.02	-0.06***	0.02
Median income, 000s	0.02**	0.01	0.01	0.01
Median family income, 000s	0.00	0.00	0.01	0.00
Adjusted - R^2				0.65
F-Statistic				60.41***

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

The final regression results for theft from vehicle can be found in Table 9. Beginning with results for the between-neighborhood component of the model, six of the ten immigration variables under analysis returned significant parameters of varying signs. Across neighborhoods, total immigrants and immigrant heterogeneity are found to have significant and negative relationships with theft from vehicles. Findings allow us to infer that on average neighborhoods with greater concentrations of immigrants and/or greater concentrations of immigrant heterogeneity have lower rates of theft from vehicles over

time. In contrast, significant and positive relationships were found for immigrants who have been in Canada for 10 years or longer, those who have been in Canada for 20 years or longer, ethnic heterogeneity and recent immigrant heterogeneity. These findings indicate that on average neighborhoods with greater concentrations of these populations will, over time, have higher rates of theft from vehicles.

The within-neighborhood component of the model had fewer measures that reached statistical significance, a general finding that has been consistent for all property crime classifications tested. Nonetheless, within neighborhood results show a significant and negative relationship for immigrants who have been in Canada for 30 years or longer and, thus, neighborhood increases in the concentration of these particular immigrants are expected to decrease thefts from vehicles over time. Total immigrants and recent immigrant heterogeneity on the other hand, are significant and positively correlated with theft from vehicles within neighborhoods. And so, as the concentration of total immigrants and heterogeneity of recent immigrants increase within a neighborhood, rates of theft from vehicles are also expected to increase within that same neighborhood.

Table 4-9. Regression results of logged theft from vehicle counts on full model

	Theft from Vehicle			
	Between neighborhood (long-run)		Within neighborhood (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	-0.07***	0.02	0.02*	0.01
Recent immigrants	0.04	0.03	0.02	0.01
Immigrants, 10 years +	0.04**	0.02	0.01	0.01
Immigrants, 20 years +	0.05**	0.02	0.02	0.02
Immigrants, 30 years +	0.01	0.02	-0.06***	0.02
Immigrants arrived 5yrs or <	0.04	0.04	-0.02	0.04
Ethnic Heterogeneity	0.02***	0.01	-0.01	0.01
Visible minorities	-0.01	0.00	-0.01	0.00
Immigrant heterogeneity	-0.01***	0.01	-0.01	0.00
Recent immigrant heterogeneity	0.01***	0.02	0.01**	0.02
<i>(Neighborhood Measures)</i>				
Dwellings rented	0.02***	0.01	0.01	0.01
Dwellings under major repair	-0.05***	0.01	-0.03	0.01
Old houses (40 yrs +)	-0.04***	0.01	-0.10**	0.01
Number of movers, past year	0.02	0.01	0.03***	0.01
Number of movers, past 5 years	0.01**	0.01	0.01	0.01
Postsecondary education	0.02***	0.01	0.01**	0.01
Low income (% families)	-0.01	0.01	-0.03***	0.01
% income government assistance	0.02*	0.01	0.05***	0.01
Unemployment rate	0.16***	0.02	-0.01	0.01
Average dwelling value, 000s,	0.01***	0.00	0.00	0.00
Average rent, 00s	-0.00	0.01	-0.05**	0.02
Median income, 000s	0.03***	0.01	0.01	0.01
Median family income, 000s	-0.01	0.00	-0.01*	0.00
Adjusted - R^2	0.61			
F-Statistic	51.41***			

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Lastly, results for the final regression model for theft are found in Table 10. In line with previous analyses, these set of results continue to reveal greater statistical significance for between-neighborhood indicators, for both the immigration variables of interest as well as, for contextual neighborhood measures. Furthermore, distinct variations in the pattern and sign of significant coefficients between and within neighborhoods suggest that each process may differentially influence crime over time. Accordingly, results from the between neighborhood component of the model revealed that six of the ten

immigration variables tested significantly impact rates of theft across neighborhoods. Specifically, total immigrants and immigrant heterogeneity are found to have significant and negative effects on theft, hence, on average neighborhoods with greater concentrations are expected to have lower rates of theft. While, positive correlations were found for immigrants who have been in Canada for 10 year or longer, immigrants who have been in Canada for 30 years or longer, immigrants who arrived in Canada at the age of five or younger and ethnic heterogeneity. The expectation here is that on average, neighborhoods characterized by higher concentrations of these factors over time, have higher rates of theft.

Within neighborhoods, immigrants who have been in Canada for 30 years or longer have a negative and significant effect on theft and, thus, an increase in the concentration of this population over time is expected to lower rates of theft. On the other hand, significant and positive effects were found for immigrants who have been in Canada for 20 years or longer and recent immigrant heterogeneity, the implication here being an increase in these populations within neighborhoods, overtime, lead to increases in neighborhood theft.

Table 4-10. Regression results of logged theft counts on full model

	Theft			
	Between neighborhood (long-run)		Within neighborhood (short-run)	
	B	Std. error	B	Std. error
<i>(Immigration Measures)</i>				
Total immigrants	-0.12***	0.04	0.03	0.03
Recent immigrants	0.09	0.06	0.03	0.03
Immigrants, 10 years +	0.08**	0.04	-0.01	0.01
Immigrants, 20 years +	0.01	0.05	0.12***	0.04
Immigrants, 30 years +	0.09**	0.05	-0.22***	0.04
Immigrants arrived 5yrs or <	0.25***	0.08	0.13	0.08
Ethnic Heterogeneity	0.02***	0.01	0.00	0.01
Visible minorities	-0.01	0.01	0.02	0.02
Immigrant heterogeneity	-0.02***	0.01	-0.01	0.01
Recent immigrant heterogeneity	0.02***	0.01	0.01**	0.01
<i>(Neighborhood Measures)</i>				
Dwellings rented	0.01	0.01	0.02	0.03
Dwellings under major repair	-0.05	0.03	0.02	0.05
Old houses (40 yrs +)	-0.05***	0.01	0.02	0.01
Number of movers, past year	0.02	0.02	-0.01	0.02
Number of movers, past 5 years	0.05***	0.01	0.05***	0.02
Postsecondary education	0.05***	0.01	-0.04***	0.01
Low income (% families)	-0.01	0.02	-0.04**	0.02
% income government assistance	0.09***	0.03	-0.04	0.03
Unemployment rate	0.19***	0.04	0.01	0.03
Average dwelling value, 000s,	0.01**	0.00	-0.01***	0.00
Average rent, 00s	0.02	0.03	-0.01	0.05
Median income, 000s	0.01	0.02	-0.02	0.03
Median family income, 000s	-0.01	0.01	0.02	0.00
Adjusted - R^2	0.53			
F-Statistic	36.49***			

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Overall, regression results for the models tested demonstrates variability amongst between and within neighborhood components of the model in the direction of the relationships and statistical significance of the same variables. This difference however, should be expected given that between and within neighborhood measures purposefully capture subtle yet distinct processes. More specifically, the between neighborhood component of the model is aimed at capturing the impact of static changes in a measure over time. For instance, the between-effect component of the model would measure the

effect of having high immigrant populations on crime, that is, on average do neighborhoods with higher immigrant concentrations have significantly more or less crime? The within-neighborhood component of the model alternately measures the impact of change in a particular indicator over time on crime. In this case, the within-effect component captures whether changes over time in the concentration of immigrants significantly impacts crime rates within a neighborhood, therefore, over time do changes or disruptions that stem from these changes significantly impact crime within a neighborhood? For these reasons, when investigating the immigration crime link it is important to consider the different temporal effects that can be identified using the decomposition model that simultaneously estimates and separates within and between effects.

Taken together, regression results for the models tested demonstrate considerable variability between and within neighborhoods with regard to the direction of the relationships obtained and statistical significance of the measures tested. This difference however, should be expected given between and within neighborhood measures purposefully capture subtle yet distinct processes. More specifically, the between neighborhood component of the model is aimed at capturing the impact of static changes in a measure over time. For instance, the between-effect component of the model would measure the effect of having high immigrant populations on crime, that is, on average do neighborhoods with higher immigrant concentrations have significantly more or less crime? The within-neighborhood component of the model alternately measures the impact of change in a particular indicator over time on crime. In this case, the within-effect component captures whether changes over time in the concentration of immigrants significantly impacts crime rates within a neighborhood, therefore, overtime do changes or disruptions that stem from these changes significantly impact crime within a neighborhood?

Results from this analytic exercise provide an instructive example of the importance of testing for within and between group effects as each could have a different impact on crime, this is especially true when evaluating neighborhood-level effects on crime. In addition to the methodological insights obtained from the use of a model that estimates within and between group effects, results from these analyses also provide empirical credence to the immigration-crime literature. Specifically, the set of results obtained here demonstrate considerable variation in the statistical significance and

direction of relationships for the immigration measures tested. Because, immigration was narrowly operationalized to include ten different classifications that consider the heterogeneous nature of immigrant populations we were able to uncover differential or group-specific effects of immigration on neighborhood crime. Distinctions otherwise masked with the use of broad measures such as immigrant concentration. Most generally, in addition to accounting for the subtle yet importance difference in between and within group effects, findings provide support for variations in the effect of different measures of immigration on property crime and, therefore, demonstrate the importance of context in testing the effects of a complex phenomenon such as immigration on crime as immigration effects on crime are not monolithic and can vary by context.

4.5. Discussion

The primary aims of the current study were broadly influenced by the recommendations made by Sampson (2013) during his presidential address to the American Society of Criminology. More specifically, Sampson's (2013) calls for greater emphasis in criminological research on place as a fundamental context in Criminology and, also, greater focus on neighborhood effects when studying crime and place appear well-suited for tests of the immigration-crime relationship. For this reason, the empirical strategy of this article was to first account for the distinctiveness of neighborhoods, as well as the heterogeneity of immigrant populations as these differences could lead to differential effects on neighborhood crime.

The former objective was achievable though an analytic strategy, the decomposition model that enables between and within neighborhood effects to be simultaneously estimated within the same model. Although the distinction may seem subtle, results from the current analysis demonstrate a clear partition in immigration effects between and within neighborhoods and, thus, provide support for the separation of these effects in future tests of the relationship.

The latter objective that concerns accounting for the heterogeneity of immigrant populations was achievable through the use of disaggregated measures of immigration, an initiative that is rare in the literature. In addition to total immigration, a very broad yet commonly used proxy in existing tests of immigration effects on crime, the current study took a more narrowed approach to the operationalization of immigration. Resulting, were

nine additional immigration measures some of which have never been tested, these measures categorize immigrant populations in ways that we felt were, not only, theoretically important but, also, empirically relevant as the disaggregation of immigration could reveal important relationships that are otherwise masked in broader definitions. Results from the current analysis lend support for the use of disaggregated measures of immigration, as current findings demonstrate a clear and significant distinction in the effects of specific immigration measures on various property crimes within and between neighborhoods.

In addition to the methodological and empirical contributions, the current article sought to make a theoretical contribution by constructing a theoretically informed analysis. More specifically, the theoretical angle undertaken in this paper was to gain insight into whether the theoretical perspectives principally used to guide research on immigration and crime and the subsequent predictions that follow, all of which are derived from American experiences are translatable to other settings. Therefore, given the gap in literature pertaining to a lack of cross-national studies, the current analyses help fill this gap by testing the relationship in a setting, neighborhoods in the city of Vancouver, British Columbia, Canada that has yet to be tested in existing works. Although, Canada and the United States share contextual similarities that could reasonably justify an expectation of similar relationships or theoretical expectations regarding immigration and crime, there are undeniably important contextual differences between the two countries that could differentially impact immigration effects on crime (Jung, 2017). For this reason, the current study aimed to investigate whether similar theoretical relationships would unfold in spite contextual differences between Vancouver neighborhoods and those in the United States.

Moreover, in line with contextual contributions the current study looked at immigration effects on neighborhood property crime, a strategy that differs from the majority of existing works as, most often, the immigration-crime link is tested in terms of violent crime. In addition to the contribution by way of crime types tested, evaluating the impact of immigration on crime also bares some theoretical influence. Most simply put, because theoretical predictions such as those postulated in strain theory or economic models of rational criminal behavior expect a positive relationship between immigration and crime, based on the notion that immigrants face greater economic hardships and/or are an economically marginalized group and, thus, commit crimes for economic gain, it

seems logical that the immigration-crime relationship be tested in terms of property crimes, that often monetary gain. Table 11. Presents a direct comparison of results for the immigration measures within and between-neighborhood for all crime models analyzed.

Table 4-11. Result comparison table, Immigration measures

(Immigration Measures)	Result comparison table											
	Property crime		Commercial BNE		Residential BNE		Theft of vehicle		Theft from vehicle		Theft	
	Between	Within	Between	Within	Between	Within	Between	Within	Between	Within	Between	Within
Total immigrants	-0.06***	0.03**	-	-	-0.05***	0.03***	-0.09***	0.06***	-0.07***	0.02*	-0.12***	-
Recent immigrants	-	-	-	-	-	-	0.07**	-	-	-	-	-
Immigrants, 10+ yrs	-	-	-	-	-	-	0.07***	-	0.04**	-	0.08**	-
Immigrants, 20+ yrs	0.05***	0.03**	-	-	0.06***	0.05***	-	0.04**	0.05**	-	-	0.12***
Immigrants, 30+ yrs	-	-0.09***	0.09***	-0.07**	-	-0.12***	-	-0.16***	-	-0.06***	0.09**	-0.22***
Immigrants 5yrs <	0.09***	-	0.15***	-	0.11***	-	0.13***	-	-	-	0.25***	-
Ethnic heterogeneity	0.02***	-	0.03***	-	0.01***	-	0.01***	-	0.02***	-	0.02***	-
Visible minorities	-	-	-	-	0.02***	-	-	-0.04***	-	-	-	-
Immigrant hetero	-0.01***	-	-0.03***	-	-0.02***	-	-0.01***	-0.02***	-0.01***	-	-0.02***	-
Recent imm hetero	0.01***	-	0.02***	-	-	-	0.01***	0.01***	0.01***	0.01**	0.02***	0.01**
Total Sig parameters	6	3	5	1	6	3	7	6	6	3	7	3

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

<Insert Table 11 about here, result comparison table>

Results from the current study provide evidence and support for the separation of between and within-neighborhood effects and, also, demonstrate the importance of using multiple measures of immigration in test of immigration effects on neighborhood crime. Overall, findings from the between and within-neighborhood components from each of the six property crime models analyzed reveal distinct and clear partitioning within and between neighborhoods with regard to the significance of the immigration variables and, also, the direction of the relationships. For the purposes of brevity, the discussion that follows will only touch upon the pattern of coefficients for the immigration variables of interest.

To begin, results from all six models tested show statistical significance was reached more often for the immigration effects between-neighborhoods. Specifically, of the 10 immigration variables analyzed in each of the 7 models tested, between neighborhood measures reached statistical significance overall far more often than within neighborhood measures (41/70 compared to 21/70). Generally, these findings indicate that in terms of the specific immigration measures selected for evaluation, that immigration effects on property crime in Vancouver neighborhoods matter more across neighborhoods than within neighborhoods and, therefore, each process differentially impacts immigration effects on crime. These results, thereby, illustrate the importance of accounting for within and between group effects in neighborhood-level studies, as distinguishing between these effects capture importance nuances that would otherwise be missed when only testing for one or the other.

Being that a majority of existing studies on immigration and crime (the exception being Sydes, 2017) have considered either how changes in immigration impact crime within a unit (see. Martinez et al., 2010; Ousey & Kubrin 2009) or how changes in static levels of immigration are associated with more or less crime between units (see e.g., Stowell & Martinez, 2007; Velez, 2009), the collective insight derived from these set of results may be void of important information regarding how each process differentially impacts neighborhood crime (Sydes, 2017). For this reason, the current study contributes to the existing literature by demonstrating the utility of accounting for both between and within neighborhood effects, particularly when studying immigration effects

on neighborhood crime, as results here show both practical and theoretical insights can be gained from teasing out these subtle, yet important effects.

Practically, in terms of informing policy and programs, these results could be used to create policies or programs that are adapted to fit the differential needs within and between neighborhoods. For instance, with reference to the set of results obtained in the current study, immigration effects on property crime across neighborhoods are distinguished from immigration effects on property crime within neighborhoods. As such, it can be reasonably expected that having insight on these differences could help formulate policies or programs that more efficiently address issues related to immigration and crime at the neighborhood level.

Theoretically, the simultaneous estimation of between and with neighborhood effects and, the corresponding results that clearly demonstrate differences in these effects can be used in theoretical refinement and theory testing. Given that the impact of high levels of immigrant concentration (between-neighborhood effect) are inherently different from changes in immigrant concentration (within-neighborhood effect) accounting for these differences and empirically identifying these differences impact the application and testing of theory and, thus, lead to a refinement in the way theory is used in neighborhood-level tests of the immigration-crime relationship.

