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Routine activity, population(s) and crime: Spatial heterogeneity and conflicting Propositions about the neighborhood crime-population link

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ABSTRACT

Routine activity theory is one of the few macro-criminological perspectives that provides support to the idea of spatial heterogeneity, suggesting that an increased human presence in a given area is expected to be associated with both an increase and a decrease in criminal activity. The goal of this article is to provide a simultaneous test of both Propositions of routine activity theory. Geographically weighted regression modelling is used to analyze data from the city of Toronto, at census-tract level. Results suggest that, unsurprisingly, there is a positive relationship between crime and population in many tracts; however, empirical support is also found for the opposite proposition that larger populations are (sometimes) associated with less crime. This is especially true for areas that receive visits largely for shopping, school, and work.

1. Introduction

Among macrosociological theories, two research areas suggest that the relationship between neighborhood crime and population is ambiguous. First, routine activity theory can be seen as including opposite Propositions (Andresen, 2006; Boivin & Felson, 2017; Pratt & Cullen, 2005). On the one hand, it proposes that areas with greater numbers of likely offenders and suitable targets will provide more criminal opportunities and thus lead to more crimes. On the other hand, the theory also suggests that areas with greater numbers of capable guardians should experience less crime – and at the same time, the theory states that anyone, by his/her simple presence, can act as a guardian (Felson & Eckert, 2015). Second, the contradiction is also evident in studies of the relationship between crime and land use (Browning et al., 2010; MacDonald, 2015). For some, mixed land use is synonymous with more "eyes on the street", i.e. a diversity of guardians who monitor public spaces (Jacobs, 1961). For others, mixed land use is a source of anonymity that could be interpreted by potential offenders as providing a lower risk of apprehension, thus encouraging criminal action (Taylor, 1988).

Thus, the neighborhood crime-population link, at least in theory, challenges the assumption of spatial homogeneity of relationships, i.e. that the relationships being modelled are the same everywhere within the study area from which the data are drawn (Fotheringham, Brunsdon, & Charlton, 2000). This study investigates the opposite theoretical Propositions about neighborhood crime and populations derived from Routine Activity theory and from the literature about mixed land use. It uses the statistical technique of geographically weighted regression (GWR) modelling, which makes it possible to consider opposing predictions by producing local coefficients, rather than one global coefficient, to represent the relationship between two variables. This allows testing the hypothesis that population size and land use are both positively and negatively related to crime in certain areas. In doing so, it also suggests that assuming that relationships at macro-level are homogeneous may not always be correct. Data are taken from the city of Toronto at census-tract level.

1.1. Empirical tests of routine activity theory

As noted in a meta-analysis by Pratt and Cullen (2005), empirical tests of routine activity theory at macro-level generally involve two sets of variables –one related to the presence/absence of guardians, and one to that of potential targets and offenders. During the period they studied (1960–1999), the most common measure of absence of capable guardianship was the household activity ratio. The presence of motivated offenders was often measured by the unemployment rate, an indirect measure that is still used in recent studies (e.g. Groff, 2007). The ratios of both variables were usually derived from censuses and thus provided only indirect tests of routine activity theory: it was assumed that the likelihood of convergence of offenders, targets, and absence of guardians that creates criminal opportunity was higher or lower depending on the level of the aforementioned variables. Pratt and Cullen

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(2005) conclude that there is empirical support for both measures – and thus, both Propositions – of routine activity theory. They found mean effect size to be higher for household activity ratio than for unemployment rate, but both measures were only moderately strong macro-level predictors of crime (tenth and fifteenth rank respectively on twenty-three factors). They conclude, however, that the empirical status of routine activity theory is incomplete and call for "additional empirical scrutiny" (p.414) because the literature analyzed focused largely on only one of the two facets (the presence of guardians) of the theory.

The last two decades of research have generally confirmed Pratt and Cullen (2005) observations, although increasingly sophisticated methodologies have been used to test the theory and that the distribution of offenders and targets gained in importance. For example, Birks, Townsley, and Stewart (2012) used agent-based modelling involving simulated environments populated by agents who represent both victims and offenders to test Propositions about the spatial clustering of crime in routine activity, crime patterns, and rational choice theories – and found support for most of them. Others (e.g., Harper, Khey, & Nolan, 2013) have studied the spatial distribution of crime in relation to the presence or absence of guardianship. The distribution of crime across space is still generally seen as a function of the supply of motivated offenders, target availability, and the presence of guardians and is usually measured using indirect estimates of all three elements (e.g., Roth, 2016).

