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## Abstract

This study explores the association between neighborhood characteristics, alcohol outlets, other micro-places, and neighborhood violence rates. Prior studies that examined the alcohol availability and violence associations suggested that alcohol outlets play an important role in violent outcomes, yet we know less about the larger environment in which alcohol outlets are located, including how the availability of other types of places that exist side by side with alcohol outlets in neighborhoods could influence the alcohol-violence relationships. I collected publicly available data on simple and aggravated assaults, neighborhood characteristics (concentrated disadvantage, concentrated immigration, residential stability, and ethnic heterogeneity), on- and off-premise outlets, and other

micro-places (colleges and universities, primary and secondary schools, financial services, gas stations, hotels and motels, laundromats, parks and playgrounds, and rooming houses) and subsequently aggregated the data to Milwaukee, Wisconsin census block groups. I estimated spatially lagged regression models to test these associations and compared the results across the models. The findings show that some neighborhood characteristics and some micro-places are important predictors of neighborhood violence. Importantly, off-premise alcohol outlets have a consistently significant positive relationship with simple and aggravated assaults, even when the influence of the neighborhood characteristics and micro-places is accounted for in the models. This study contributes to the environmental criminology theories and alcohol availability theory by highlighting the importance of off-premise outlets as crime attractors and crime generators to explain violence.

## Keywords

## 1. Introduction
The purpose of this study is to examine the role that neighborhood characteristics, alcohol outlets, and other types of micro-places play in neighborhood violent crime rates. It advances the alcohol-violence literature by carefully examining this relationship through several inquiries. First, it estimates the relationship between neighborhood characteristics and violence. Second, it examines the relationship between alcohol availability and violence when important neighborhood characteristics are also considered. Lastly, it examines the relationship between alcohol availability and violence, when other types of micro-places are also measured in addition to the neighborhood characteristics.

This approach allows for a more nuanced understanding of the role that alcohol plays in violence by considering the characteristics of neighborhoods, and availability of alcohol selling establishments and other types of places that exist in neighborhoods to explain variation in neighborhood violent crime rates. This study draws from the environmental criminology theories as well as the alcohol availability theory to explore neighborhood violent crime rates. Each of these theories is described in detail in the following sections. Later in the paper, the data and methods are described in detail, and the results of the analyses are presented in the context of comparisons of several models for simple and aggravated assaults. The paper discusses the findings of the study in light of the prior alcohol availability-violence literature and concludes with a summary of the theoretical and policy implications of this study findings.

## 2. Literature review
### 2.1. Neighborhood characteristics and places within neighborhoods
The focus on high crime areas and the area characteristics that contribute to high crime rates has a long tradition in criminological research (e.g., Guerry, 1833; Quetelet, 1835; see Andresen, 2014). In one of the earlier works in this area, Park (1915) argued for a careful investigation of Chicago because it provided an optimal laboratory within which to study human behavior. Subsequently, Park and Burgess (1925/1984) drew upon biological ecology ideas to create a model of social ecology, in which the city's expansion could be seen through a series of concentric circles, each representing different

areas of urban growth. Building on this work, Shaw and McKay (1942) compared socioeconomic characteristics in different concentric circles to explain juvenile delinquency and found that several neighborhood characteristics, such as ethnic heterogeneity, rapid population growth, and residential instability explained why some areas, and not others, had more crime. Shaw and McKay (1942) conceptualized such areas as being socially disorganized, because their neighborhood characteristics reduced social cohesion and trust and created inability of the community to realize common goals and control undesirable events occurring in the community (Morenoff et al., 2001; Sampson et al., 1997).

More recent ecological studies maintained the traditional measures of ethnic heterogeneity and residential instability and advanced additional measures of concentrated disadvantage, concentrated immigration, and collective efficacy (e.g., Goodson and Bouffard, 2017; Hipp and Kane, 2017; Morgan and Jasinski, 2017; Sampson et al., 1997). Contrary to the social disorganization framework expectations, however, the findings from the contemporary empirical scholarship suggested that immigration was negatively related to violence (e.g., Light, 2017; MacDonald et al., 2013; Ousey and Kubrin, 2018; Stowell et al., 2009). On the other hand, the traditional social disorganization measure of ethnic heterogeneity remained positively related to violence (e.g. Hipp and Kane, 2017; Kubrin et al., 2018).

On the other hand, theoretical developments advanced by Routine Activities Theory (Cohen and Felson, 1979) and Defensible Space Theory (Brantingham and Brantingham, 1981) suggested that some areas have high levels of crime also because of the types of micro-places that operate there. Some micro-places create the environmental backcloth within which the convergence of motivated offenders, vulnerable targets, and a lack of capable guardians occurs in time and space (Cohen and Felson, 1979) and results in crime. Absent any one of these three elements, the opportunity for crime diminishes (Cohen and Felson, 1979). For example, during early hours bars provide a venue where sober patrons and well-trained bar staff may serve as capable guardians to look over the patrons even when a motivated offender is present. In the late hours when the patron numbers increase or even after bar closing time, however, intoxicated patrons may become vulnerable targets available for victimization by present motivated offenders, at a time when other patrons are also likely to be intoxicated and unable to serve as capable guardians, and when bar employees are no longer able to serve as place managers (Madensen and Eck, 2008).