The most pertinent and clear demonstration of this notion relates to consistently disparate findings between and within neighborhoods for the total immigration measure, where the relationship found was most often in opposite directions. Being that total immigration is most often used in the literature as a measure of immigration, the implications that stem from these disparate findings are important to consider as they bare both practical and theoretical importance. Interestingly, in four of the six models tested (property crime, residential break and enter, theft of vehicle and theft from vehicle) significant effects in opposite directions were found for total immigrants, where the between-neighborhood effect was always negative while the within-neighborhood effect always positive.

The inference here is that neighborhoods that on average, have greater concentrations of immigrants over time will have lower rates of various property crime. Alternately, increases in the concentration of immigrants within a neighborhood (year-to-

year) will lead to higher rates of certain property crimes. Because we found opposite results for the same measure, an important and commonly used measure nonetheless, cases such as this, show the importance of testing for between and within group differences. From a practical perspective, the implications of testing for one or the other could at worst lead to important decision being made using false/inaccurate inferences or at best incomplete inferences on the state of the relationship. Because empirical evaluations on the immigration-crime link provide information that can be used to inform policy and public perception thus, having real life implications, it is important when testing relationships such as these to be comprehensive and thorough.

As well as the practical implications, the divergent effects of total immigration on property crime within and across neighborhoods demonstrate the theoretical importance of testing for group specific effects, especially in the context of immigration and crime. Because findings reveal opposite relationships with regard to the effect of total immigration on property crime within and across neighborhoods, failing to account for both effects could lead to inaccurate or incomplete theoretical inferences on the relationship. For example, the current study found that between neighborhoods, total immigration was significant and negatively related to property crime, residential break and enter, theft of vehicle, theft from vehicle and theft. Therefore, results obtained from the between neighborhood component of the model conform to theoretical expectations of perspectives such as, the immigrant revitalization perspective, and the immigrant enclave thesis that predict negative associations.

Conversely, results from the within-neighborhood component for property crime, residential break and enter, theft of vehicle, theft from vehicle revealed significant and positive relationships, thereby conforming to theoretical expectations of perspectives that predict positive associations between immigration and neighborhood crime, namely social disorganization theory. Results from the models for commercial break and enter and theft provide an additional example of opposite findings for the same immigration measure, immigrants who have been in Canada for 30 years or longer. However, the pattern of coefficients for these models differ from the ones discussed previously, the between-neighborhood component revealed a significant and positive relationship, whereas the within-neighborhood relationship was significant and negative.

The inference here is that on average neighborhoods with greater concentrations of immigrants who have been in Canada for 30 years or longer, will over time have higher rates of commercial break and enter and theft. On the other hand, within neighborhood increases in the concentration of this same demographic, over time reduces rates of commercial break and enter and theft. Examples of polarized findings therefore, show, that different theoretical perspectives can be used to explain the immigration-crime relationship between and across neighborhoods. As such, these results lend support to the notion that the hypothesized effects of immigration on crime from competing dichotomies such as social disorganization theory and the immigrant revitalization thesis could perhaps occur simultaneously, both perspectives are important but in different ways. Moreover, the synthesis of traditionally polarized theoretical perspectives could help better explain the complex processes that underlie the immigration-crime link, particularly at the neighborhood-level.

In addition to findings that reveal opposite effects, within and across neighborhoods for the same immigration measure, there were also many instances where the direction of the relationships were the same. In the models for property crime and residential break and enter, immigrants who have been in Canada for 20 years or longer was significant and positive in both the within and between neighborhood components. The indication here is that over time neighborhoods with greater concentrations and neighborhoods that see an increase in the concentration of this immigrant population will have more property crime and residential break and enter. The consistency within and across neighborhoods shows the strength of this measure in predicting neighborhood-level property crime and residential break and enter, for this reason, it would prove fruitful to further investigate this measure.

Recent immigrant heterogeneity is another measure where the direction of the relationship found was identical within and between neighborhoods. To be more precise, this was the case in models for theft of vehicle, theft from vehicle and theft, drawing from these findings we can infer that neighborhoods with greater heterogeneity of recent immigrants and, areas that see an increase in the heterogeneity of recent immigrants will have higher rates of various forms of theft.

Alternately, immigrant heterogeneity was found to have a significant and negative impact on theft of vehicle within and across neighborhoods. This was the only measure

to show consistency in the negative direction within and across neighborhoods and, thus, whether an increase over time within a neighborhood or on average, having greater heterogeneity of immigrant populations, the effect on thefts of vehicle is negative. These results interestingly show opposite relationships in the same model (theft of vehicle) for immigrant heterogeneity (negative effect) and recent immigrant heterogeneity (positive effect). Even though both are measures of immigrant heterogeneity, findings indicate that the effect of recent immigrant heterogeneity is significantly different/opposite of immigrant heterogeneity. Thereon, these results demonstrate the importance of disaggregation, as the impact of recent immigrant heterogeneity can be opposite of immigrant heterogeneity, an important difference for theoretical and practical considerations, one that would have been overlooked if immigration was more broadly measured.

Of course, there were instances where immigration measures only reached significance in one of the components, within or between of the model. These results are also important, as they delineate the importance of context, when evaluating the immigration-crime link. The above discussion exemplifies that expectations with regard to the impact of immigration on crime, are not monolithic, results show significant variance in the relationships tested, findings demonstrate variations within and across neighborhoods, across property crime types and also, across different immigration measures. Further to the latter point, the extent of variation in the disaggregated immigration measures are clearly demonstrated in the results, and, thus, the next discussion pertains to important inferences that can be made regarding the use of multiple immigration measures.

Stowell and Martinez (2007) encouraged the use of multiple measures of immigration, as to provide a more comprehensive test on the impact of immigration, on social structure. The current study adapted this approach to account for the heterogeneity of immigrant populations and, in this way, provides a more comprehensive approach to tests of the immigration-crime relationship. Being that immigrants are an incredibly heterogeneous group, it is important to capture or account for some of the variation amongst immigrant populations as, these differences could lead to differential impacts on crime. As such, the current analyses include ten theory driven measures of immigration, measures that are categorized to capture dynamics that we feel are relevant and important in neighborhood-level tests of immigration effects on crime.

Accordingly, the immigration measures capture recent immigrants, immigrant heterogeneity, duration of time spent in Canada, age of arrival in Canada and, to keep in line with existing research a measure of total immigration. Drawing from the findings that reveal significant parameters for all the immigration variables tested, it is clear that the inclusion of disaggregated measures of immigration facilitated a more nuanced understanding of immigration effects on property crime within and across neighborhoods. Moreover, findings show distinct variation in the pattern of significant coefficients, even though, all the immigration measures tested matter, the effects vary by context, providing support for more narrowed interpretations of immigration in empirical research.

When examining the overall pattern of significance (accounting for within and between neighborhood results) total immigration reached significance more often than any other measured tested (overall ten significant parameters with varying signs). The between-neighborhood results for total immigration showed significant and negative relationships in five of six models and, therefore, in line with theoretical expectations of the immigrant revitalization and immigrant enclave perspectives. On the other hand, total immigrants was significant and positive in models for residential break and enter, theft of vehicle and theft from vehicle, here results conform to theoretical expectations of social disorganization theory and, other perspectives such as Strain theory, economic models of rational criminal behavior, subculture theory and social control theory that posit a positive immigration-crime relationship.

Taken together, results for total immigration are in concurrence with existing findings as greater support was found for negative relationships. Following, measures for immigrants who have been in Canada for 30 years or longer and recent immigrant heterogeneity also revealed a substantial pattern of significant coefficients (total of nine significant parameters for each measure). Interestingly, of all the measures evaluated, recent immigrant heterogeneity was the only immigration measure to have all nine significant parameters in the positive direction. Therefore, the consistency shown in these results not only indicate very strong support for the theoretical propositions of social disorganization theory but also point to the importance of this particular measure whether for practical consideration, future empirical efforts or theoretical refinement/testing. Furthermore, the set of results obtained for recent immigrant heterogeneity lend support to disaggregation efforts, this important finding could have

been masked in broader measures. Correspondingly, immigrants who have been in Canada for 30 years or greater also had nine significant parameters, albeit in different directions with more negative than positive parameters (six negative, three positive).

These results generally imply that within a neighborhood, increases in the concentration of immigrants who have been in Canada for 30 years or longer, will over time reduce various forms of property crime. This finding could be interpreted as being in line with the long-run theoretical predictions of Strain theory, economic models of crime, social control theory and, importantly, social disorganization theory. Most generally, these perspectives commonly focus on the economic and social hardships often experienced by new immigrants. For example, Merton (1938) believed that in capitalist societies, such as Canada, culturally defined goals related to wealth and prestige provide an aspirational framework that the majority strive to achieve. Even though, the goals and aspirations are unidimensional, access to legitimate means such as higher education or meaningful employment, requisite factors to achieve these goals are not equally accessible. In these instances, new immigrants are especially susceptible to having limited access to legitimate means, limitations that stem from few social networks relating to employment and/or difficulties with the recognition of foreign credentials and, thus, often struggle to access the legitimate means required to achieve success in capitalist terms (Andresen, 2013).

For these reasons, it is expected that the social and economic barriers faced by new immigrants make them more susceptible to crime. Furthermore, from a social disorganization perspective, it is expected that new immigrants who are often burdened by restricted access to economic resources initially settle in high crime areas or socially disorganized neighborhoods, as these areas provide inexpensive housing options (Shaw & McKay, 1931; 1942). However, over time as immigrants become more integrated into their host society and develop conventional bonds or social capital that provide opportunities for legitimate means, they become less susceptible to crime or in the case of social disorganization theory are able to move out of socially disorganized neighborhoods into areas with less crime. Having said that, within neighborhood increases in the concentration of immigrants who have been in Canada for 30 years or longer may be negatively related to property crime because residents in this demographic have adequate social and economic capital and, therefore, not at risk to

commit property crime. Another viable explanation could be that residents in this area have aged out of crime (Hirschi & Gottfredson, 1983).

Interestingly, the negative effect on neighborhood property crime of immigrants who have been in Canada for 30 years or longer are very specific to this demographic, results for immigrants who have been in Canada for 20 years or longer is opposite as all significant findings are positive. Specifically, opposite effects are most notable in direct comparisons for the within component of the property crime, residential break and enter, theft of vehicle and theft models. The inference here is that the effect of long term immigrants on neighborhood property crime is distinguished and, very specifically so, as a ten-year difference in duration of time spent in Canada, 20 years compared to 30 years produced contrasting results. Generally, these results speak to the importance of disaggregation or the use of narrowly defined measures that allow for nuances such as these to be captured in the results. Current results do not reveal the underlying reasons for why these differences exist, however, these findings do provide an important point to be further investigated.

In a similar fashion, opposite findings were also obtained for recent immigrant heterogeneity and immigrants who have been in Canada for 30 years or longer. This distinction was particularly evident in three within-neighborhood components of models capturing various forms of theft, theft of vehicle, theft from vehicle and theft. In these instances, neighborhoods with increasing concentrations of recent immigrant heterogeneity over time experience more theft. These findings closely conform to the theoretical expectations of social disorganization theory. In addition, to the structural explanation offered by social disorganization theorist, these results can be interpreted to align closely with theoretical predictions that focus on the economic and social hardships experienced by new immigrants, such as, Strain theory, economic models of crime, social control theory and, subculture theory. However, at this point the mechanisms that underlie these results are unclear, further testing is required to gain insight into how these forces operate. Regardless, current findings vividly illustrate the empirical utility in testing multiple, narrowly conceived measures of immigration, including variables that facilitate the estimation of time-variant relationships. This point is well demonstrated in findings that show differential effects in time-variant relationships between long-term immigrant residents (20 years compared to 30 years), along with important differences

between long-term immigrants (30 years) and recent immigrants (recent immigrant heterogeneity).

Taken together, the current paper provides an instructive example of how paucities in the immigration-crime literature can be filled with the use of a methodological technique that separates within and between-neighborhood effects, multiple disaggregated measures of immigration. Along with the methodological and empirical contributions, the current analyses shed new insight on the immigration-crime relationship by testing immigration effects in a never before tested context, neighborhoods in Vancouver and, also, by testing immigration effects on neighborhood property crime, as existing studies overwhelmingly look at violent crime. The main take away from the current study is that immigration effects on neighborhood crime are highly context dependant, current results show that the impact of immigration on property crime varies by crime type, immigration measure tested and according to whether within or across neighborhoods effects are considered. Thereon, current findings lend credence to Sampson's (2013) call for a relentlessly focus on context, particularly neighborhood context that can be achieved through studies that account for neighborhood context, social mechanisms, and spatial inequality.

4.6. Conclusion

Currently, discourses related to immigration effects on crime have become an international mainstay in political and social discourses. The dialogue on immigration is plentiful and, in recent years, concerns that relate to immigrants and crime have been amplified, as conflict and violence have propelled the rate of displaced individuals to record levels, the highest since the Second World War (United Nations High Commissioner for Refugees, 2016; Sydes, 2017). As a result, refugee and immigration claims have surged and, accordingly, nations are faced with the task of providing new settlement for a record number of people (United Nations Department of Economic and Social Affairs, 2016). Immigration has therefore, contributed to the rapid change in cities and neighborhoods, changes that open up an entirely new set of challenges that relate to unsolved problems of race and inequality that have long plagued cities and justice systems alike (Sampson, 2013). Because immigrants and immigration have become an integral part of contemporary society, issues related to immigration remain at the forefront of concerns raised by the public and politicians of host countries, with some

believing that increased immigration will increase crime and, thus, threaten the security and safety of native populations (Sides & Citrin, 2007).

However, much of the more recent research on immigration and violent crime show at different levels of aggregation, that increased immigration does not lead to significant increases in crime, instead the effect has been found to be either negative or null. These results, however, have not negated concerns regarding immigration effects on crime. Although the literature spans over several decades, there are substantial gaps that remain unaddressed, perhaps in addressing these gaps, we as researchers can contribute to an empirically based knowledge stream that could help alter perceptions of the immigration-crime link.

The current article contributes in a number of ways to the more recent empirical research on immigration and crime. Overall, findings from the current study illustrate the complex and highly context dependent nature of immigration effects on neighborhood property crime. Namely, results demonstrate the need for greater malleability with regard to expectations, whether theoretical, empirical or general regarding the nature of immigration effects on crime. Because, at the very least, variations amongst immigrant groups, neighborhood context and property crime types all lead to differential relationships between immigration and crime, at least in the context of Vancouver neighborhoods. Results from the current study and the inferences that follow lead to numerous suggestions for avenues for future research. In an effort to address the implications of using multiple/disaggregated measures of immigration raised in the current paper, future studies particularly in the U.S neighborhood-level context on property crime should be undertaken as this will facilitate a direct comparison between established literature (majority US based) with findings presented in the current analysis.

On a related note, given that the immigration-crime literature currently suffers from a lack of context, evaluations of the relationship in other contexts, namely other countries, at the neighborhood-level with a focus on property crime would, not only, help substantiate current findings but also prove beneficial in broadening the knowledge scope regarding immigration effects on crime. Furthermore, testing immigration effects on crime cross-nationally would enable greater insights into whether the theoretical perspectives that are derived from US based experiences, often used to frame assessments of the immigration-crime relationship translate well to other settlements and,

accordingly, whether continuity exists in the negative associations found in a majority of existing studies. Further to this point, future contributions that undertake a similar empirical and methodological approach as employed in the current paper could help corroborate past research or provide greater insight into the relationships found here. More specifically, future research could either contribute to the generalizability of results found here or alternately demonstrate that the Vancouver context is somehow markedly different from those elsewhere.

Finally, because context was found to be an important element in current tests of immigration effects on neighborhood crime, the final suggestion for future research is specifically methodological. Because results here show that immigration effects vary according to crime type, immigration measure tested and within and across neighborhoods, it would be constructive to use methodological techniques that are capable of teasing out these effects. Whether future studies elect to use the decomposition model in a different context to test multiple/similar immigration measures on property crime or select methodologies that are capable of pulling neighborhood effects apart, such as, local-level models, the immigration-crime literature will surely capitalize on these contributions. Because context matters in neighborhood-level analyses of immigration effects on crime, it is important that the analytic techniques selected are capable of capturing contextual variations amongst neighborhoods as these differences will surely impact immigration effects on neighborhood crime.

Relating back to Sampson's (2013) piece on the importance of context in neighborhood-level studies, some fruitful suggestions for future research include accounting for neighborhood-level variations with the use of specific metrics for ecology or econometrics. In addition, empirical assessments should examine spatial mechanisms that cross neighborhood boundaries, an initiative can be accomplished with the use of spatial analytic techniques, such as geographically weighted regression or other local modeling techniques that identify local spatial variations in the relationships tested.