One of the novelties in recent tests of routine activity theory is the (re-) consideration of population size, recognizing that if most people can be potential offenders, targets, and guardians, the more populated an area, the more potential offenders, targets, and guardians it contains. After all, the relationship between crime and population size is one of the few accepted "facts" in criminology (e.g., Siegel, 2003): crime is assumed to be more frequent in more populated areas, a statement that has usually been confirmed by cross-sectional research (Ousey, 2000). Many studies have, however, argued that this statement is too vague, because it does not define the population that should be considered. Early research from Boggs (1965) and Gibbs and Erickson (1976) argued that, as in epidemiology, criminologists should calculate incidence rates based on the population at risk. In other words, researchers should document the ambient rather than the residential population of an area – they should look at the total population present in a spatial unit, regardless of residence. Hipp's general theory of spatial patterns (2016) builds on the idea that individuals vary in the degree to which they occupy the role of potential offender, target, and guardian and discusses the impact of the probability of each individual coming to a given location on aggregate measures of crime. He argues that the important body of research on population "has provided suggestive evidence that the presence of persons nearby is likely important, but it has not tried to measure the presence of offenders, targets, or guardians" (p.657), suggesting that we need to recognize that individuals are mobile and some are likely to be involved in crime wherever they are.

However, measuring the population at risk of becoming involved in crime in a specific area within a specified period of time has proved to be such a difficult task that many researchers have settled for a proxy measure – residential population size. Residential population is a convenient way to measure population size: not only is data easily accessible (Chamlin & Cochran, 2004) but it also avoids the impact of short-term population shifts (e.g. Lemieux & Felson, 2012). Residential population size remains the most used measure of population size and, with rare exceptions, population size is generally considered a trivial contributor to crime counts (Chamlin & Cochran, 2004). Documenting the actual population of an area at a given time requires innovative sources of data that are not necessarily widely available or complete, such as estimations based on satellite imagery (e.g., Andresen, 2006), GPS location (e.g., Malleson & Andresen, 2015; Traunmueller, Quattrone, & Capra, 2014), or transportation surveys (e.g. Boivin & Felson, 2017).

Yet, it took decades before researchers provided strong evidence that challenged the use of residential population size in crime rates and, more broadly, the assumption that residential population size is a strong predictor of crime in an area (Andresen & Jenion, 2010; Andresen, 2006, 2007; Boivin, 2013; Foote, 2015; Rotolo & Tittle, 2006). Alternative measures of population at risk include the ambient population, a general term used to designate an average estimate of the population present in a spatial unit at a given time regardless of who composes this population (Andresen, 2011). The ambient population thus includes a mix of residents and non-residents, which provides a different – and more precise – denominator for crime rates but cannot be used to further explore the differential impacts of various populations (Boivin & Felson, 2017). Empirical studies have shown that both ambient and visiting population sizes (Andresen, 2006; Boivin & Felson, 2017) are positively related to aggregate crime counts – again proving that crime is higher where there are many people. For example, Andresen (2006) showed that using residential population size as an indicator of "ambient" population size was especially problematic for areas with low residential population but high activity. His analysis confirmed the usual result that more residents equals more crime, but he also found "curious" results, such as a negative association between ambient population density and ambient-based automobile theft rate, that support the guardianship component of routine activity theory. Also, in their study of a large Eastern Canadian city, Boivin and Felson (2017) showed that an increase in visitor inflow not only increased the number of visitors charged with crimes but also the number of local residents charged. Their results support the proposition derived from routine activity theory that visitors and residents are potential offenders and targets.

1.2. Land use and crime

The impact of mixed land use on crime remains controversial. On the one hand, Jacobs (1961) "optimistic" model is based on the expectation that mixed land use draws large numbers of pedestrians who provide effective informal social control of public space. Monitoring of streets is primarily seen as a by-product of increased interest of local residents and business owners (see Browning et al. (2010) for a discussion). On that view, densely populated neighborhoods should be associated with increased guardianship –and less crime. On the other hand, Taylor (1988) territorial model distinguishes between "regulars" (locals) and "outsiders" (visitors). He argues that a high prevalence of unfamiliar faces ("outsiders") in a neighborhood increases anonymity but also weakens social control inclinations among locals. Residents ("regulars") are expected to be less willing to use public space and to intervene, which in turn reduces guardianship. Furthermore, Taylor argues that more street activity brings together potential offenders and targets/victims, thus increasing criminal opportunities. In other words, Taylor's model expects that mixed land use increases the probability that offenders and targets will converge in the absence of a guardian – and thus leads to increases in crime.

Coincidentally, increasing attention has been given to the relationship between the built environment and crime (MacDonald, 2015). Mixed land use has become a goal in urban planning, in part to reduce crime and increase security. It is a crucial part of the idea of smart growth, defined as a mixture of commercial, residential, and industrial land use that serves the needs of the local population, and is opposed to the segregation of residential land uses from non-residential uses (Aurand, 2010). A key element of effective mixed land use is that services are easily accessible, aimed primarily at residents of the area. In the context of metropolitan cities, this means that services are also easily accessible to non-residents, who act both as providers of services (as employees) and as beneficiaries. From a routine activity point of view, these non-resident populations provide a diversity of potential offenders, targets, and guardians. Whatever the expectations for criminal activity, two factors that may affect crime are always discussed.