We can also understand various places that operate in neighborhoods as generating crime or as attracting crime. Some areas may have many crime generators that draw people to these areas for reasons unrelated to criminal activity (Brantingham and Brantingham, 1995) but which provide opportunities for victimization through a flow of available targets. For example, off-premise alcohol outlets located along commercial corridors, where other types of retailers are also located, such as gas stations, laundromats, or banks may simply generate crime because they are embedded within an environment that draws people to the area, increasing the likelihood of social interaction and the risk of victimization. Other areas may have high crime levels because they have crime attractors within their boundaries (e.g., bar districts, city centers) that attract motivated offenders to the area in pursuit of criminal opportunities (Brantingham and Brantingham, 1995). For example, as bar patrons travel to and from bars through an environment that lacks surveillance, motivated offenders may be aware of

such traveling patterns and act upon the opportunities to engage in criminal behavior. Taken together, these theoretical arguments suggest that both the *neighborhood characteristics* and the *places* that operate within neighborhoods determine whether some areas experience repeat victimization.

## 2.2. Alcohol outlets

Alcohol outlets are places that serve a legitimate purpose of providing a commodity to the public, although some have raised the question of whether alcohol can be considered an ordinary commodity due to its intoxicating effect (see Babor, 2010). Alcohol outlets are important for the examination of neighborhood crime rates because as alcohol availability increases in the neighborhoods so does alcohol consumption, which leads to a range of negative public health outcomes (Stockwell and Gruenewald, 2004). For example, areas with high alcohol availability also have high levels of mortality rate due to liver cirrhosis for the total population (Colon, 1981), high alcohol consumption, and high alcohol-related mortality and morbidity in the general population (Rush et al., 1986). To preserve public health, carefully designed alcohol policies are often implemented as a way to reduce alcohol-related harm (Leon and McCambridge, 2006). For example, a suite of restrictive alcohol policies implemented in 2006 in Russia reduced deaths due to alcohol poisoning among males and deaths due to alcohol liver cirrhosis among males and females (Pridemore et al., 2014), a finding that highlights the connection between alcohol availability and harm confirmed by other studies (e.g., Anderson et al., 2009; Andreasson et al., 2006; Ramstedt, 2001).

In addition to the individual-level harms that stem from increased alcohol availability, the burden of alcohol availability is also evident at the societal level exemplified in the form of harm to others (i.e., crimes and violence). In the four decades since the Surgeon General's Report on Healthy People first identified violence as a public health issue, social science and public health experts have been working together to improve our understanding of violence and what can be done about it (U.S. Department of Health, Education, and Welfare, 1979). The impact of violence on public health is especially troubling given that violence is among one of the leading causes of death for young people, and homicide prevalence is particularly high among African American males (Centers for Disease Control and Prevention, 2013).

Empirical evidence reveals generally that alcohol is associated with individual-level homicide and suicide victimization, but also that alcohol outlet density is associated with community-level assaults (Pridemore and Grubesic, 2013; Snowden and Pridemore, 2013). In addition, alcohol outlets are associated not only with violent crimes (e.g., Cameron et al., 2016; Pridemore and Grubesic, 2013) but also with intentional and unintentional injuries (Morrison et al., 2016b) and suicide among males (Giesbrecht et al., 2015). A longitudinal examination of the relationship between alcohol outlets and neighborhood crime rates also revealed a presence of a strong relationship between the number of alcohol outlets and the number of street crime incidents in Norfolk, Virginia (White et al., 2015), a finding also echoed in a study of Baltimore, Maryland neighborhoods (Jennings et al., 2014). Indeed, the accumulation of knowledge in the alcohol-violence literature suggests that alcohol availability matters for violence despite some limitations of this body of research (see Gmel et al., 2016; Morrison et al., 2011).

However, this rich body of literature has left two areas that warrant further examination. The first relates to a more nuanced understanding of the local ecological conditions in violent outcomes when

alcohol availability is also assessed. Therefore, in this study the effect of neighborhood characteristics on simple and aggravated assaults is examined in the baseline models, and the additive effect of alcohol availability on simple and aggravated assaults is subsequently evaluated to provide a detailed portrayal of the correlates of neighborhood rates of violence. The second, and perhaps more important, is the possibility that other micro-places (besides alcohol outlets) operate in neighborhoods where outlets are located and may also be important predictors of violence (e.g., Grubesic et al., 2013; Tabb et al., 2016). In fact, Grubesic et al. (2013) found that alcohol availability predicted aggravated assaults even when other commercial retailers, risky retailers, and public transportation stops are included in the models, but also that other commercial retailers were important predictors of aggravated assaults. In a more recent study, Tabb et al. (2016) examined the spatio-temporal association between alcohol availability and violence and included the percentage of vacant housing units in their models, as an additional micro-place that could contribute to neighborhood violence rates, as well as other commercial retailers, risky retailers, and public transportation stops.