The current study provides several contributions that help advance the immigration-crime literature, however, it is not without limitations. First, although one of the contributions of this piece relates to the never before tested context (Vancouver neighborhoods) and rarely tested crime type (property crimes), the scarcity of research

in this context also make comparisons difficult and, thus, results are limiting with regard to generalizability. Given the disparity between the context and crime types tested in the current study and those tested in the majority of existing studies, results from the current analysis are difficult to generalize. Therefore, despite being informative, it could be that findings from the current study relate only to Vancouver neighborhoods and are not generalizable to other context, for this reason we recommend that future tests attempt to replicate current findings in different context. Furthermore, the analytic strategy used in this paper, although capable of simultaneously separating within and between-neighborhood effects and, thereby, producing important inferences does not account for spatial differences in immigration and neighborhood contextual effects on property crime. Because the decomposition is a global model and, thereby, the parameter estimates produced apply equally to all neighborhoods within the study area, this strategy does not facilitate the explicit estimation of local structural and spatial contexts. Therefore, global models such as the one used in this study, and similar to most other research in this area, assume that the processes that underlie the relationships tested are stationary and do not exhibit spatial variance. However, because ecological data are often non-stationary and spatially heterogeneous, future studies that use neighborhood-level, ecological data will undoubtedly benefit from the use of local modeling techniques that explicitly account for spatial variations. Finally, the endogeneity effect is a limitation that pertains to most, if not all, studies of immigration and crime, it is important that we are cognizant of this limitation and, moving forward develop empirical solutions to help circumvent some of the biases brought upon by endogeneity such as, identifying and subsequently including missing regressors.

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Chapter 5.

Spatially-varying relationships between immigration measures and property crime types in Vancouver census tracts, 2016

Abstract

We empirically test for spatial heterogeneity or local effects of multiple immigration measures on various property crime classification across Vancouver CTs, 2016. Using spatially referenced crime data (commercial burglary, residential burglary, theft from vehicle, theft of vehicle, other theft, and aggregate property crime) and census data, we use geographically weighted regression, local regression analysis that captures potentially significant local variability in parameter estimates to investigate the neighborhood level effects of immigration on crime. We find that spatial non-stationarity is present for immigrant and recent immigrant heterogeneity on rates of residential burglary, ethnic heterogeneity on rates of commercial burglary, and immigrants residing in Canada for 20 years + on rates of theft from vehicle. Moreover, in some cases, local immigration effects are significant, but do not vary significantly at the local-level. Overall, significant spatial variation in the effects of immigration on property crime is present. These are important for policy and theory. The identification of varied spatial patterns of immigration effects on crime may help explain some of the inconsistent/disparate results found in neighborhood level studies on immigration and crime.

Keywords: Immigration; property crime; geographically weighted regression; spatial non-stationarity; spatial analysis

5.1. Introduction

Ecological research in criminology has shown there are many demographic factors of a neighborhood (age, gender, race and ethnicity, immigrant concentration and residential mobility) that impact crime rates (Arnio & Baumer, 2012; Sampson & Laub, 1993; Sampson & Lauritsen, 1997). Despite this focus, a notable limitation exists within this body of neighborhood-level research. Specifically, within the social disorganization literature, is the possibility of significant spatial heterogeneity for its social constructs (Arnio & Baumer, 2012). For example, social disorganization theory highlights neighborhood variations in racial composition, immigrant concentration, socioeconomic disadvantage, and residential instability as mechanisms that impact differences in crime across neighborhoods (Arnio & Baumer, 2012). The expected hypothesis that follows, therefore, should include dimensions of spatial variations related to demographic differences across neighborhoods that are expected to generate those differences (Arnio & Baumer, 2012). Despite this, much of this literature has not empirically accounted for these spatial variations.

Criminologists have become more cognizant of non-stationary effects when considering crime relationships (see, for example, Arnio & Baumer, 2012; Cahill & Mulligan, 2007; Graif & Sampson, 2009; Morenoff, Sampson, & Raudenbush, 2001; Tita & Cohen, 2004). However, the utilization of spatial methodologies that formally estimate spatially varying relationships in an analysis of immigration and crime is limited (Graif & Sampson, 2009). For this reason, the current study builds on existing scholarship that explicitly tests for spatial heterogeneity with the use of a geographically weighted regression (GWR) to investigate neighborhood level immigration and crime relationships.

The present study aims to explore the spatial dimensions of immigration on various classifications of property crime across Vancouver census tracts (CTs) for 2016. The analytic design consists of a global component, using OLS models, and a local component, using GWR, for six property crime types across CTs in Vancouver. This allows for the identification of localized trends in the data, assessing the merits of global models that have been applied in most neighborhood studies of demographic context and crime and, in all but one, study immigration and crime (the lone exception being Graif & Sampson, 2009). We advance previous research by explicitly assessing the merits of the common global approach and juxtapose it against an alternative local

strategy, GWR that is capable of identifying potential significant “local” variability in model parameters.

5.2. Theoretical mechanisms explaining the link between immigration and crime

Immigration has been linked to crime through a variety of theoretical processes, the most prominent being social disorganization. Within the social disorganization framework, Shaw and McKay (1942) note that immigrant populations are not direct correlates of neighborhood crime. Rather, the immigration-crime relationship is influenced by patterns of immigrant settlement into socially disorganized neighborhoods, given the availability of inexpensive housing options for newcomers (Bursik, 1988; Shaw & McKay, 1931, 1942). However, after obtaining the necessary economic and/or social capital, most immigrants relocate to areas with greater structural stability, with crime not following immigrants into their new neighborhoods. Most recent empirical studies on immigration and crime have demonstrated no relationship or a negative association (Kubrin & Desmond, 2015; MacDonald et al., 2013; Martinez et al., 2010; Chavez & Griffiths, 2009; Graif & Sampson, 2009; Ousey & Kubrin, 2009; Stowell & Martinez, 2007; Martinez et al., 2004; Lee & Martinez, 2002; Lee et al., 2001). For this reason, contemporary scholars have begun to question whether constructs derived from the social disorganization perspective accurately capture immigrant experiences in contemporary landscapes, particularly for recent immigrants.

Lee and Martinez (2009) highlight the fact that contemporary societies are fundamentally different from those of the early- to mid-twentieth century. Therefore, the lack of contemporary support for social disorganization predictions (for recent immigrants) could be attributed to significant changes in the social landscape (Martinez et al., 2010). The growing skepticism regarding theoretical correlates advanced by social disorganization theory have led some scholars (Lee & Martinez, 2002; Sampson, 2008; Sampson, Morenoff, & Raudenbush, 2005) to consider alternative perspectives such as the emerging immigration revitalization perspective and the ethnic enclave perspective, both of which predict a negative immigration/crime relationship.

Additionally, the immigration and crime literature has an empirical limitation: the assumption of spatial invariance in parameters. Real-world processes are rarely, if ever,

stationary in part due to the incredibly heterogeneous nature of urban environments, that include neighborhoods, and because of heterogeneity in settlement patterns. With regard to the empirical literature on immigration, there is a consensus that levels of immigration within neighborhoods either negatively or insignificantly impact crime (Lee & Martinez, 2009). Taken together, theoretical, empirical, and practical wisdom tell us that demographic factors that include immigrant concentration and other immigration related factors demonstrate spatial non-stationarity in effect on neighborhood crime patterns. Therefore, the limitation that pertains to assumptions of invariance in the effect of theoretically identified demographic factors is important to consider.

5.3. Geographically weighted regression: Applications in Criminology

In an analysis of spatial patterns of residential burglaries with various neighborhood level socioeconomic characteristics, Malczewski & Poetz (2005) used geographically weighted regression (GWR) to assess local-level variations in estimated parameters. Findings from GWR analyses showed significant local variations in the relationships between the risk of residential burglary victimization and the average value of dwellings and percentage of the population in multifamily housing. This study demonstrates the practicality of using local-level analysis such as GWR, with local results that can be used to guide crime prevention policies, adequately tailored according to neighborhood need. Following this research, Cahill and Mulligan (2007) used GWR in the context of violent crime in Portland, Oregon. Overall, Cahill and Mulligan (2007) found that the majority of explanatory variables tested were found to have locally varying relationships with violence, some switching signs place to place.

Arnio and Baumer (2012) hypothesized that the effects of both traditional demographic indicators (immigrant concentration, racial composition, socioeconomic disadvantage, and residential instability) and a contemporary aspect of housing transition (foreclosure) on neighborhood crime varies spatially. They found significant variation across Chicago census tracts with regard to percent black, immigrant concentration, and foreclosure for both robbery and burglary rates. Additionally, results revealed significant variation across neighborhoods for socioeconomic disadvantage on robbery rates and residential stability on burglary rates. In the same year, Light and Harris (2012) investigated the relationship between racial composition and violent crime.

Using county-level data comprised of Western and South-Western counties (from Washington to New Mexico), Southern counties (from Texas east through Georgia) and East Coast counties, their results showed that spatial processes have greater relevance when considering white compared to black violent crime, with significant spatial variation in the relationship between county characteristics for both white and black violent crime.

More recently, Cameron et al. (2016) took a local-level approach to investigating the impact of alcohol outlet density (licensed clubs/bars, night clubs, off-licensed clubs and restaurants/café) on violence across census tracts on the North Island of New Zealand. Results from their analyses show that bar and night club density, as well as licensed club density (sports clubs), are significant and positively related to violence. However, these relationships did not demonstrate significant local variation, but significant local variation was found for the impact of off-license density and restaurant/café density on violence.

Boivin (2018) used GWR to test a contradiction within routine activity theory: the convergence of people in any given space can lead to both an increase and decrease in criminal activity. He found both positive and negative associations between population and crime across census tracts. As such, areas with greater concentrations of people can have guardianship effects, but this was especially true in areas largely occupied or frequented by people for shopping, school, and work (Boivin, 2018). Bunting et al. (2018), Louderback and Roy (2018), and Cowen et al. (2018) have investigated global and local regression results for various crime types and context in the Miami-Dade area. These authors have consistently found that a limited number of places were driving the global regression results (local regression results were not statistically significant in all places) and that the local regression results often, but not always, switch signs when compared to the global results. And one of the most recent contributions to the spatial criminology literature is that of Smith and Sandoval (2019) who examined the local variability of robbery rates across census tracts and block groups for the City of Saint Louis. GWR results reveal significant local variations in the relationship between race, stability, and robbery rates across St. Louis. They show that specific areas where significant relationships occur and would be a valuable tool for crime prevention policies or policing strategies.

Graif and Sampson (2009) found considerable evidence of spatially varying effects of neighborhood characteristics on homicide across Chicago neighborhoods: immigrant concentration was either unrelated or inversely related to homicide, findings that conform to existing literature. Specifically, they estimated global and local effects of foreign-born concentration and language diversity on homicide rates, controlling for neighborhood-level indices of concentrated disadvantaged, residential stability, and population density. Global results showed insignificant relationships between percentages of foreign-born and homicide rates, whereas the language diversity index was significantly related to lower homicide rates. GWR results revealed significant local variation in the effects of percentage foreign-born and language diversity on homicide, local parameters for language diversity tend to be nonsignificant or significantly negative in predicting homicide, local parameters for foreign-born are mostly negative with positive parameters identified for more than a quarter of the areas, and local parameters for immigrant concentration are mostly insignificant with approximately 16% of areas indicating significant negative coefficients, whereas approximately 7% exhibit significant positive coefficients.

Graif and Sampson (2009) clearly convey the empirical, theoretical and substantive importance of local-level considerations in evaluations of immigration and crime. Accordingly, we aim to extend and build upon this research. The current study, therefore, takes an analytic approach that is structurally similar to the approach used in Graif and Sampson (2009): the use of global OLS models as well as local GWR models to assess the impact of various immigration measures on different classifications of property crime across Vancouver CTs.

5.4. Data and methods

The data used in the analyses below are for the City of Vancouver, British Columbia, Canada. Vancouver is within the Metro Vancouver region, the third largest population metropolitan area in Canada. Vancouver has long been considered a “gateway” city for immigrants into Canada (Hou & Bourne, 2006). The Vancouver Census Metropolitan Area (CMA) is the largest metropolitan area in western Canada, approximately 2.55 million in 2016. Since 1991, the Vancouver CMA has seen significant population growth, including new immigrants, especially since the 1986 World Exposition on Transportation

and Communication. The World Exposition in 1986 brought global attention to the Vancouver CMA along with subsequent international investments especially and initially from Hong Kong based multinational companies focused on major apartment/condo developments concentrated in the inner-city neighbourhoods including the central business district (Ley & Murphy, 2001).

As part of the Pacific Rim countries with historical immigration links to Asia, substantial increases in immigrants from these regions occurred throughout the latter part of the 20th century and in the initial near two decades of this century (Murdie, 2008). In addition, Metropolitan Vancouver has the mildest climate in Canada, which along with its spectacular natural ocean and mountains, has attracted large numbers of interprovincial migrants (Newbold & Cicchino, 2007). In the context of immigrant settlement, Vancouver is the second most favored destination in Canada after Toronto and, for this reason, consists of an incredibly heterogeneous and large immigrant population (Hou & Bourne, 2006). Overall, Vancouver's resident population has steadily increased from 546,000 in 2001 to 630,000 in 2016.

5.4.1. Crime data

Crime incident data for Vancouver were obtained from the Vancouver Open Data Catalogue.³ Property crime, residential burglary, commercial burglary, theft of vehicle, theft from vehicle and other theft are analyzed. Each criminal incident includes the location (X/Y coordinates, geocoded to census tracts), date, time, and year of the crime incident. Though available from 2003 to 2018, we only use the 2016 crime incident data because of the most recently available census data. Census tracts are relatively small and stable geographic areas that tend to have a population ranging from 2500 to 8000, with an average of 4000 persons. We analyze the 105 census tracts in Vancouver to estimate local relationships between crime and immigration.

5.4.2. Immigration data

All immigration and ecological variables in the analyses are from Statistics Canada's Socio- Economic Information Management System (CANSIM) for the year 2016. We

³ <https://data.vancouver.ca/datacatalogue/crime-data.htm>

consider multiple measures of immigration that aim to capture the multidimensional aspects of immigrant populations and, accordingly, account for some of the heterogeneity between immigrant groups. Specifically, the immigrant categories include: total immigrants, recent immigrants, long-term immigrants, immigrants who arrived at a very young age, and multiple measures of heterogeneity.

Consistent with existing research, total immigrants, the percentage of total immigrants within each census tract in Vancouver is included in the variable set. We also include a measure of recent immigrants, defined by the percentage of immigrants within a census tract who have been in Canada for five years or less. This is followed by immigrants within a census tract who have been in Canada for 10+, 20+ and 30+ years. Relatedly, another measure consists of immigrants who arrived in Canada at a very young age (five years old or younger). Immigrants who arrived very young to a host country are likely able to be culturally assimilated quicker than immigrants who arrived in their older years and, therefore, less likely to engage in crimes that stem from issues related to failures or difficulties in assimilating (Waters & Jimenez, 2005).

The final immigration dimension consists of several forms of heterogeneity: ethnic heterogeneity, visible minorities, immigrant heterogeneity, and recent immigrant heterogeneity. Measures of ethnic heterogeneity and visible minorities alone are not direct proxies of immigration, but they are considered control measures because they, arguably, represent an important ethnic component of neighborhoods. All the ethnic heterogeneity variables are measured using the Blau (1977) Index that ranges in value from zero to one hundred, with zero representing no ethnic mix and one hundred representing a perfectly even mix of ethnic groups.

5.4.3. Ecological data

We include 13 control variables that capture various neighborhood structural characteristics including housing, income, and land use characteristics. The ecological data are obtained through the census and conform to social disorganization measures often used in the ecology of crime literature. The general hypothesis of social disorganization theory is that social and economic deprivation, ethnic heterogeneity, and population turnover/ residential mobility lead to increases in crime/delinquency rates (Shaw & McKay, 1931; 1942). As such, we include population change within the past

five years, number of residents who have moved into the neighborhood within the past year, and percentage of rental units that captures the transient nature of renters when compared to owners. Additional housing characteristics are measured with percentage of dwellings under major repair and percentage of old homes (40 years+). Income measures included are: the unemployment rate, post-secondary education (degree/diploma/certificate), low income, income from government assistance (welfare, family allowance, employment insurance, etc.), average dwelling value, average rent, median income, and median family income—all income variables are measured in 2006 dollars. Lastly, we include a measure that captures percent of Aboriginal population, given the well-documented high levels of (child) poverty in this population that may not be accounted for using census-related variables (MacDonald & Wilson, 2013).

5.4.4. Geographically weighted regression: A statistical model

Global models assume invariance or stationarity of the relationships tested. Moreover, suppressing local processes, when they exist, could lead to model misspecification and, subsequently, biased or inefficient estimates of the relationships evaluated (Fotheringham et al., 1996; Neuhaus & McCulloch, 2011). As such, we estimate a global OLS model and a geographically weighted regression (GWR) model. Local and global results are then compared, with comparative inferences regarding, measure significance, model fit and importantly, significant local variations at the forefront of consideration.

Being that, GWR models are general extensions of basic global regression models, we begin with a delineation of the components of the global OLS model in equation 1:

$$y_i = \beta_0 + \sum_k \beta_k x_{ik} + \varepsilon_i \quad (1)$$

where y_i is the crime rate in census tract i , β_0 is the estimated constant, β_k is a vector is estimated global parameters for the k independent variables, x_{ik} are the values for each independent variable in census tract i , and ε_i is the residual for census tract i . In the calibration of this model one parameter is estimated for the relationship between each

independent and dependent variable, thus the underlying assumption here is spatial invariance in the effects of the relationship/s tested (Fotheringham et al., 2000).

GWR is an extension of the traditional regression framework, the main distinguishing factor being that GWR allows for local rather than global parameters to be estimated, the model is rewritten in equation 2 to demonstrate the notion of spatial variation at the local level:

$$y_i = \beta_0(u_i, v_i) + \sum_k \beta_k(u_i, v_i)x_{ik} + \varepsilon_i \quad (2)$$

where (u_i, v_i) denotes the coordinates of the i th unit of analysis, such that a constant (β_0) and parameter for each independent variable (β_k) is estimated for each census tract i (Brunsdon et al., 1996; Fotheringham et al., 2000). The GWR equation therefore, importantly recognizes that spatial variations might exist in the relationships tested and, accordingly, provides a means by which they can be measured and accounted for in the estimates (Fotheringham et al., 2000). Lastly, GWR requires the identification of its bandwidth calibration. To minimize issues associated with inadequate bandwidth selection, the optimal bandwidth is estimated through an iterative process to minimize the Akaike information criterion (Fotheringham et al., 2001). The global spatial regression models and local GWR models for this study were calibrated using R version 3.5.2. GWR models were estimated with the use of: The R library spgwr: Geographically Weighted Regression v. 0.6-32.

Accordingly, the current study looks to empirically evaluate the following hypotheses using the analytic techniques described above:

Hypothesis 1 (H₁)

The processes that link immigration to property crime are non-stationary and, thereby, exert significantly different effects across Vancouver CTs.

Hypothesis 2 (H₂)

The impact of immigration on property crime vary across space, by crime type and immigration measure.

5.5. Results

The OLS results for property crime displayed in Table 1 show that of the ten immigration measures tested, only recent immigrant heterogeneity revealed a positive and significant relationship with property crime. The current finding conforms to a key hypothesis of the social disorganization perspective—recent immigrant heterogeneity is associated with increased neighborhood crime rates (Kubrin, 2000; LaFree & Bersani, 2014). Three of the thirteen controls measures tested reached statistical significance; positive and significant coefficients are found for population change in the past five years and percentage of low-income families, while dwellings under major repair is significant and negatively related to property crime.

Table 5-1. Global OLS and local GWR results, logged property crime

Property crime	Global (OLS) model		Local (GWR) model				
	Coefficient	(SE)	Lower Quartile	Median	Upper Quartile	GWR sig	Local Variation
Total immigrants	-0.040	0.046	-0.044	-0.040	-0.038		
Recent immigrants	0.098	0.067	0.083	0.089	0.098		
Immigrants, 10 years +	-0.052	0.060	-0.050	-0.048	-0.044		
Immigrants, 20 years +	0.180	0.098	0.161	0.166	0.174		
Immigrants, 30 years +	-0.120	0.083	-0.122	-0.116	-0.107		
Immigrants arrived 5yrs or <	-0.022	0.100	-0.039	-0.025	-0.002		
Ethnic heterogeneity	0.004	0.009	0.001	0.004	0.007		
Visible minorities	0.011	0.020	0.009	0.013	0.015		
Immigrant heterogeneity	0.004	0.016	0.003	0.005	0.007		
Recent immigrant heterogeneity	0.014*	0.006	0.013	0.014	0.014	**	No
Population change 5 yrs	0.015**	0.005	0.014	0.014	0.015		
Dwellings rented	-0.020	0.014	-0.025	-0.024	-0.028		
Dwellings under major repair	-0.180**	0.054	-0.187	-0.182	-0.176		
Old houses (40 yrs +)	0.005	0.015	0.001	0.004	0.007		
Number of movers, 1 yr	-0.002	0.022	-0.002	-0.001	0.001		
Postsecondary education	0.007	0.018	0.006	0.009	0.012		
Low income (% families)	0.067**	0.024	0.067	0.072	0.074		
% income government assistance	-0.063	0.039	-0.068	-0.062	-0.054		
Unemployment rate	0.019	0.075	-0.003	-0.004	-0.018		
Average dwelling value, 000s,	-0.001	0.001	-0.001	-0.001	-0.001		
Average rent, 00s	0.041	0.057	0.022	0.029	0.045		
Median family income, 000s	-0.001	0.010	-0.004	-0.001	0.002		
Aboriginal	0.044	0.040	0.037	0.039	0.040		

Adjusted - R^2	0.520	0.675
Akaïke information criterion		192.108

Notes. $n = 105$; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

The GWR model is markedly consistent with respect to significance found for immigration variables. Conforming to OLS findings, GWR results show that recent immigrant heterogeneity is significantly positive in predicting property crime at the local-level. Significance testing for locally varying relationships reveals that recent immigrant heterogeneity is significantly associated with increases in property crime at the local-level—see Figure 1. The mapped output illustrates that the magnitude of effect increases steadily westward, which is interesting given that CTs located to the west of the city are some of the most economically affluent areas. Furthermore, the magnitude of effect is also strongest in areas located in the northern most tip of Vancouver, where the central business district is located.

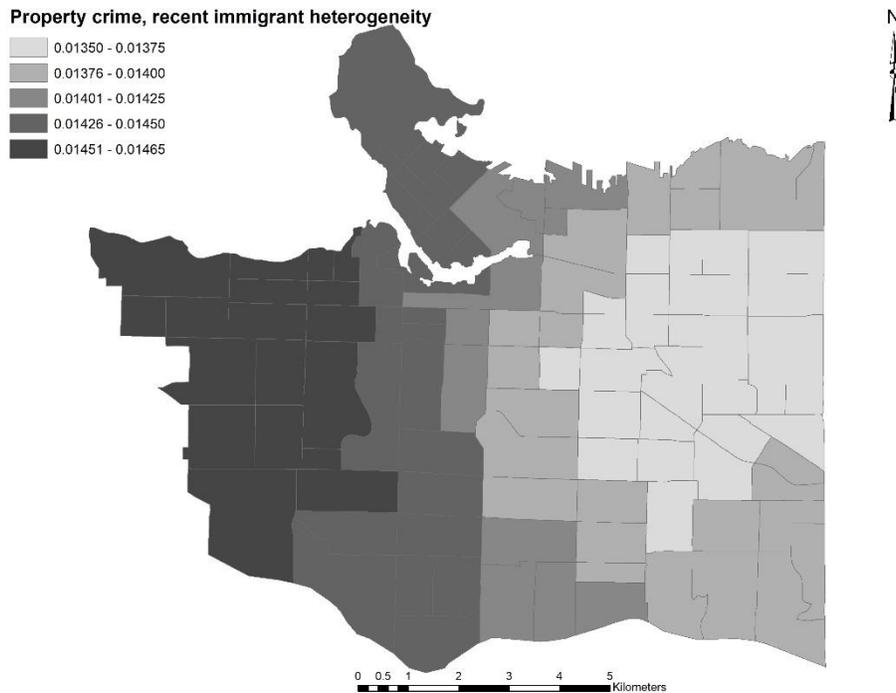


Figure 5.1. Mapped GWR results, property crime, recent immigrant heterogeneity

Even though, results from OLS and GWR models are consistent with regard to immigration effects, there is divergence on the significance of controls measures. Results from the OLS model revealed that three of the thirteen structural neighborhood measures were significantly related to property crime. However, the GWR results returned insignificant results for all thirteen control measures tested. Although, the recent immigrant heterogeneity relationship does not vary significantly at the local-level, testing

for spatial variations at the local-level using GWR revealed spatial differences in the magnitude of effects, highlighting the range of effects across Vancouver CTs.

Table 5-2. Global OLS and local GWR results, logged residential burglary

<u>Residential break & enter</u>	Global (OLS) model		Local (GWR) model				
	Coefficient	(SE)	Lower Quartile	Median	Upper Quartile	GWR sig	Local Variation
Total immigrants	0.005	0.038	-0.424	-0.155	0.268		
Recent immigrants	0.018	0.056	0.253	0.859	1.219		
Immigrants, 10 years +	-0.008	0.050	-0.430	-0.352	-0.245		
Immigrants, 20 years +	-0.019	0.081	0.583	0.950	1.212		
Immigrants, 30 years +	0.044	0.068	-0.096	0.057	0.342		
Immigrants arrived 5yrs or <	0.024	0.082	0.524	1.102	1.381		
Ethnic heterogeneity	0.004	0.008	0.084	0.103	0.135		
Visible minorities	-0.016	0.017	-0.440	-0.410	-0.361		
Immigrant heterogeneity	-0.031*	0.014	-0.761	-0.480	-0.218	**	Yes
Recent immigrant heterogeneity	0.012*	0.005	-0.029	0.045	0.139	**	Yes
Population change 5 yrs	0.008*	0.004	0.030	0.059	0.079		
Dwellings rented	-0.050***	0.012	-0.368	-0.233	-0.142		
Dwellings under major repair	-0.086	0.045	0.283	0.633	0.816		
Old houses (40 yrs +)	0.017	0.013	0.387	0.450	0.560		
Number of movers, 1 yr	0.007	0.018	0.175	0.280	0.317		
Postsecondary education	0.013	0.015	-0.044	0.004	0.039		
Low income (% families)	0.037	0.020	0.792	0.872	0.993		
% income government assistance	-0.054	0.032	-0.745	-0.586	-0.415		
Unemployment rate	-0.034	0.062	-1.429	-1.005	-0.019		
Average dwelling value, 000s,	-0.047	0.000	0.002	0.005	0.006		
Average rent, 00s	-0.090	0.047	-2.030	-1.783	-1.531		
Median family income, 000s	-0.002	0.009	0.366	0.443	0.500		
Aboriginal	0.062	0.033	-0.038	0.201	0.434		

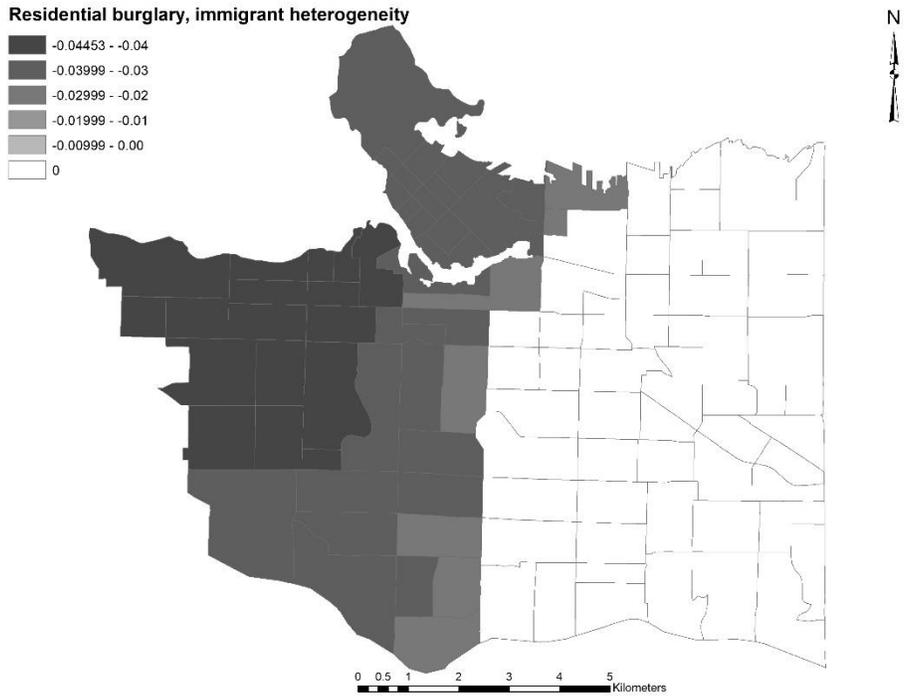
Adjusted - R^2	0.545	0.870
Akaike information criterion		699.870

Notes. $n = 105$; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

The global and local effects of immigration on residential burglary are shown in Table 2. Global results indicate that immigrant heterogeneity is significant and negative while recent immigrant heterogeneity is significant and positive. These findings conform to the theoretical predictions of social disorganization theory and, perhaps, predictions of opposing perspectives such as, the immigrant revitalization perspective and immigrant enclave thesis. With respect to the control variables, results reveal a significant and positive association between population change in the last five years, whereas rental dwellings are significant and negative

Figure 2a provides a visual representation of significant differences in the negative impact of immigrant heterogeneity on residential burglary. Here we can see that the impact of immigrant heterogeneity applies only to CTs located in the west and northern most areas of Vancouver. Therefore, increases in the concentration of immigrant heterogeneity are located to the west of the city and some of the wealthiest areas in Vancouver negatively impact residential burglary. The same pattern is found for areas located in the northern most tip of Vancouver.

a) immigrant heterogeneity



b) recent immigrant heterogeneity

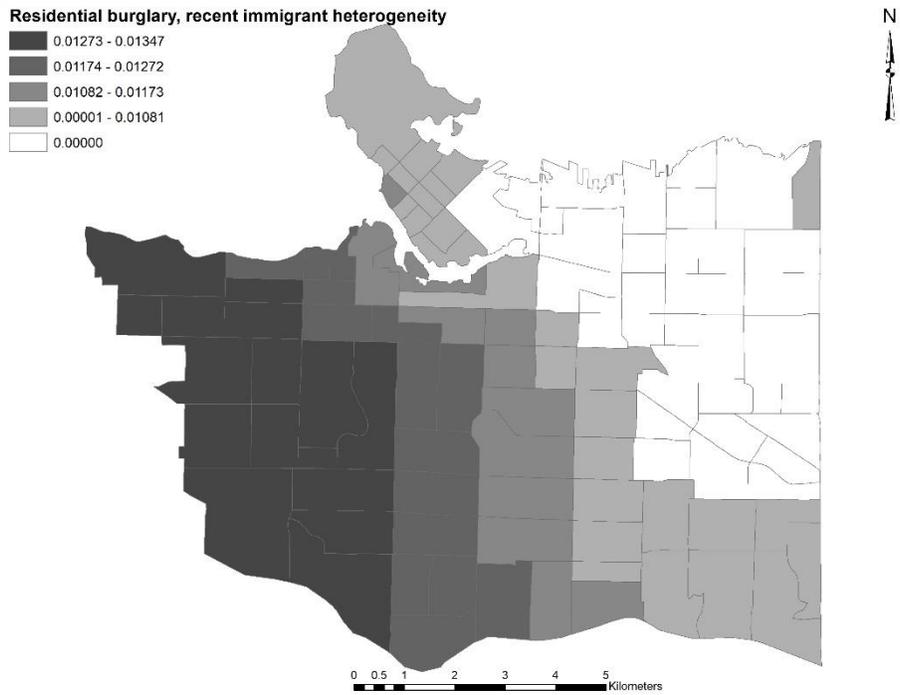


Figure 5.2. Mapped GWR results, residential burglary

Figure 2b illustrates substantial differences in the spatial distribution of the positive association found for recent immigrant heterogeneity. Interestingly, although the effects of immigrant heterogeneity (negative effect) and recent immigrant heterogeneity (positive effect) on residential burglary are opposite, the spatial pattern of significance shows some similarity. Here, the positive pattern of impact for recent immigrant heterogeneity and residential burglary takes on a gradient effect—the strongest effect is noted in the western most areas while the magnitude gradually tapers off eastward. The strength of the positive and significant relationship is also quite strong in neighboring areas that are also largely residential neighborhoods characterized by higher family incomes and housing prices. The impact then gradually wanes moving east.