Yet, we know less about how the relationship between alcohol availability and neighborhood violence rates may be influenced by the presence of other types of micro-places (e.g., schools, parks, parking lots) that also exist in the area. This is important because omitting some of these crime generators and crime attractors could lead to biased inferences about the relationship between alcohol availability and neighborhood violence rates. Thus, in this study the relationship between alcohol availability and simple and aggravated assaults is assessed when accounting not only for the neighborhood characteristics but also for additional types of micro-places that may be influencing neighborhood rate of violence (e.g., Erickson et al., 2015; Grubesic et al., 2013; Tabb et al., 2016).

Moving the environmental criminology theory forward in these two areas is important because if alcohol availability matters for explaining neighborhood violence rates, in addition to and independent of other factors that influence violence (i.e., neighborhood characteristics, other micro-places), carefully designed policy responses can be crafted to influence violence occurring in neighborhoods. Neighborhood characteristics that are associated with violence may be more difficult to change via policy mechanisms, while considerations of limiting the availability of alcohol outlets may be more amenable to such change. This may be especially important in socioeconomically disadvantaged areas (Foster et al., 2017), which have high availability of alcohol outlets and low demands relative to wealthier areas that have lower alcohol outlet availability and higher purchasing demands (Morrison et al., 2016a).

Given this literature review, this study aims to test the following three hypotheses. First, the neighborhood characteristics of concentrated disadvantage and ethnic heterogeneity will be positively associated with simple and aggravated assaults, and the neighborhood characteristics of concentrated immigration and residential stability will be negatively associated with simple and aggravated assaults. In this baseline model, I expect that areas that have higher levels of concentrated disadvantage, higher levels of ethnic heterogeneity, lower levels of residential stability, and lower levels of concentrated immigration would have higher rates of assaults, and this expectation is in line with both the traditional and more recent social disorganization literature reviewed above.

Second, on- and off-premise alcohol outlets will be positively associated with simple and aggravated assaults, net of neighborhood characteristics. In this alcohol availability model, I expect that alcohol

outlets will have an independent effect on assaults, regardless of the neighborhood characteristics in which alcohol outlets are located. This is especially important given the neighborhood-level literature reviewed above that suggested that alcohol outlets are more likely to be located in socially disorganized neighborhoods. The alcohol availability model allows me to disentangle the correlates of assaults and separate the effects of alcohol outlets on assaults and, at the same time, control for the influence of neighborhood characteristics on assaults.

Last, on- and off-premise alcohol outlets will be positively associated with simple and aggravated assaults, net of neighborhood characteristics and net of other micro-places that operate in the neighborhoods. In this full model, I expect that alcohol outlets will continue to be associated with assaults, even when other types of crime generators and crime attractors and neighborhood characteristics are also used in predicting assaults. This approach is valuable because alcohol outlets are not the only types of facilities that exist in neighborhoods, so the correlates of assaults occurring in neighborhoods could also be affected by other types of facilities that operate there.

The basic premise of the environmental criminology studies reviewed above is that both social (i.e., neighborhood characteristics) and physical characteristics (i.e., micro-places that exist in neighborhoods) of communities must be considered when thinking about how crime emerges, concentrates, and develops (see Andresen, 2014; Brantingham and Brantingham, 1981; Kennedy et al., 2011). Some micro-places create a unique set of opportunity structure that makes them more crime prone than others. For example, services available from gas stations and laundromats are available at all times of the day, bringing people to these micro-places during times when no capable guardians are available, which can provide opportunities for assault victimizations. Additionally, I expect alcohol outlets to create opportunities for assault victimization through increasing availability in neighborhoods, which is followed by an increase in alcohol consumption and a range of negative social outcomes, including assaults. In contrast, schools, financial services, hotels, rooming houses, and parks have formal guardians employed to look over the events that are occurring at or near their locations, so I expect these micro-places to have less crime-prone opportunities at their locations that protect against assaults occurring at or near their locations.

## 3. Materials and methods

### 3.1. Research site

The research site for this study is Milwaukee, Wisconsin. Milwaukee is the largest city in the state of Wisconsin, located in the mid-western United States. Milwaukee covers land area of 96.79 square miles and its population is 598,672 (U.S. Census Bureau, 2016). Milwaukee is in many ways dissimilar than other towns and cities across the state of Wisconsin but faces similar challenges as other major urban American cities. For example, relative to the rest of the state, Milwaukee's racial/ethnic diversity is reflected in the following population statistics: 46.8% White (compared to 86.5% White population for the entire state), 39.3% African American (compared to 6.3% African American population for the entire state), 3.6% Asian (compared to 2.5% Asian population for the entire state), 6.1% Other (compared to 1.7% Other for the entire state), and 3.6% identifying with two or more races (compared to 2.1% identifying with two or more races for the entire state) (U.S. Census Bureau, 2016). Additionally, in Milwaukee 36.3% of the population are non-Hispanic or Latino Whites, and 18% are of

Hispanic or Latino origin, and in Wisconsin 82.4% are non-Hispanic or Latino Whites, and 6.3% are of Hispanic or Latino origin (U.S. Census Bureau, 2016).