Table 5-3. Global OLS and local GWR results, logged commercial burglary

	Global (OLS) model		Local (GWR) model			GWR Sig	Local Variation
	Coefficient	(SE)	Lower Quartile	Median	Upper Quartile		
<u>Commercial break & enter</u>							
Total immigrants	-0.075	0.076	-0.094	-0.071	-0.051		
Recent immigrants	0.170	0.112	0.092	0.138	0.181		
Immigrants, 10 years +	0.046	0.101	0.015	0.039	0.072		
Immigrants, 20 years +	0.101	0.164	0.058	0.108	0.148		
Immigrants, 30 years +	-0.102	0.139	-0.143	-0.112	-0.071		
Immigrants arrived 5yrs or <	0.170	0.167	0.167	0.184	0.203		
Ethnic heterogeneity	0.021	0.015	0.011	0.018	0.028	**	Yes
Visible minorities	-0.050	0.033	-0.052	-0.048	-0.045		
Immigrant heterogeneity	-0.024	0.027	-0.030	-0.019	-0.013		
Recent immigrant heterogeneity	0.004	0.009	-0.001	-0.003	-0.006		
Population change 5 yrs	0.018*	0.008	0.016	0.017	0.018		
Dwellings rented	-0.018	0.024	-0.020	-0.016	-0.013		
Dwellings under major repair	-0.017	0.090	-0.187	-0.173	-0.158		
Old houses (40 yrs +)	-0.019	0.026	-0.030	-0.025	-0.018		
Number of movers, 1 yr	0.030	0.037	0.015	0.027	0.034		
Postsecondary education	0.011	0.029	0.003	0.012	0.020		
Low income (% families)	0.044	0.041	0.042	0.056	0.065		
% income government assistance	-0.076	0.064	-0.099	-0.081	-0.052		
Unemployment rate	0.102	0.125	0.075	0.085	0.010		
Average dwelling value, 000s,	-0.001	0.000	-0.000	-0.001	-0.001		
Average rent, 00s	0.001	0.095	-0.030	-0.015	-0.009		
Median family income, 000s	-0.018	0.018	-0.016	-0.012	-0.008		
Aboriginal	0.038	0.066	0.009	0.016	0.24		

Adjusted - R^2	0.535	0.722
Akaïke information criterion		301.857

Notes. $n = 105$; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

OLS results for commercial burglary are displayed in Table 3, with the only significant parameter being population change, which is significant and positively related to commercial burglary. GWR results reveal that ethnic heterogeneity is significantly positive at the local-level. What's more, the GWR analysis further shows that the relationship demonstrates significant spatial variation at the local-level. Figure 3 allows for visual inspection of this spatial pattern, showing that the positive impact of ethnic heterogeneity on commercial burglary only matters in a relatively small area of Vancouver, CTs located in the west of Vancouver, the most affluent areas of Vancouver.

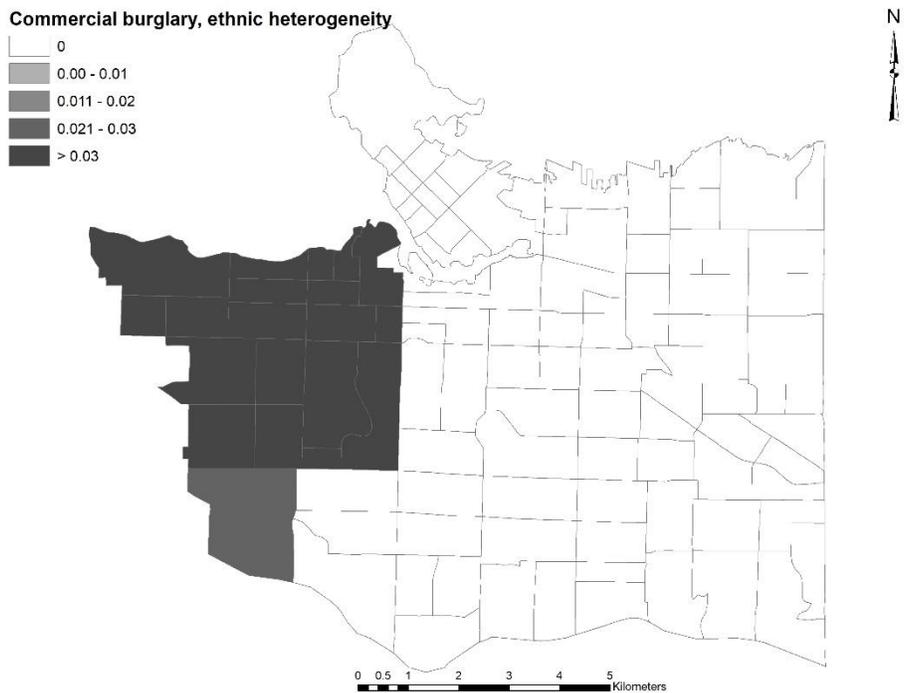


Figure 5.3. Mapped GWR results, commercial burglary, ethnic heterogeneity

Table 5-4. Global OLS and local GWR results, logged theft

<u>Theft</u>	Global (OLS) model		Local (GWR) model				
	Coefficient	(SE)	Lower Quartile	Median	Upper Quartile	GWR sig	Local Variation
Total immigrants	-0.200	0.145	-0.202	-0.193	-0.185		
Recent immigrants	0.274	0.212	0.235	0.251	0.277		
Immigrants, 10 years +	0.109	0.192	0.098	0.105	0.111		
Immigrants, 20 years +	0.126	0.311	0.112	0.125	0.138		
Immigrants, 30 years +	-0.194	0.263	-0.215	-0.195	-0.180		
Immigrants arrived 5yrs or <	0.227	0.316	0.202	0.214	0.224		
Ethnic heterogeneity	-0.013	0.029	-0.017	-0.133	-0.010		
Visible minorities	0.096	0.064	0.097	0.098	0.099		
Immigrant heterogeneity	0.070	0.052	0.072	0.073	0.075		
Recent immigrant heterogeneity	0.009	0.018	0.009	0.009	0.010		
Population change 5 yrs	0.018	0.016	0.017	0.018	0.019		
Dwellings rented	-0.033	0.045	-0.036	-0.034	-0.031		
Dwellings under major repair	-0.033	0.172	-0.331	-0.322	-0.314		
Old houses (40 yrs +)	0.026	0.049	0.022	0.025	0.028		
Number of movers, 1 yr	0.001	0.069	-0.001	0.001	0.002		
Postsecondary education	0.012	0.057	0.015	0.017	0.018		
Low income (% families)	0.060	0.077	0.054	0.058	0.063		
% income government assistance	-0.099	0.123	-0.103	-0.010	-0.095		
Unemployment rate	-0.087	0.238	-0.117	-0.107	-0.094		
Average dwelling value, 000s,	-0.001	0.001	-0.001	-0.001	-0.001		
Average rent, 00s	0.223	0.180	0.220	0.230	0.234		
Median family income, 000s	-0.052	0.035	-0.056	-0.055	-0.052		

Aboriginal	0.048	0.126	0.036	0.046	0.054
Adjusted - R^2		0.276			0.458
Akaike information criterion					434.990

Notes. n = 105; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

Results for the OLS and GWR models for theft are found in Table 4, with theft being the only crime type where immigration effects are all statistically insignificant. With the OLS results being insignificant throughout, neither immigration nor neighborhood structural measures are significantly related to theft in Vancouver. The addition of local information leads to a marginal improvement in model fit, though the overall fit is still rather poor. The lack of statistical significance leads us to believe that theft in Vancouver can perhaps be better explained using a different set of explanatory measures, not including immigration.

Table 5-5. Global OLS and local GWR results, logged theft of vehicle

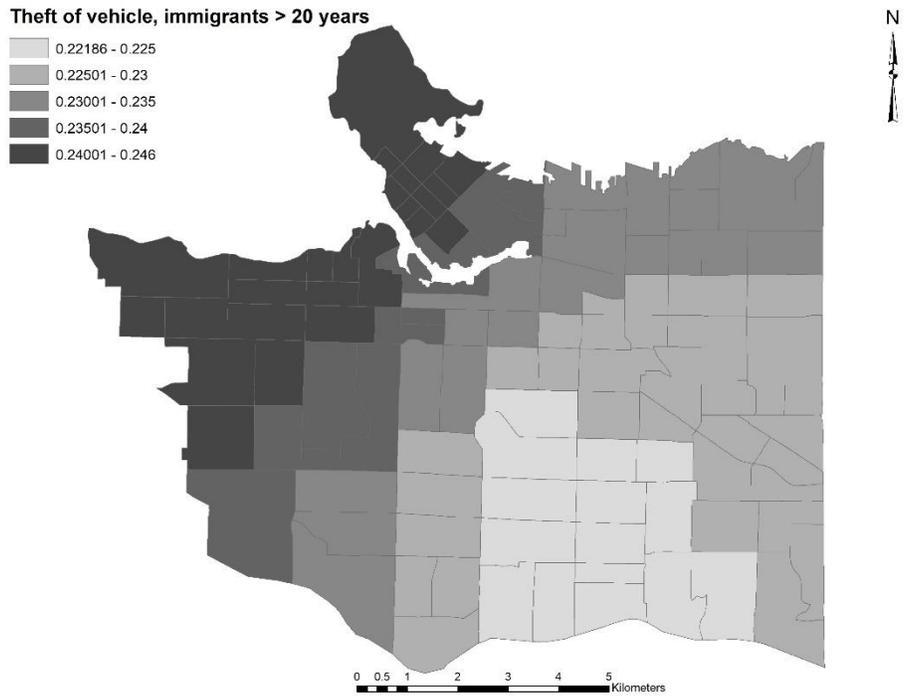
Theft of vehicle	Global (OLS) model		Local (GWR) model			GWR sig	Local Variation
	Coefficient	(SE)	Lower Quartile	Median	Upper Quartile		
Total immigrants	0.020	0.042	0.015	0.016	0.017		
Recent immigrants	0.021	0.061	0.021	0.024	0.025		
Immigrants, 10 years +	-0.103	0.055	-0.100	-0.099	-0.097		
Immigrants, 20 years +	0.238**	0.089	0.227	0.230	0.239	**	No
Immigrants, 30 years +	-0.204**	0.076	-0.207	-0.195	-0.200	**	No
Immigrants arrived 5yrs or <	-0.096	0.091	-0.102	-0.094	-0.086		
Ethnic heterogeneity	-0.002	0.001	-0.003	-0.002	-0.002		
Visible minorities	0.001	0.018	0.002	0.004	0.005		
Immigrant heterogeneity	-0.005	0.015	-0.005	-0.004	-0.003		
Recent immigrant heterogeneity	0.018**	0.005	0.017	0.017	0.018	**	No
Population change 5 yrs	0.008	0.004	0.007	0.007	0.007		
Dwellings rented	-0.017	0.013	-0.019	-0.019	-0.018		
Dwellings under major repair	-0.091	0.049	-0.093	-0.092	-0.091		
Old houses (40 yrs +)	-0.001	0.014	-0.001	-0.001	-0.002		
Number of movers, 1 yr	0.001	0.020	0.001	0.002	0.003		
Postsecondary education	-0.010	0.016	-0.009	-0.008	-0.008		
Low income (% families)	0.036	0.022	0.037	0.038	0.039		
% income government assistance	-0.040	0.035	-0.039	-0.038	-0.037		
Unemployment rate	-0.048	0.068	-0.055	-0.052	-0.047		
Average dwelling value, 000s,	-0.001	0.001	-0.001	-0.001	-0.001		
Average rent, 00s	-0.008	0.052	-0.012	-0.010	-0.008		
Median family income, 000s	0.004	0.010	0.004	0.005	0.005		
Aboriginal	0.061	0.036	0.058	0.060	0.062		

Adjusted - R^2	0.543	0.658
Akaike information criterion		173.595

Notes. n = 105; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

Results from the models that test immigration effects on automotive theft, Table 5, reveal a different pattern of immigration effects. Turning to the OLS model, results show that three of the ten immigration measures tested, immigrants who have been in Canada for 20 years+, immigrants who have been in Canada for 30 years+, and recent immigrant heterogeneity are significantly related to automotive theft in Vancouver. Findings demonstrate that in Vancouver, immigrants who have been in Canada for 20 years+ and recent immigrant heterogeneity have significant and positive relationships with automotive theft. Alternatively, immigrants who have been in Canada for 30+ years are significantly negative in predicting rates of automotive theft. Inspection of GWR results also show that at the local-level immigration effects on automotive theft are identical to those obtained from the OLS model. Figure 4a provides a visual representation of the positive relationship between immigrants who have been in Canada for 20 years+ and theft of vehicle.

a) immigrants who have been in Canada for 20+ years



b) recent immigrant heterogeneity

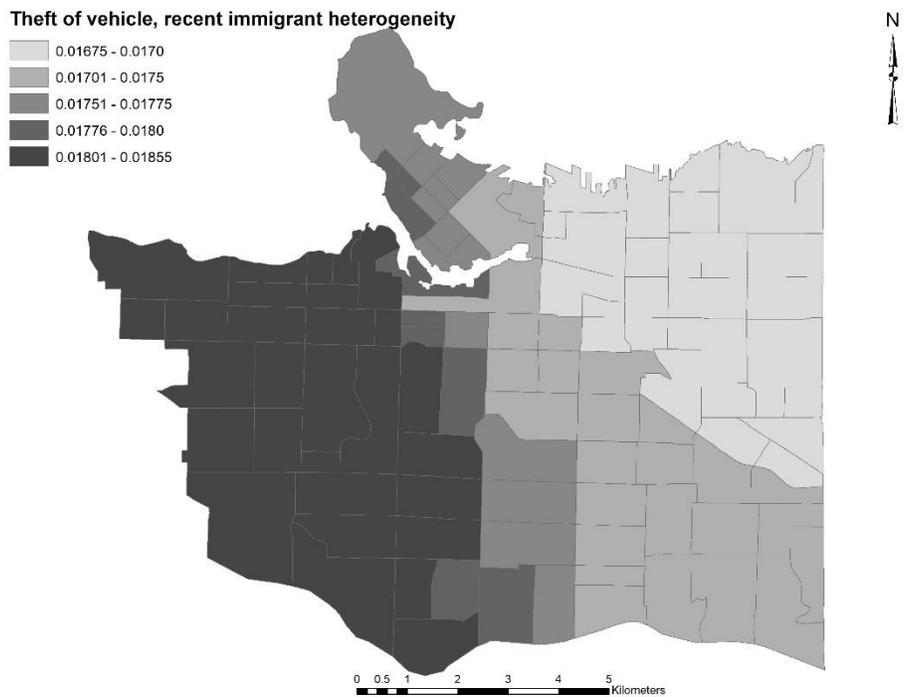


Figure 5.4. Mapped GWR results, theft of vehicle

Although the significant positive effect found here does not significantly vary at the local-level, it is clear that the magnitude of effect demonstrates some local variation. For instance, the relationship is strongest in areas located in the upper western quadrant of Vancouver where some of the most affluent neighborhoods are located. The most northern tip of Vancouver, where the central business district of Vancouver and the city's largest park (Stanley Park) also have large magnitudes of the relationship. Figure 4b provides a spatial depiction of the range of magnitudes for the positive relationship between theft of vehicle and recent immigrant heterogeneity. Once again, the magnitude of the relationship is strongest in areas located to the west of the city (the wealthiest areas). The strength of the relationship gradually weakens moving west to east, though all CTs in Vancouver are impacted by this significant association between recent immigrant heterogeneity and auto theft.

The measure that captures immigrants who have been in Canada for 30+ years is the only significantly negative variable in predicting auto theft at the local-level. The spatial pattern of the magnitude of effects is strongest in the North West area and the most northern tip of Vancouver. The magnitude of effects gradually weakens, as you move from the upper northwestern areas to the southeast region of the city. It is worth noting that although both immigration measures that capture duration of time spent in Canada (20+ years and 30+ years) reached statistical significance, findings were in opposite directions and the spatial distribution of the magnitude of effects were distinct. These results speak to the importance of measure disaggregation as the ten-year interval between these two immigrant populations lead to differential effects on auto theft, at the global and local levels.

Table 5-6. Global OLS and local GWR results, logged theft from vehicle

Theft from vehicle	Global (OLS) model		Local (GWR) model			GWR sig	Local Variation
			Lower Quartile	Median	Upper Quartile		
Total immigrants	-0.034	0.043	-0.044	-0.038	-0.034		
Recent immigrants	0.075	0.064	0.069	0.072	0.077		
Immigrants, 10 years +	-0.080	0.058	-0.076	-0.071	-0.064		
Immigrants, 20 years +	0.210*	0.094	0.187	0.192	0.200	**	Yes
Immigrants, 30 years +	-0.109	0.080	-0.108	-0.102	-0.099		
Immigrants arrived 5yrs or <	-0.086	0.095	-0.104	-0.073	-0.099		
Ethnic heterogeneity	0.006	0.008	0.005	0.006	0.009		
Visible minorities	0.006	0.019	0.002	0.006	0.011		
Immigrant heterogeneity	0.005	0.016	0.002	0.004	0.009		
Recent immigrant heterogeneity	0.013*	0.005	0.012	0.013	0.013	**	No
Population change 5 yrs	0.013**	0.004	0.012	0.013	0.013		
Dwellings rented	-0.014	0.013	-0.019	-0.018	-0.016		
Dwellings under major repair	-0.200***	0.052	-0.207	-0.205	-0.201		
Old houses (40 yrs +)	0.001	0.014	-0.001	-0.001	-0.003		
Number of movers, 1 yr	-0.009	0.021	-0.010	-0.007	-0.004		
Postsecondary education	0.003	0.017	0.003	0.006	0.008		
Low income (% families)	0.079***	0.023	0.079	0.084	0.088		
% income government assistance	-0.070	0.037	-0.075	-0.068	-0.058		
Unemployment rate	0.064	0.072	0.039	0.050	0.069		
Average dwelling value, 000s,	-0.001*	0.001	-0.001	-0.001	-0.001		
Average rent, 00s	0.058	0.054	0.037	0.047	0.061		
Median family income, 000s	0.002	0.010	-0.000	-0.003	-0.006		
Aboriginal	0.020	0.038	0.013	0.015	0.016		

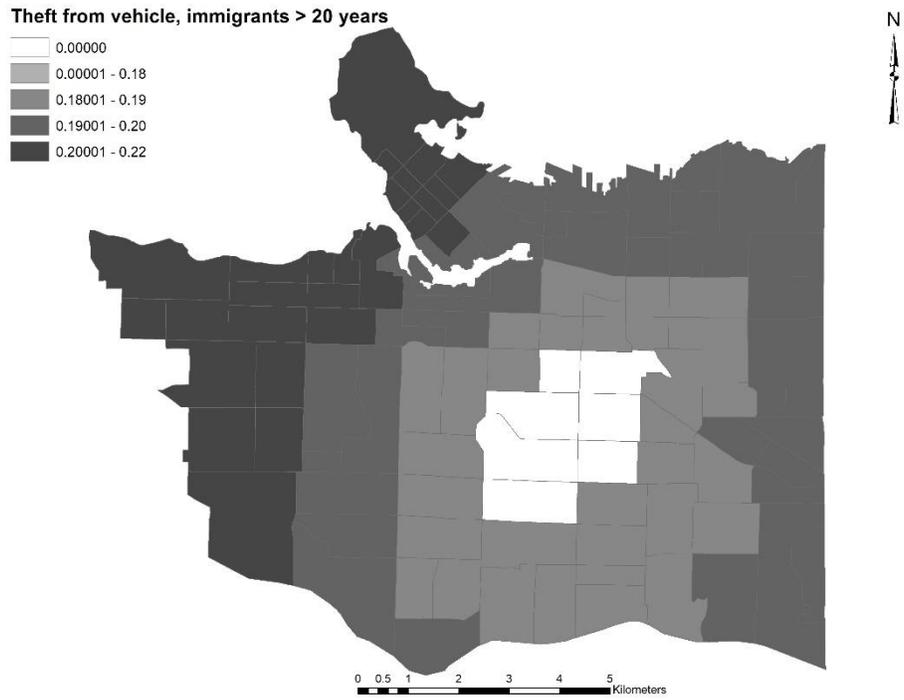
Adjusted - R^2	0.560	0.711
Akaike information criterion		180.050

Notes. $n = 105$; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors. GWR, geographically weighted regression; OLS, ordinary least squares; SE, standard error. Pseudo Adjusted R^2 reported for GWR model.

The final model that evaluates immigration effects on theft from vehicle can be found in Table 6. OLS results show that immigrants who have been in Canada for 20+ years and recent immigrant heterogeneity are significant and positively linked to this property crime type. Four of thirteen control measures also reach statistical significance. Results from GWR analysis conform to those obtained from OLS analysis. The primary and most importance difference between OLS and GWR results relates to local variations in the significance and magnitude of effects that are conveyed only in the GWR results. As such, the positive relationship between immigrants who have been in Canada for 20+ years and theft of vehicle demonstrates significant variation at the local level, Figure 5a provides an illustration of local-level variations in this relationship.

For instance, the relationship is insignificant in areas located in the middle of Vancouver. Alternately, at the other end of the spectrum, in the west side of Vancouver (affluent areas aforementioned) and northern most tip of Vancouver the relationship is significant with the greatest magnitude; these areas have been the most consistent with regard to high magnitudes and significant immigration effects on crime. Furthermore, the impact of this particular immigrant population on theft from vehicle increases as one moves away from the central area of Vancouver. Areas around the central core where the relationship is insignificant see the lowest magnitude of the relationship, the magnitude continues to increase in a spatially circular pattern reaching the greatest strength in areas located in the west and northern tip of Vancouver.

a) immigrants who have been in Canada for 20+ years



b) recent immigrant heterogeneity

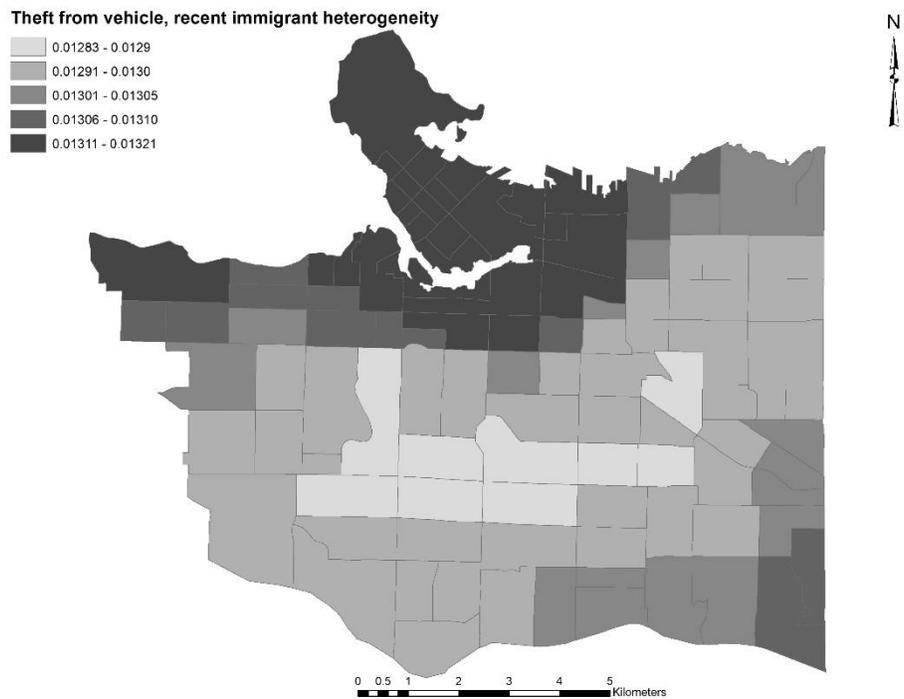


Figure 5.5. Mapped GWR results, theft from vehicle

The mapped results of the significant and positive relationship between recent immigrant heterogeneity and theft from vehicle are displayed in Figure 5b. Disparate from previous findings, this relationship does not vary at the local-level and, hence, all the CTs across Vancouver experience significant and positive effects of recent immigrant heterogeneity on theft from vehicle. The primary distinction between CTs only relate to differences in magnitude of effect. The spatial pattern of strength in the magnitude of effect reveal that the strongest effects are found are in areas located in the northern tip of Vancouver and immediately surrounding areas.

A final noteworthy observation from these results pertain to the consistency and strength of the relationship found between recent immigrant heterogeneity and property crime. In sum, recent immigrant heterogeneity significantly predicts four of the six property crime types tested. All significant findings at the global level was retained even after accounting for spatial information in GWR models. We elaborate on these findings because recent immigrant heterogeneity is correlated with various measures: total immigrants (-0.84), immigrants, 10 years + (-0.80), visible minorities (-0.84) and immigrant heterogeneity (0.87). As such, this important relationship would have been unfounded if we employed data reduction *a priori* due to collinearity concerns.

Considered together, findings from OLS and GWR models support the hypotheses presented at the onset of this article. GWR results show support for H¹, we hypothesized that immigration effects are non-stationary and, therefore, the impact on property crime is expected to show significant spatial variation across Vancouver CTs. Results, for the most part, conform to this prediction, as spatial variations whether in the magnitude of effects or magnitude and statistical significance of effects are shown in GWR results. What's more, GWR results illustrate considerable variability in the spatial distribution of immigration effects and significance of immigration effects across Vancouver CTs and across crime types for all but one crime type, theft. Results, therefore, show that immigration effects, at least in the context of Vancouver, not only vary across CTs, demonstrating the empirical importance of local-level analysis but effects also vary across crime type, immigration measure, demonstrating the import of measure disaggregation, a finding in support of H².

5.6. Discussion

Given that spatial units rarely, if ever, demonstrate structural homogeneity, studies of immigration effects on crime that highlight local variations provide more detailed, real-world approximations of the relationship. This specification, in turn, can help contribute to a better understanding of the routes through which immigration may affect crime (Butcher & Piehl, 1998; Cahill & Mulligan, 2007). Results from the current study provide support for the assertions put forth by scholars such as Butcher & Piehl (1998) and Cahill & Mulligan (2007). With the use of an alternative local modeling strategy we were able to identify localized trends of immigration effects on crime that show geographic differences when considering this relationship—spatial distinctions that help provide information on the local context of immigration effects on crime.

Most generally, GWR findings reveal some degree of local variation when considering immigration effects on property crime. Significant localized trends, however, are specific to immigration measure and crime type. OLS results, on the other hand, revealed significant relationships for various immigration measures in predicting property crimes in Vancouver, namely, immigrant heterogeneity, recent immigrant heterogeneity, immigrants who have been in Canada for 20+ and 30+ years and, ethnic heterogeneity. When compared to GWR results that identified significant local variations for certain parameters (i.e. immigrant and recent immigrant heterogeneity) it became clear that OLS results convey an over simplistic interpretation of the relationship.

GWR results strengthened OLS findings—the addition of local information did not lead to signs switching in any of the models but instead always increases the explanatory power of the model. Theoretically, OLS models provided some support for predictions of the most prevalent perspective used to guide studies on the relationship between immigration and crime—social disorganization theory. OLS results reveal positive and significant associations between immigration captured in the recent immigrant heterogeneity measure and property crime, residential burglary, theft of vehicle, and theft from vehicle (positive and significant relationships revealed in 4 of 6 models). In contrast, OLS results also reveal that immigrant heterogeneity negatively predicts rates of residential break and enter.

Parameter estimates in the GWR model are consistent with those obtained from the OLS model with respect to direction and significance of variables. Results show that these relationships only impact some CTs and not others, showing *where* these relationships are significant along with the spatial distribution of the magnitudes. For example, immigrant heterogeneity is significant and negatively related to residential burglary in CTs located in the west and northern most tip of Vancouver (Figure 2). Interestingly, the areas identified here as having negative and significant experiences with immigrant heterogeneity and crime are also some of the most affluent areas in the city. This particular finding is theoretically informative, because in the Vancouver context, areas that are highly concentrated with respect to heterogeneous immigrant populations are not disorganized, economically marginalized, nor high crime but instead very affluent, structurally stable, and generally low crime. Therefore, this particular finding counters the negative perception of immigrant heterogeneity often derived from social disorganization theory. As such, current findings may provide greater support for opposing perspectives that predict negative associations between immigrant heterogeneity and crime.

Alternately, the positive and significant association between recent immigrant heterogeneity and residential burglary, when considered together with the negative association for immigrant heterogeneity, offer some rather interesting insights. GWR results show some spatial overlap in the effect of recent immigrant heterogeneity and immigrant heterogeneity on residential burglary. The spatial overlap between the negative effect of immigrant heterogeneity and positive effect of recent immigrant heterogeneity on residential burglary initially seemed counterintuitive. However, upon further inspection, it makes empirical and theoretical sense that these opposite relationships could occur in the same places. Empirically, magnitudes for the negative associations between immigrant heterogeneity and residential burglary are almost four times greater than those obtained for recent immigrant heterogeneity. Therefore, when summed, the overall magnitude of effect is still negative. It would be theoretically and substantively interesting to understand the mechanisms that underlie the opposing effects for immigrant and recent immigrant heterogeneity on residential burglary in these specific areas. As such, further investigation into these areas by way of including specifications of more proximate social processes (e.g., collective efficacy, subculture

intensity) or with the addition of a more comprehensive set of structural measures could help us better understand what mediates this spatial variation (Graif & Sampson, 2009).

Theoretically, these relationships can also be explained in terms of social disorganization in that newer immigrant populations may initially settle into small pockets of disorganized areas located in close proximity to larger organized areas, perhaps social housing options that are sometimes located within relatively wealthier residential areas. Keeping in line with social disorganization tradition, these newer immigrants are hypothesized to move away from disorganized neighborhoods into more structurally organized areas once they've obtained the requisite economic and social capital to do so. Nonetheless, it could be the case that recent immigrant settlements into small pockets of disorganized areas settled by various other populations of recent immigrants (i.e. recent immigrant heterogeneity) facilitate a small spike in property crime. However, at this point we can only speculate as the current analyses do not permit further inferences into the nuances of these localized relationships. Future research can test these propositions through the introduction of a greater set of neighborhood structural measures.

In the current context, GWR analysis revealed significant localized effects for immigration on property crime and, so, findings demonstrate the utility of local models. From an empirical perspective, current results demonstrate that in some instances, when relationships are stationary global models may be sufficient. Finally, using local models to explore the spatial dynamics of immigration effects on crime can prove theoretically useful. From a theoretical perspective, local analytic techniques offer insight into important spatial distinctions in parameter effects that can help with theoretical refinement or provide clues for possible theoretical linkages. On a final note, the complex relationship between immigration and crime is perhaps deserving of more intricate theoretical treatments, given that monolithic expectations are likely insufficient in capturing the nuances that underlie these relationships. Nonetheless, most studies in this literature have opted to test or use one theory over another, which could explain why theory testing initiatives often fall short. The relationship that links immigration to crime is complex, that needs both theoretical and methodological refinements, including spatial treatments of the topic that could facilitate the refinement, advancement, or integration of competing theoretical strands.

5.7. Conclusion

The current study highlights the utility of local analytic techniques, namely GWR, in the context of immigration and crime. As elaborated by Fotheringham and colleagues (1997), spatial variations are intrinsic in some relationships, particularly ecological relationships. For this reason, researchers benefit from the use of local models in the analysis of spatial or ecological data. Results from the current analytic exercise demonstrate the benefits of local analysis, in revealing spatial nuances of immigration effects on crime. Specifically, GWR results show localized effects of immigration on commercial and residential burglary, facilitating rather interesting spatial inferences on the immigration-crime relationship in Vancouver, inferences that can be further explored in subsequent research. In addition to empirical and theoretical applications, local-level analyses are important to consider from a practical or substantive point of view. Local level analysis revealed several striking spatial patterns with regard to immigration effects across Vancouver CTs, patterns that would otherwise be masked in global parameters. In spite some very interesting and instructive findings facilitated through GWR analysis, there are a few caveats that should be noted.

The first limitation relates to the cross-sectional nature of these analysis. Being that only a single cross section was analyzed, results from these analyses only represent immigration effects on crime in Vancouver at one point in time (2016). For this reason, current results cannot be compared to results from other cross-sectional analyses at other points in time and certainly not results from panel or longitudinal analysis. Second, the inability to gain access to violent crime data places limitations on the generalizability of current findings, as we only analyzed property crime classifications. Third, we rely solely on police reports, limitations that have long been recognized in criminological literature (Sherman et al., 1989).

Moving forward, we believe that additional explorations into the urban geography of immigration and crime patterns at the local level would offer additional substantive and empirical insights into immigration and crime. The current analysis, though informative, raises a number of questions that ought to be considered in subsequent research. Future directions for spatial research should first include further replication across different time periods and other places. It would also be instructive for replications of the current study to investigate the spatial distribution of immigration and

property crime at different levels of aggregations. This strategy would allow us to determine whether the patterns found at the CT level remain consistent at smaller scales of analysis. If results are found to be consistent at all levels of aggregation then it is possible to infer that results are due to the spatial consistency of measures tested and not merely an artifact of the data/method used. Finally, results from the current study provide a basis for future investigations into why these patterns exist. More specifically, with the use of multiple and substantively distinct measures of immigration we discovered that the spatial patterns for immigrant and recent immigrant heterogeneity were significantly distinct from other measures, as their effects are significantly localized. These findings indicate that elements of immigration captured in these measures and the areas where they show significant localized effects are distinct. Findings such as these, therefore, provide an avenue for future research into why these spatial patterns exist in certain areas but not others. As such, future assessments in different contexts that correspond to the ones undertaken here could help bolster our understanding of how neighborhood dynamics impact immigration effects on crime.

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Chapter 6.