What appears to be a very diverse city has its own set of challenges, however, illustrated in Milwaukee's stark geographic segregation along racial/ethnic lines. In Milwaukee, the White population resides within the North Shore area located along Lake Michigan, the African American population lives north-west of the city center, the Hispanic or Latino population is predominantly found on the south side of the city, and the Asian population is found primarily in small pockets within the near north side of the city. So, while Milwaukee does have the numbers to suggest that it is a very diverse city, the city population is segregated along racial/ethnic lines. Importantly, racial/ethnic segregation is a common indicator of other challenges in the city, such as structural disadvantage and elevated crime rates. As described in detail in the Results section (Fig. 1, Fig. 2), it is clear that both violence and neighborhood disadvantage indicators seem to be geographically clustered in Milwaukee (Moran's $I$ for aggravated assaults was 0.60, p = 0.00; Moran's $I$ for simple assaults was 0.50, p = 0.00; Moran's $I$ for concentrated disadvantage was 0.52, p = 0.00). Highest levels of violent crimes and greatest neighborhood disadvantage can be found in the north-west and the near south side of the city, suggesting a vital role that neighborhood characteristics seem to have in crimes occurring in Milwaukee.

Relative to other similar cities both within the state and across the nation, Milwaukee also has a higher crime rate. For example, Milwaukee's violent crime rate of nearly 1600 per 100,000 is four times higher than the national crime rate of 363 per 100,000 (U.S. Department of Justice, 2015a, 2015b). Milwaukee also has a high availability of alcohol selling establishments, owing it partly to its long history of alcohol consumption and production, which remains to be an important part of Wisconsin life. Alcohol consumption is similarly high in this part of the nation: Wisconsin per capita alcohol consumption is 1.3 times higher than the national per capita consumption rate, and heavy drinking among adults is more common in Wisconsin than in the rest of the nation (Dwyer-Lindgren et al., 2015).

## 3.2. Units of analysis

In line with prior research, the units of analysis for this study are 572 U.S. census block groups that lie within the city boundaries. Census block groups are geographical units that are smaller than census tracts and larger than census blocks, and they are the smallest geographical units for which U.S. Census Bureau publishes sample household socio-economic data (U.S. Census Bureau, 2016). The census block groups are an optimal unit of analysis not only due to practical reasons of data availability but also because these are commonly used proxies for neighborhood boundaries in violence and criminological research (e.g., Gorman et al., 2001; McCord et al., 2007; Weiss et al., 2007). I obtained the data for Milwaukee's 572 census block groups from the U.S. Census Bureau Topologically Integrated Geographic Encoding and Referencing (TIGER)/Line shapefiles product.

## 3.3. Dependent variables

I obtained the data on dependent variables from the publicly available data source website maintained by the City of Milwaukee. The data included incident number, date and time when the incident occurred, police district in which the incident occurred, offense type, and address location where the incident occurred. The simple and aggravated assaults address location data were successfully

geocoded, 100%, using ESRI's ArcMap software and the city of Milwaukee's hybrid address locator that first references Milwaukee's Master Address Index and then Milwaukee's street centerline dataset. Subsequently, I calculated simple assault density and aggravated assault density measures as the number of crimes per square mile for each unit of analysis and standardized the data prior to analyses.

## 3.4. Independent variables

I obtained the data on independent variables from the U.S. Census Bureau, and the City of Milwaukee publicly available data source website. For this project, I queried the 2011–2015 American Community Survey 5-year estimates data to obtain neighborhood characteristics to measure concentrated disadvantage, concentrated immigration, residential stability, ethnic heterogeneity, and population density.[2] Subsequently, I analyzed the data for underlying latent structures and carried out principal component analysis to reduce multicollinearity and identify structural components, such as concentrated disadvantage, concentrated immigration, and residential stability.

*Concentrated disadvantage* measure (Cronbach's Alpha = 0.74) included proportions of: households receiving SSI, households receiving public assistance income, population that is 16 years and over that is unemployed, households with income below poverty level, and single parent households that have children under the age of 18 living in them. *Concentrated immigration* measure (Cronbach's Alpha = 0.73) included proportions of: population that is foreign born and population that is of Hispanic or Latino origin. *Residential stability* measure (Cronbach's Alpha = 0.65) included proportions of: population that resided in same house 1 year ago and owner-occupied housing units. I calculated *ethnic heterogeneity* measure by using the Herfindahl index (Gibbs and Martin, 1962), and first calculating proportions of White, African American, American Indian/Alaska Native, Asian, Hawaiian/other Pacific Islander, and Other populations. Subsequently, each proportion was squared, the squared proportions were summed, and then subtracted from 1, with higher scores indicating a greater diversity in the neighborhood (Osgood and Chambers, 2000). I calculated *population density* as the number of individuals residing in each block group divided by the block group area size in square miles, to account for the likelihood of higher crime rates occurring in areas due to higher population numbers. Lastly, I also controlled for *daytime population* in a set of sensitivity analyses to control for the additional level of guardianship provided by having people out and about, and the results (available upon request) remained unchanged. In line with prior work in this area (see Stults and Hasbrouch, 2015), I calculated the measure for commuter-adjusted daytime population as: daytime population = resident population + workers working in city – workers living in city. I standardized all the neighborhood measures prior to analyses.