Toward a more complete understanding of the immigration and crime relationship

In his presidential address to the American Society of Criminology in 2012, the leading social disorganization theorist, Robert Sampson called for greater emphasis on context, specifically, in terms of place characteristics and neighborhood effects when theorizing about and reassessing the classic relationships of crime and place. He argued that “place”, especially as manifested in the traditional neighborhood construct central to Shaw and MacKay’s (1931) original social disorganization theory of certain crimes, needed to be reemphasized as a fundamental context in criminological theories despite contemporary macro structural trends. Sampson (2012) explained further that globalization, technological change, and urbanization have allowed individuals routinely to transcend place through internet devices that facilitate global interconnectedness. The latter effectively has created a global culture where personal, professional relationships and sense of community in conjunction with mass access global travel have expanded upon the once dominant and exponentially narrower neighborhood and local contexts. Yet, while these structural changes have attenuated the importance of physical boundaries or place characteristics in contemporary life, Sampson (2012) cautioned against neglecting the role of traditional place when theorizing about crime. He argued that local spatial structural inequalities still remained central to explanations of crimes that overwhelmingly occur in neighborhoods. Sampson (2012) hypothesized further that traditional structural diversity and distinctiveness continued to be the basis of spatial based inequalities concerning social capital, concentrated economic disadvantage, and victimization related to crime at the neighborhood level.

In other words, according to Sampson (2012), the spatial distribution of prosocial structural resources continued to explain racial based neighborhood disparities in a range of crimes including widespread gun violence, drug trafficking and homicides that often involve gang and organized crime in cities such as Chicago, Baltimore, and New Orleans. He acknowledged that neighborhoods were persistently evolving for macroeconomic structural and related city policy reasons such as, the dramatic increase in technologically based jobs in urban centers that facilitate the fundamental

gentrification of inner-city neighborhoods. And, further, even after traditional high rise social housing buildings were raised and replaced by smaller housing stock changing, ethnic/race based structural inequalities continued in these new contexts (Sampson, 2012). According to Historian Michael Katz (2012) another structural trend involving the new age of immigration relates to the reconceptualization of the black/white dichotomy. In acknowledging these fundamental structural changes, Sampson (2012) reasserted that the new complexities of space associated with immigration required a refocus on neighborhood context, social mechanisms, and spatial inequalities.

With Sampson's concerns in mind, this thesis's theoretical and policy discussions focus on the "new age of immigration" and its relationship to crime at the neighborhood level in a Canadian context. In the following sections, the key findings concerning this relationship in the three empirical based chapters will be summarized. Table 6.1. Provides an overview of all three studies.

Table 6-1. Summary of three thesis studies

Study descriptions			
	Chap 3 (Spatial point pattern test)	Chap 4 (Decomposition model)	Chap 5 (Geographically weighted regression)
Study aims	<ul style="list-style-type: none"> -Identify significant changes in the spatial distribution of immigration, property crime and immigration and crime patterns together -Determine whether immigration and property crime patterns exhibit ecological stability over time (2003, 2016) 	<ul style="list-style-type: none"> - Simultaneously test within and between neighborhood effects of immigration on property crime using a multidimensional operationalization approach for immigration. 	<ul style="list-style-type: none"> - Assess whether immigration effects on property crime show spatially heterogeneous or local effects for Vancouver CTs, 2016. -Examine the appropriateness of global analytic strategies for modeling spatial/ecological data.
Analytic strategy	<ul style="list-style-type: none"> -The spatial point pattern test was used in a series of analyses to identify significant similarities or otherwise differences in the spatial patterns of: (a) multiple measures of immigration (b) various property crime classifications (c) immigration and property crime patterns for 2003 and 2016 	<ul style="list-style-type: none"> -Decomposition model, simultaneously estimates between and within neighborhood effects of multiple immigration measures on various classification for property crime for a panel of 105 CTs from Vancouver, British Columbia, 2003-2016. 	<ul style="list-style-type: none"> -Geographically weighted regression (GWR), local strategy of modeling spatial dynamics that estimates local variability in parameters. - Ordinary least squares regression (OLS), global modeling strategy that averages across study unit/space. -GWR and OLS used to estimate local and global effects (respectively) of ten measures of immigration on six classifications of property crime.
Key results	<ul style="list-style-type: none"> - Theoretically and substantively relevant local-variation of immigrant settlement, identifiable in disaggregated measures of immigration. - Immigrant concentration patterns are ecologically stable in Vancouver. Significant similarity in spatial distribution from 2003-2016. -Property crime patterns are not ecologically stable, indicated by insignificant similarities from year to year. 	<ul style="list-style-type: none"> -Immigration effect on property crime varies across crime type and immigration measure. - Between and within neighborhood effects also demonstrate variation differences in: direction of relationship, significance and magnitude of effect. -Overall, between neighborhood effects of immigration reached statistical significance far more often than immigration measures in the within-neighborhood component. 	<ul style="list-style-type: none"> -Significant local variation found in 3/6 crime models. -Mapped GWR output show significant effects most pronounced in CTs located in wealthy and downtown areas. -Relationships range from + to – demonstrating context dependency. -Immigration effects vary depending on geographic context, immigration measure and crime type

Study descriptions			
	Chap 3 (Spatial point pattern test)	Chap 4 (Decomposition model)	Chap 5 (Geographically weighted regression)
Contribution	<ul style="list-style-type: none"> -Spatial point pattern test facilitates more direct empirical test of spatial/ecological stability. - Use of spatial inferential test (SPPT) for exploratory analyses of ecological data revealed measures deemed to be collinear in correlation analysis actually spatially distinct. - Testing multiple and substantively distinct measures of immigration allowed for the identification of important variations in the spatial patterns of immigration measures. -Analyses reveal utility of local-level spatial analyses. 	<ul style="list-style-type: none"> -Effect of immigration substantially vary across crime types, between and within neighborhoods and across immigration measures. -Important to test for potential differences by including more narrow interpretations of immigration, disaggregated measures of crime and statistical models capable of teasing out between and within neighborhood effects. -Current results show that context matters. 	<ul style="list-style-type: none"> - Found evidence of local-level differences in effect of immigration on property crime. - Local variability in the spatial pattern of immigration effects on crime indicates a more nuanced and complex relationship than those captured in global estimates.
Future directions	<ul style="list-style-type: none"> - Further consideration into the urban geography of immigration and crime patterns, facilitated through local-level tests or, specifically using the spatial point pattern test. - Future replications of current analysis at different aggregate levels; with the use of more comprehensive measures of immigration; across property and violent crime types. -The objective is to determine whether immigration and crime patterns demonstrate ecological stability in other context and, also, identify spatially varying patterns of immigration and crime that bare theoretical and substantive import. 	<ul style="list-style-type: none"> -Immigration effects are context dependent. -Future research should strive to capture the many contextual differences that may significantly impact or alter the way immigration impacts neighborhood crime. - Suggestions include: using disaggregated measures of immigration to capture some of the heterogeneity between immigrant groups; disaggregate property and or violent crime types; adopting analytic models capable of capturing contextual variations across neighborhoods such as, local-spatial methodologies. 	<ul style="list-style-type: none"> -Greater utilization of local methodologies, such as GWR that allow for spatial variations (if they exist) to be captured in parameter estimates of immigration effects on crime. -Use disaggregated measures of immigration and crime (property and violent) to maximize local modeling capabilities in identifying non-stationarity effects of immigration.

6.1. Multidimensional indicators of immigration and property crime

Currently, most studies of immigration-crime literature utilized broad measures of immigration, total immigration and/or immigrant concentration to test the effects on violent crime. However, immigrants historically and currently are a heterogeneous group, important especially, in terms of duration in host country. As discussed extensively, this duration immigration sub-construct is theoretically important because of time based prosocial acculturation and integration dynamics, which have long been predicted to mitigate immigrant crime. Furthermore, operationalizing the immigration construct to include categories that distinguish between recent immigrants and immigrants who have resided in Canada for long durations of time ie. 10+, 20+ and 30+ years bares theoretical import. Specifically, theoretical propositions drawn from perspectives such as, social disorganization, strain theory, economic models of rational criminal behavior, immigrant revitalization and the immigrant enclave thesis all place emphasis on the relationship between new or recent immigrants and crime. For instance, an underlying hypothesis of social disorganization theory centers on notions that recent immigrants are expected to reside in higher crime areas due to initial financial constraints. Over time, the expectation is that immigrant's transition from higher crime areas to lower crime, more structurally stable areas—given they are able to obtain the social and economic capital required to facilitate upward mobility. As such, capturing recent vs long term aspects of immigration led to particularly instructive insights.

Table 6-2. Result comparison table, immigration measures from chapter four

(Immigration Measures)	Result comparison table											
	Property crime		Commercial BNE		Residential BNE		Theft of vehicle		Theft from vehicle		Theft	
	Between	Within	Between	Within	Between	Within	Between	Within	Between	Within	Between	Within
Total immigrants	-0.06***	0.03**	-	-	-0.05***	0.03***	-0.09***	0.06***	-0.07***	0.02*	-0.12***	-
Recent immigrants	-	-	-	-	-	-	0.07**	-	-	-	-	-
Immigrants, 10+ yrs	-	-	-	-	-	-	0.07***	-	0.04**	-	0.08**	-
Immigrants, 20+ yrs	0.05***	0.03**	-	-	0.06***	0.05***	-	0.04**	0.05**	-	-	0.12***
Immigrants, 30+ yrs	-	-0.09***	0.09***	-0.07**	-	-0.12***	-	-0.16***	-	-0.06***	0.09**	-0.22***
Immigrants 5yrs <	0.09***	-	0.15***	-	0.11***	-	0.13***	-	-	-	0.25***	-
Ethnic heterogeneity	0.02***	-	0.03***	-	0.01***	-	0.01***	-	0.02***	-	0.02***	-
Visible minorities	-	-	-	-	0.02***	-	-	-0.04***	-	-	-	-
Immigrant hetero	-0.01***	-	-0.03***	-	-0.02***	-	-0.01***	-0.02***	-0.01***	-	-0.02***	-
Recent imm hetero	0.01***	-	0.02***	-	-	-	0.01***	0.01***	0.01***	0.01**	0.02***	0.01**
Total Sig parameters	6	3	5	1	6	3	7	6	6	3	7	3

Notes. n = 1470; * 10 percent significance; ** 5 percent significance; *** 1 percent significance; All inference based on heteroskedasticity and autocorrelation consistent errors.

Table 6.2. Presents an overview of results from chapter four that illustrate the differential, and opposite effect of immigrant and recent immigrant heterogeneity across five of six crime models. Interestingly, immigrant heterogeneity is consistently linked to lower levels of property crime (total property crime, commercial break and enter, theft of vehicle, theft from vehicle and theft), while recent immigrant heterogeneity has the opposite, positive impact. These results therefore, conform to theoretical predictions that highlight temporal changes in the immigration-crime relationship. Accordingly, measure disaggregation has the potential of providing contextually important information on the immigration-crime relationship that can be used in theory testing, theoretical refinement and, importantly policy and program initiatives. Specific to substantive applications, empirical efforts that reveal the positive relationship between recent immigrant heterogeneity and property crime could be used to inform programs (ie. Employment training, skill development) that provide new immigrants with the skills required to obtain legitimate employment opportunities and, in this way, help curtail motivations toward crime. Table 6.3 provides a summary of significant immigration measures across three studies.

Table 6-3. Summary table of significant immigration measures across three studies

Summary table: Significant immigration measures across three studies																			
	BNER			BNEC			Property			Theft			TFV			TOV			
Article chapters	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	3	4	5	
(Immigration measures)																			
Total Immigrants		XX						XX						XX				XX	
Recent immigrants																	X ('16)	XB	
Immigrants 10 years+														XB				XB	
Immigrants 20 years+		XX						XX						XB	XX			XW	XX
Immigrants 30 years+	X ('03)	XW			XX			XW						XW				XW	XX
Immigrants arrive 5yrs<	X ('03)	XB		X ('03)	XB		X ('03)	XB					X ('03)				X ('03)	XB	
Ethnic heterogeneity		XB			XB	XL		XB						XB				XB	
Visible minority		XB																XW	
Immigrant heterogeneity		XX	XX		XB			XB						XB				XX	
Recent immigrant hetero		XW	XX		XB			XX	XX					XX	XX			XX	XX

Notes: Chapter 3 findings; X ('03) = Significant similarity in 2003 and X ('16) = Significant similarity in 2016; Chapter 4 findings; XW=significant within group effect, XB= significant between group effect; XX=significant within and between group effect; Chapter 5 findings; XG=significant global result, XL=significant local result, XX=significant global and local result

An additional contextual contribution of this thesis relates to the testing of property crime as oppose to violent crime that is commonly tested in this literature. Mears (2011) elaborates, there are practical, theoretical and methodological reason to analyze less serious offenses as they relate to immigration. From methodological and empirical vantages, instances of homicide are relatively low when compared to other crimes and, therefore, to obtain a more generalizable conception of immigration effects on crime it is necessary to study relatively common types of delinquency and other less serious offenses (Mears, 2011). Furthermore, moving beyond homicide and violent crime associations may prove useful as the immigration–crime relationship might vary by property crime type in theoretically relevant ways (see. Cancino et al., 2009). The current thesis provides support, particularly for the practical and theoretical utility of analyzing less serious, ie. property crime offences. Theoretically, results across all three studies provide support for theoretical perspectives such as, strain theory and economic models of rational criminal behavior that posit a positive relationship between recent immigrants but also immigrants in general and property crime. The general hypothesis being that recent immigrant’s experience economic strain —social and economic stratification limit access to legitimate means, accordingly they are more susceptible to committing economic crimes, property crimes. For this reason, analyses into the relationship between immigration and property crime not only, supports a more generalizable conception of immigration effects on crime but also provides theoretically relevant insight into underlying mechanisms that may help explain findings. Kubrin & Mioduszewski, (2018) provide an in-depth discussion on how to work toward step toward a more complete theoretical understanding of immigration effects on crime. Substantively, the contextual insights gained from assessments into immigration effects on property crime provide inferences that are relevant to policy and programs. As such, instructive trends emerge from the thesis results that demonstrate the importance of temporal considerations in immigrant conceptualization. For example, two interesting patterns are revealed in findings from chapter five. The first is that neighborhoods with greater concentrations of recent immigrant heterogeneity have more crime (found in 4/6 models where measure is significant). Furthermore, neighborhoods with greater concentrations of immigrant heterogeneity always have less property crime. Therefore, the big contextual take away that can be used to inform policy is that resources in terms of programs, that perhaps help with employment prospects should be directed at the neighborhoods where recent immigrant heterogeneity increases property crime.

6.2. Local spatial considerations

The second contextual consideration drawn largely from Sampson's (2012) call for greater emphasis on context relates to methodological contributions that allow for potential local differences in the spatial distribution of immigration effects to be considered in the analysis. Theoretical expectations for spatial heterogeneity regarding crime exists in the ecology of crime literature. Importantly, expectations of localized trends for demographic/structural indicators including immigration underpin traditional social disorganization perspectives along with more contemporary ecological perspectives such as, the immigrant revitalization perspective and immigrant enclave thesis. Furthermore, neighborhoods differ substantially with regard to structural key social disorganization factors and, therefore, research that account for local variations or local contexts of crime provide closer approximations of real-world processes. However, with the exception of the Graif and Sampson (2009) study, despite social disorganization and environmental theoretical perspectives' calls local spatial considerations in neighborhood-level assessments of immigration, such studies are rare. The primary contributions of chapters three and five, therefore, are the contextual emphasis on place characteristics involving local spatial considerations in the analysis of immigration effects on property crime.

The analytic strategy employed in chapter three, the spatial point pattern test (Andersen, 2009) —reveal varying effects in the spatial distribution of immigration and property crime patterns in Vancouver 2003 and 2016. Importantly, this spatially inferential test, assess whether immigration and property crime patterns in Vancouver in 2003 and 2016 demonstrate ecologically stability. The implications of these findings are important primarily because ecological stability has been long accepted as a critically important theoretical concept in the ecology of crime literature (see. Bursik, 1988). More specifically, the ecological stability of contextual constructs in this thesis studies are essential in attempting to identify unexpected spatial shifts —such changes are not captured in studies that used cross-sectional research-based analyses. As such, if the structures under evaluation are not ecologically stable and shift from year to year then any cross-sectional tests of these relationships only represent a special case. Accordingly, the generalizability of these cross-sectional results are limited and, thereby, cannot be used to make valid predictions for relationships found at other times or in

other places (Andresen et al., 2017). For this reason, using the spatial point pattern test that facilitates a more direct test of ecological stability may help clarify some of the inconsistencies in existing research ie. results differ across studies due to a lack of spatial stability in immigration and/or crime measures. Andresen et al. (2017) also notes that testing for spatial stability can lead to instructive inferences regarding the development of testable hypotheses or research questions. For example, in the context of immigration and crime, if results from the test reveal stability of immigration and crime patterns for a large percentage units or regions in a city, the lack of stability in a smaller number of regions could reveal key structural or other factors that differentiate them from the larger number of regions.