City of Milwaukee publicly available data source website provided data on alcohol availability. The data included tax key (also known as parcel number), license classification, effective and expiration dates, licensee and corporation names, establishment name, and the address where the licensee operates. I subsequently disaggregated the resulting 2016 dataset by license classification into off-premise outlets (Class A license type) and on-premise outlets (Class B and C license types), and the license classification did not permit for further disaggregation of outlets beyond these broad categories. As with crime data, the alcohol outlet address data were successfully geocoded, 99%, using ESRI's ArcMap software and the city of Milwaukee's address locator and I calculated on- and off-premise density measures as the

number of on- and off-premise outlets per square mile for each unit of analysis, and I subsequently standardized the data prior to analyses.

The City of Milwaukee website also provided publicly available data on micro-places. The Master Property Record (MPROP) contains the data on micro-places, in the form of a record for each property parcel in the city. The MPROP dataset is an incredibly rich source of property data, containing more than 90 attributes (e.g., tax key, property parcel address, owner name and owner address, zoning code, and land use code, among others) for each of over 160,000 land parcels in the city. I downloaded the historic 2016 MPROP dataset and queried it for the following land use categories (according to land use codes) to capture the micro-places of interest and explore their role in violence for Milwaukee: (a) *colleges and universities* (land use code 8221), (b) *primary and secondary schools* (land use code 8211), (c) *financing institutions* (land use codes 6010, 6011, 6021, 6022, 6035, 6061, 6062, 6099), (d) *gas stations* (land use code 5541), (e) *hotels and motels* (land use code 7011), (f) *laundromats* (land use code 7215), (g) *parks and playgrounds* (land use codes 8860 and 8870), and (h) *rooming and boarding houses* (land use code 7021). The micro-place parcels were geocoded with ESRI's ArcMap software, using tax key as the geocoding identifier, and resulted in 99% successful match rate. I also standardized the micro-places data using area size for the units of analysis, to create density measures for each of the micro-places and subsequently standardized the data prior to analyses.

## 3.5. Analytic strategy

I estimated spatially-informed regression models using GeoDa software (Anselin et al., 2006) with a queen contiguity weights matrix, and I carried out Exploratory Spatial Data Analyses (ESDA) using ESRI's ArcMap software. I also considered alternative (i.e., non-linear and spatial error) regression approaches and alternative weight matrices (i.e., rook, nearest neighbor). That is, I also created and used in the regression models additional weights matrices (i.e., rook and nearest neighbor). The findings from the regression models that used additional weight matrices were consistent with the models presented in the manuscript. In addition, I also estimated non-linear regression models and spatial error regression models (the spatial error models also were estimated with a queen contiguity matrix, rook and nearest neighbor matrices), and the findings were consistent with the models presented in the manuscript.

Because the variables used in this study contain spatially referenced data (e.g., physical addresses where crimes occurred, where alcohol outlets are located) and spatial units of analysis (e.g., census block groups that cover geographic areas within Milwaukee), I paid special attention to ensure that the regression models estimated here were appropriate for handling such data (see Loftin and Ward, 1983). Two problems associated with spatially referenced data (spatial heterogeneity and spatial autocorrelation) can lead to incorrect inferences, so the models controlled for the effect of spatial autocorrelation on parameter estimates by adding a term for it (*Rho*) to the models (Anselin, 1988; Anselin and Bera, 1998; Loftin and Ward, 1983).

## 4. Results

The descriptive statistics for the dependent and independent variables are shown in Table 1 below, which shows the values of the variables before standardization. On average, in 2016 there were between 0 and 33 simple assaults (with a mean of 6.54 simple assaults), and between 0 and

37 aggravated assaults (with a mean of 7.37 aggravated assaults) in an average Milwaukee block group (N = 572). Table 1 also shows that for an average Milwaukee block group (N = 572), the counts of on-premise outlets ranged from 0.00 to 74.00 (with a mean of 1.74), and the counts of off-premise outlets ranged from 0.00 to 6.00 (with a mean of 0.52).