The chapter five article consists of empirical tests for the spatial heterogeneity or local effects of immigration on property crime rates using a local-level modeling technique— Geographically Weighted Regression (GWR). Fotheringham and colleagues (1997) asserted that spatial variations were intrinsic in certain relationships particularly ecological neighborhood-level relationship including the immigration-crime relationship. The chapter five findings support the utility of spatial models in the evaluation of such ecological data. Specifically, GWR results reveal localized effects for immigrant and recent immigrant heterogeneity on commercial and residential burglary in the Vancouver context. Variations are across immigration measures, property crime type, and spatial unit. These findings are consistent with a key theoretical theme of this thesis; immigration is a complex multidimensional phenomenon and an array of hypothesized related contextual structural factors is necessary to understand the relationship between the “new age of immigration” and different types of crime.

Local-level analysis too is important in resolving some of the inconsistent relationship findings in studies about immigration and crime discussed throughout this thesis. Specifically, GWR results reveal that the hypothesized processes that link immigration to crime are non-stationary and, therefore exert significantly different effects across spatial units. In effect, it could be inferred that contextual differences among neighborhoods possibly explain differential relationships between immigration and crime. The research design that facilitated these findings can be considered as responding to Kubrin and Mioduszewski (2018) contention about the limitations in the immigration-crime theoretical literature; theoretical explanations such as social disorganization, immigrant revitalization and immigrant enclave perspectives proffered incomplete

explanations of inconsistent empirical findings. Mears (2001) earlier had provided a specific analytic framework to guide theory and research on immigration and crime. This framework emphasized this relationship at different units of analysis, using disaggregated crime types, and the incorporation of hypotheses from both individual and ecological-level theories of the immigration-crime. These critical themes also reflect reflected Sampson's (2012) admonition concerning the need to expand the utilization of conceptualizations of contextual/structural factors at the neighborhood level in empirical research on immigration and crime.

The current thesis employed two important contextual elements often overlooked in tests of immigration and crime. The first involves the key independent variable, immigration. While the second involves the identification of spatially varying relationships using local-spatial methodologies. Taken together, these empirical and methodological contributions provide more nuanced interpretations of the immigration-crime link that might help refine, advance, or integrate competing theoretical strands (Thomas, 2011).

Finally, Thomas (2011) believes that ecological analyses of crime and other dislocations represent promising first steps in answering Mears's (2001) call for expansion of theoretical application to immigration and crime. I agree with this assertion and believe that the immigration-crime scholarship will surely benefit from finer-grained considerations of specific immigration and crime measures along with the use of local-modeling techniques capable of identifying local-variations of immigration effects on crime. In short, the relationship between immigration and crime is complex, dynamic, and anything but monolithic or "modal,"—context is crucial and, so, the advancement of this literature depends largely on scholars appreciating as much (Thomas, 2011).

Lastly, empirical results are often used to inform public policy. As such, when conducting empirical assessments of policy relevant issues, such as immigration and crime researchers should always aim for empirical accuracy. With regard to immigration effects on crime, the mere complexity of this relationship makes it reasonable to assume that the real-world conditions under which immigration increases or decreases crime is also rather intricate. Therefore, crime studies that highlight local variations—local contexts of crime—likely provide better approximations of conditions under which immigration impacts crime and, thus, more relevant to real-world policy applications (Cahill & Mulligan, 2007). Furthermore, being that effective policies rarely take on a 'one

size fits all' approach, research that informs policy should also move beyond the global 'one size fits all' model. For this reason, I believe that local analytic frameworks such as the one's employed in this thesis provide a valuable tool for policy initiatives. Because local spatial methodologies facilitate the identification of localized effects across neighborhoods, results from these analyses provide geographically specific information that can effectively be used in policy making decisions. Therefore, in addition to the scholarly benefits, working toward a more complete understanding of the immigration-crime relationship is very important from a substantive vantage. Adelman et al. (2018) importantly note that immigration policies provide a telling sign of how immigrants are perceived or problematized in a society. Therefore, if empirical studies have a role in informing policy, and policies shape how immigrants are perceived or problematized in a society, then as academics we can help provide a more accurate and complete conception of phenomena such as immigration and crime through our research efforts.

6.3. Limitations

The current thesis makes several empirical and methodological contributions that help advance the immigration-crime literature, however, it is not without limitations. The first limitation concerns the endogeneity effect, a limitation that pertains to most, if not all, neighborhood studies on immigration and crime. Endogeneity common centers around questions regarding the validity or existence of neighborhood effects —wherein a neighborhood effect is generally defined as a social interaction that influences the behavior or socioeconomic outcome of an individual (Dietz, 2002). Although, endogeneity impacts nearly all ecological research, particularly at the neighborhood-level it is important that, as researchers, to be aware of this limitation (Dietz, 2002). As such, various steps can be taken to help circumvent potential biases of endogeneity. Empirically, researchers may strive to identify and, thereafter, include missing regressors in neighborhood-level analyses. Furthermore, Dietz (2002) notes that adequate distinction of neighborhood effects with respect to the geographic scope of the effect can have important implications for adequate model selection —methodological implications. However, efforts to delineate neighborhoods based on theoretically motivated definitions or otherwise, empirically motivated definitions as outlined by Manski (1993; 2000) are often difficult given the limitations of available data (Dietz, 2002).

The second limitation pertains to the rare context in which immigration effects were evaluated. Although, a contextual contribution of this study relates to the never before tested context (Vancouver neighborhoods) and rarely tested crime type (property crimes), the scarcity of research in this context make comparison efforts difficult. For this reason, the spatial patterns of immigration and crime identified in chapters three and five cannot be generalized to spatial distributions of violent crime patterns in Vancouver. Because many recent empirical studies on immigration and crime are focused on homicide, and most of the exceptions (Cancino, Martinez, & Stowell, 2009; Morenoff & Astor, 2006; Polczynski Olson, Laurikkala, Huff-Corzine, & Corzine, 2009; Stowell & Martinez, 2007) test violent crimes, the property crime perspective presented here limits the generalizable power of this study. However, as Mears (2011) elaborates, there are practical, theoretical and methodological reason to analyze less serious offenses as they relate to immigration. For example, instance of homicide are relatively low when compared to other crimes and, therefore, to obtain a more generalizable conception of immigration effects on crime it is necessary to study relatively common types of delinquency and other less serious offenses (Mears, 2011). Furthermore, moving beyond homicide and violent crime associations may prove useful as the immigration–crime relationship might vary by crime type in theoretically relevant ways (see. Cancino et al., 2009). Taken together, the limitation that comes from considering only immigration effects on property crime is actually also a contribution that should be further explored in future research.

Another data related limitation has long been recognized in the criminological literature and concerns the use of data obtained from police reports (see. Sherman, Gartin, & Buerger, 1989). In the context of spatial analytics, Sherman et al. (1989) argues that spatial data are not always completely accurate, due to inaccuracies in the tabulation of basic information such the addresses included in police reports. However, the use of data at the census tract level as opposed to the address level may help circumvent this reliability concern while still allowing for analysis at a micro-spatial scale.

From a methodological perspective there are several limitations overall, that arise in each of the three studies. Beginning with the decomposition model used in chapter four, although capable of simultaneously separating within and between-neighborhood effects this analytic technique does not account for spatial differences in immigration and neighborhood contextual effects on property crime. Because the decomposition model is

a global model parameter estimates apply equally to all neighborhoods within Vancouver. The use of global models can be problematic because they do not account for non-stationary and spatially heterogeneous effects that are commonly found in ecological datasets.

The local-level spatial analytic techniques used in chapters three and five help protect against possible model misspecification stemming from the use of global methodologies. However, there are limiting factors associated with each of the local models employed. First, although the spatial point pattern test (Andresen, 2009) identified spatial shifts or otherwise stability in patterns of immigration and crime, additional inferences into the processes that underlie these patterns were not possible. Specifically, while output from the spatial point pattern tests are informative with regard to understanding spatial trends of immigration and property, findings do not explain why immigration and crime patterns are occurring in some areas and not others. Therefore, even though, the spatial point pattern tests is inferential in nature, findings are more exploratory.

Additionally, despite compelling support for the use of microspatial units, results obtained from these data might be artifacts of the methodology or data rather than an artifact of spatial consistency becoming more apparent at smaller scales of analysis (Andresen & Malleson, 2011). For this reason, in future analysis when the requisite data become available, I will attempt to use the spatial point pattern test at all scales of aggregation. This undertaking would acknowledge the modifiable areal unit problem (Openshaw, 1984) by enabling test for whether choice of spatial unit influences the substantive results.

Limitations specific to the article presented in chapter five relate first to the cross-sectional nature of the analysis. Because, this study analyzes a single cross section of data from 2016, findings only capture the state of immigration and crime for that year. Accordingly, the results though interesting cannot be generalized nor compared to results obtained from other cross-sectional analyses at other points in time and certainly not results from panel or longitudinal analysis (Mears, 2011). Accordingly, future research should test for spatial stability, for instance by consulting the spatial point pattern test (see. Andresen, 2009) to determine whether immigration and crime patterns in Vancouver are ecologically stable. If results reveal spatial stability for immigration and

crime patterns in Vancouver then it is possible to make inferences beyond one year on the state of these patterns. Furthermore, by establishing temporal consistency in the spatial stability of research measures it is possible to remove one year/s from a panel of data and still have confidence in the accuracy of the results. Again, while study findings inform on the nature of local spatial effects of immigration and property crime across Vancouver neighborhoods, results fail to provide in depth answers regarding why significant patterns occurring in specific places and not others. As such, to develop a better understanding of the processes that underlie the relationships identified here, future research should aim at conducting in-depth assessments, perhaps by including a greater number of structural characteristics in the assessment of areas identified as having localized effects of immigration on crime.

6.4. Further directions for future research

Currently, discourses related to immigration effects on crime have become an international mainstay in political and social discourses. As such, immigration is a vigorously debated public policy issue, particularly in the United States, though increasing prevalent in Canada and abroad. In the United States, the election of President Donald Trump has facilitated antipathy toward immigrants creating a state of political zeitgeist and increasing hostility toward immigrants (Adelman et al. 2018). Similar dialogues, have been prevalent in European nations such as France, Germany, Italy and the United Kingdom where considerable political debate center on whether the presence of immigrants and migrants who seeking asylum contribute to higher rates of crime (Aoki & Todo, 2009; Caviedes, 2015). In spite, political and public perceptions of immigrants as criminal, the empirical research concedes that immigrants are less likely than native populations to commit crimes (see. Martinez & Lee, 2012). These results, however, have not negated concerns regarding the criminal tendencies of immigrant populations. Although the literature spans over several decades, there are substantial gaps that remain unaddressed, perhaps in addressing these gaps, we as researchers can contribute to an empirically based knowledge stream.

The current thesis contributes in a number of ways to the more recent empirical research on immigration and crime. Overall, findings from the current study illustrate the complex and highly context dependent nature of immigration effects on neighborhood property crime. Accordingly, results demonstrate the need for greater malleability with

regard to expectations, whether theoretical, empirical or more generally regarding the nature of immigration effects on crime. Because, at the very least findings show that immigration effects vary significantly across immigration measure, property crime classification, and neighborhood (spatially). Accordingly, results from the current thesis and the inferences that follow suggest numerous avenues for future research.

First, I encourage future researcher to continue with the theme of measure disaggregation in a way that sufficiently captures the multidimensional aspect of immigration. This empirical exercise could prove especially instructive when used to evaluate the immigration-crime link in contexts outside the US. Replication efforts help facilitate a means of comparison between established US based literature, the findings presented in this thesis and subsequent findings derived from varying context. Furthermore, there are also theoretical reasons to disaggregate the immigration measure in a way that captures the many heterogeneous dimensions of the immigrant population. For instance, using multiple measures of immigration, particularly those drawn from theory will enable the identification of theoretically relevant relationships or, otherwise, provide support for existing theoretical predictions. As such, measure disaggregation facilitates the identification of nuanced interpretations of the relationship providing information that could help fill some of the gaps in knowledge that contribute to incomplete theoretical explanations (Kubrin & Mioduszewski, 2018). For example, the total immigration measure reached statistical significance in the global decomposition model (Chapter four), however, at the local-level the measure did not matter—indicated by a lack of significance in the analyses from Chapters 3 and 5. Therefore, the null relationships found in previous studies and theoretical insights that follow could be due to immigration effects being masked by: 1) the use of an overly broad measure of immigration 2) global analysis that does not account for spatially varying relationships. At the local-level a distinct set of measures mattered, the analyses in Chapter three reveal that immigrants who arrived at a very young age (five years old or younger) and immigrants who have been in Canada for the longest duration (30 years or longer) had the most significant relationships, indicate by spatial overlap with property crime. Relatedly, results from Chapter 5, show that at the local-level immigrant and recent immigrant heterogeneity are consistency with regard to statistical significance and spatial variation. It would be theoretically instructive to further assess such findings in order to identify why these immigration measures matter and under which conditions or

processes they occur—empirical results that identify varying effects across immigration measure have theoretical import by providing insights useful to theoretical testing or the refinement of theoretical mechanisms.

Spatial analytics (Chapters 3 and 5) have proven valuable throughout this thesis and, therefore, I strongly urge future researchers to conduct additional explorations into the urban geography of immigration and crime patterns at the local level. Even though, the local spatial methodologies and the results that follow facilitate important insights, they also uncover a number of important questions to be considered in subsequent research. Specifically, I urge researchers to employ the same methodologies that were employed in the current thesis to evaluate the immigration-crime nexus across different context, subsequent results would lend to whether the localized patterns established here apply to other contexts. Future replication efforts that include a greater number of cross-sections in the analysis would also be instructive as researchers could determine whether localized trends remain stable or change over time—in either case important inferences can be drawn. If replication studies are able to consistency identify localize trends over time, then similar empirical frameworks can be used for theoretical testing, theoretical refinement, policy considerations and result generalizability. Moreover, results that show vast changes in the spatial distribution of immigration effects on crime over time are also instructive—findings could be used for subsequent research to try and identify *why* these spatial shifts occur and, accordingly, provide a contextual contribution to the literature. Relatedly, there is instructive value in replication studies that aim to investigate the spatial distribution of immigration and property crime measures at different levels of aggregations.

Finally, results from the current thesis provide a basis for future investigations into why these patterns exist. Overall, using multiple measures of immigration allowed for important nuances in the immigration-crime relationship to manifest. For example, results from chapter three show the spatial patterns for immigrant and recent immigrant heterogeneity are significantly distinct from all other measures considered for 2003 and 2016. These findings indicate that elements of immigration captured in these measures are perhaps distinct from those encompassed by the other immigration measures. Correspondingly, results may also provide indication that areas in Vancouver with greater concentrations of immigrant/recent immigrant heterogeneity, are perhaps structurally distinct. Findings such as these, therefore, pave the way for future research

into why these spatial patterns exist in certain areas but not others. As such, future assessments in different contexts that correspond to the ones undertaken here could help bolster our understanding of how neighborhood dynamics impact immigration effects on crime. What's more, the identification of distinct immigrant settlement patterns at the local level could contribute to our understanding of immigration effects at the neighborhood level and, hence, help inform future tests of the relationship. Finally, I believe that local-level analyses of multi measures of immigration provide an excellent starting point to address limitations related to ambiguities related to the processes by which immigrants are less criminally involved than native born and which immigrant concentration leads to less crime in areas.

Lastly, because a majority of studies on immigration and crime test the relationship in the US context using measures of violent crime, our understanding of how and why immigration impacts non-violent crime in other contexts remain limited. Accordingly, evaluations into the relationship between immigration and non-violent crime from a multi-national context would prove incredibly instructive, particularly for the purposes of generalizability. Furthermore, testing immigration effects on crime cross-nationally enables greater insight into whether the theoretical perspectives derived from US based experiences, translate well to other settlings. Moreover, assessments that focus on the immigration-property crime link would help expand the general scope of knowledge on immigration and crime for two reasons. The first is that instances of violent crime are rare and, therefore, cannot be generalized to the greater population. Second, theoretical perspectives used to guide research or explain findings often focus on economic deprivation as a motivating factor for immigrant related crime and, so, it makes theoretical sense that we include property crimes that are economic based crime in evaluations of the relationship.

On a finale note, the immigration experience in Vancouver is somewhat unique, consisting of a vast population of wealthy immigrants who arrive in Vancouver under the investor program (Pavlov & Somerville, 2017). For this reason, I believe that future studies that incorporate the empirical and methodological techniques undertaken in this thesis could either contribute to the generalizability of results found here or alternately demonstrate that the Vancouver context is somehow markedly different from those elsewhere.

6.5. Conclusion

The three empirical articles presented in this thesis provide contextual insights into the dynamic and complex relationship between immigration and crime. As such, I believe that future applications of the empirical and methodological strategies employed in this thesis will facilitate insights that help promote a better understanding of differential mechanisms that underlie how and why immigration impacts crime.

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