Table 1. Descriptive statistics for Milwaukee block groups (N = 572).

| | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| *Dependent Variables* | | | | |
| Simple Assaults | 0.00 | 33.00 | 6.54 | 5.22 |
| Aggravated Assaults | 0.00 | 37.00 | 7.37 | 6.53 |
| *Neighborhood Characteristics* | | | | |
| Concentrated Disadvantage | −2.96 | 3.14 | 0.00 | 1.00 |
| Social Security Income | 0.00 | 0.54 | 0.11 | 0.09 |
| Public Assistance Income | 0.00 | 0.33 | 0.05 | 0.05 |
| Unemployed | 0.00 | 0.32 | 0.08 | 0.06 |
| Income Below Poverty Levels | 0.00 | 0.81 | 0.27 | 0.17 |
| Male and Female Headed Households | 0.00 | 0.93 | 0.30 | 0.19 |
| Concentrated Immigration | −1.30 | 3.66 | 0.00 | 1.00 |
| Foreign Born | 0.00 | 0.50 | 0.09 | 0.10 |
| Hispanic or Latino | 0.00 | 0.91 | 0.17 | 0.24 |
| Residential Stability | −4.72 | 1.99 | 0.00 | 1.00 |
| Same Residence One Year Ago | 0.00 | 1.00 | 0.80 | 0.13 |
| Owner Occupied Housing Units | 0.00 | 1.00 | 0.44 | 0.22 |
| Ethnic Heterogeneity | 0.00 | 0.81 | 0.34 | 0.20 |
| Total Population | 0.00 | 3200.00 | 1052.50 | 456.93 |
| *Alcohol Availability* | | | | |
| On Premises | 0.00 | 74.00 | 1.74 | 4.88 |
| Off Premises | 0.00 | 6.00 | 0.52 | 0.83 |
| *Micro-places Parcels* | | | | |
| Colleges and Universities | 0.00 | 11.00 | 0.07 | 0.58 |
| Primary and Secondary Schools | 0.00 | 16.00 | 0.43 | 0.92 |
| Financial Services | 0.00 | 4.00 | 0.16 | 0.50 |
| Gas Stations | 0.00 | 4.00 | 0.46 | 0.72 |
| Hotels and Motels | 0.00 | 7.00 | 0.12 | 0.60 |
| Laundromats | 0.00 | 1.00 | 0.05 | 0.22 |
| Parks and Playgrounds | 0.00 | 9.00 | 0.56 | 1.20 |
| Rooming Houses | 0.00 | 9.00 | 0.22 | 0.89 |

The choropleth and Anselin Local Moran's *I* maps shown below in Fig. 1, Fig. 2, respectively, show the spatial distribution of neighborhood characteristics (Fig. 1), and assaults and alcohol availability (Fig. 2) for Milwaukee block groups. As anticipated, the spatial variation across units of analysis is evident for these measures. For example, in the choropleth maps of neighborhood characteristics in Fig. 1, we can

observe that concentrated disadvantage is evident in the northwest part of the city, concentrated immigration is prevalent in the near south side, residential stability measure seems to not have a clear spatial pattern, and ethnic heterogeneity seems to be mainly found in the near south side and far north side of the city.
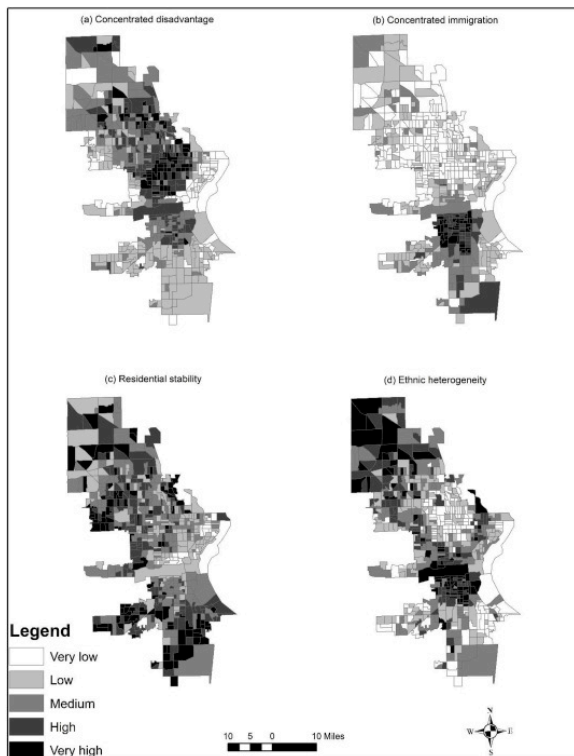


Fig. 1. Neighborhood characteristics of concentrated disadvantage, concentrated immigration, residential stability, and ethnic heterogeneity for Milwaukee block groups (N = 572).

The northwest side of Milwaukee experiences a range of difficult social and economic conditions, which have resulted from deindustrialization, the loss of manufacturing jobs in this area, and subsequent out-migration of middle-class families in search of better living opportunities. Concentrated disadvantage in this part of the city is evident in the following examples. First, the unemployment rate in the northwest side of Milwaukee is over four times higher than the city's rate of unemployment, and poverty rate in the northwest side of Milwaukee is almost five times higher than the city's poverty rate (Boyle, 2009). Also, this part of the city highlights the racial segregation that characterizes the city of Milwaukee. In the northwest side of Milwaukee, the African American population constitutes almost 80% of the population, compared to about 6% of White population, and about 4% of Hispanic/Latino population (Boyle, 2009). In sum, concentrated disadvantage here is a confluence of rapidly increasing poverty rates, lower median incomes, and a young population with a high concentration of single-parent households, and creates residents' social, racial, economic, and linguistic isolation from the surrounding Milwaukee communities (Boyle, 2009).

The concentration of immigration is found in the near south side, which has traditionally been an immigration destination for those moving to the city. The south side was home to first Polish immigrants in the mid-late 1800's and subsequently to Hispanic/Latino people in search of better opportunities in the early 1900's (Gurda, 1999), and even presently the south side remains to be the

destination area of the city for immigrants moving to Milwaukee. The map also suggests some similarities of immigration patterns with ethnic heterogeneity patterns.

High levels of ethnic heterogeneity are also found in the near south side of the city, but also in the far north side of the city. Ethnic heterogeneity is clearly prominent throughout Milwaukee and it reflects the city's heterogenous heritage and current realities. Although the most visible population growth across ethnic/racial categories is found for African Americans, Latinos, Asians, and Native Americans, the population change for the less visible ethnicities have remained stable for the city. In fact, a local historian, John Gurda, recently suggested that the German Milwaukeeans continue to have a strong cultural presence in the city, and those who claimed Italian, Polish, Irish, English, and Norwegian ancestral ties are still very much an important part of the cultural milieu in the city's social fabric.

The Anselin Local Moran's *I* maps shown in Fig. 2 shows the spatial distribution of assaults and alcohol availability for Milwaukee block groups, suggesting that spatial clustering in assaults is evident in the near south side, west, and north-west of the city center. Specifically, there is some similarity between the spatial distribution for simple and aggravated assaults, and this similarity makes sense given the nature of this particular crime. Milwaukee residents are very much aware of the crime concentrations that exist along the south and northwest side of the city, both of which the residents view as being high crime areas.
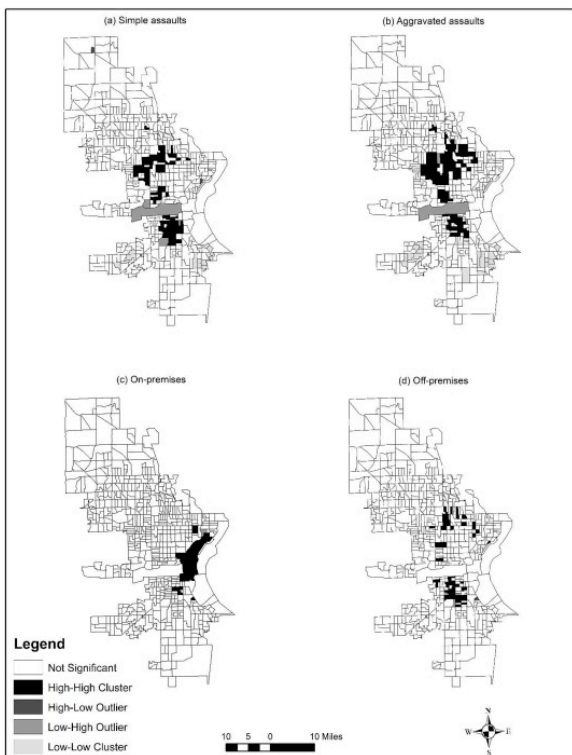


Fig. 2. Simple and aggravated assaults, and on- and off-premises for Milwaukee block groups (N = 572).

The spatial distribution of on-premises seems to be clustered along the upper east/downtown area, and somewhat in the near south side, and these are the parts of the city where people go in search of entertainment, including dining out or bar-going. For example, the large area that captures high on-premise availability is also where some of the most expensive high-rise condominiums are located,

right along the Lake Michigan, which provides a pleasant environmental background. This part of the city also experiences the most concentrated commercial and entertainment investments and it houses a range of other leisurely, cultural, recreational, and historic places, such as the Riverwalk, the Pabst Theater, the Fistserv Forum, and the Historic Third Ward.

On the other hand, off-premise outlets seem to be clustered in the near south side, west, and north-west of the city center. Historically, these areas reflect Milwaukee's manufacturing past: various foundry, tannery, heavy machinery and brewing companies that operated there employed residents who also lived in these areas. Manufacturing workers have traditionally enjoyed going to the neighborhood bars to have a drink after working hours, and with the decline of manufacturing jobs in the area, the neighborhood bars have been replaced by local corner stores, where alcohol beverages can be purchased for a lower price and consumed in the privacy of one's home. In addition, there seems to be some difference in the ways the local public officials view liquor establishments, which can help explain spatial distribution of alcohol outlets in Milwaukee. Some public officials believe that additional liquor establishments provide excitement in a nightlife district (e.g., former Alderman Tony Zielinski), while others warn to use caution when issuing new liquor licenses (e.g., Alderman Jeff Schmidt, City of Oconomowoc), and the higher distribution of off-premise licenses may simply reflect the residents' and public officials' views on the role that off-premise outlets serve in the community.

The results shown in Table 2 below test the relationship between neighborhood characteristics and violence, to investigate the first hypothesis and provide a baseline model of violence. Model 1 shows results for neighborhood characteristics regressed on simple assault density. Concentrated disadvantage is positively associated with simple assault density ($\beta$ = 0.30, p = 0.00), residential stability is negatively associated with simple assault density ($\beta$ = −0.09, p = 0.01), and population density is positively associated with simple assault density ($\beta$ = 0.27, p = 0.00). The spatial lag term (*Rho*) for simple assaults is a significant contributor to the model ($\beta$ = 0.42, p = 0.00). Together, these variables explain 50% of the variance in simple assault density, and multicollinearity between the variables was not a problem, evident in the multicollinearity condition number of 2.16, much lower than the threshold value of 30 (Anselin, 2004).

Table 2. Neighborhood characteristics regressed on simple and aggravated assault density for Milwaukee block groups (N = 572).

| | Model 1 Simple Assault | | | Model 2 Aggravated Assault | | |
|---|---|---|---|---|---|---|
| | $\beta$ | S.E. | p | $\beta$ | S.E. | p |
| **Concentrated Disadvantage** | 0.30 | 0.03 | 0.00 | 0.23 | 0.03 | 0.00 |
| **Concentrated Immigration** | 0.03 | 0.04 | 0.35 | 0.01 | 0.03 | 0.83 |
| **Residential Stability** | −0.09 | 0.03 | 0.01 | −0.10 | 0.03 | 0.00 |
| **Ethnic Heterogeneity** | −0.05 | 0.03 | 0.13 | −0.10 | 0.03 | 0.00 |
| **Population Density** | 0.27 | 0.04 | 0.00 | 0.18 | 0.03 | 0.00 |
| ***Rho* Simple Density** | 0.42 | 0.05 | 0.00 | − | − | − |
| ***Rho* Aggravated Density** | − | − | − | 0.62 | 0.04 | 0.00 |
| **Constant** | 0.01 | 0.03 | 0.67 | 0.01 | 0.03 | 0.59 |
| **R-Squared** | | 0.50 | | | 0.60 | |
| **Log Likelihood** | | −620.80 | | | −571.73 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **AIC** | | 1255.6 | | | 1157.47 | |
| **Multicollinearity Co. No.** | | 2.16 | | | 2.16 | |

Model 2 shows neighborhood characteristic measures regressed on aggravated assault density. The results suggest similar associations for aggravated assault density as for simple assault density. That is, concentrated disadvantage was positively associated with aggravated assault density (β = 0.23, p = 0.00), residential stability was negatively associated with aggravated assault density (β = −0.10, p = 0.00), and population density was positively associated with aggravated assault density (β = 0.18, p = 0.00). Ethnic heterogeneity measure, however, became an important predictor of aggravated assault density, while it wasn't so for simple assault density (β = −0.10, p = 0.00). The spatial lag term (Rho) was associated with aggravated assault density (β = 0.62, p = 0.00). The variables explained 60% of the variance in aggravated assault density, and as with the simple assault model, multicollinearity condition number value of 2.16 indicates that multicollinearity was not a problem for aggravated assault density model.

The results of the models presented in Table 2 above suggest that neighborhood characteristics play a vital role in neighborhood rates of violence. Table 3 models shown below tests the second hypothesis to explore the role of alcohol availability in neighborhoods, net of the neighborhood characteristics. Model 3 shows the results for simple assault density, and the results suggest that while neighborhood characteristics continue to be important predictors of simple assault density, much like what was evident in Table 2 above, the results also suggest that alcohol availability matters. Milwaukee census block groups that had a high availability of on-premises had low simple assault density (β = −0.11, p = 0.00), and those that had a high availability of off-premises had high simple assault density (β = 0.08, p = 0.01). The spatial lag term (*Rho*) was a statistically significant predictor of simple assault density (β = 0.40, p = 0.00), and as in the previous models multicollinearity was not present, indicated by the value of 2.39. Together, these variables explained 51% of the variance in the simple assault density.

Table 3. Alcohol outlet density and neighborhood characteristics regressed on simple and aggravated assaults for Milwaukee block groups (N = 572).

| | Model 3 Simple Assault | | | Model 4 Aggravated Assault | | |
|---|---|---|---|---|---|---|
| | β | S.E. | p | β | S.E. | p |
| **On Premise Density** | −0.11 | 0.03 | 0.00 | −0.07 | 0.03 | 0.02 |
| **Off Premise Density** | 0.08 | 0.03 | 0.01 | 0.12 | 0.03 | 0.00 |
| **Concentrated Disadvantage** | 0.26 | 0.03 | 0.00 | 0.20 | 0.03 | 0.00 |
| **Concentrated Immigration** | 0.03 | 0.04 | 0.44 | −0.01 | 0.03 | 0.81 |
| **Residential Stability** | −0.11 | 0.03 | 0.00 | −0.10 | 0.03 | 0.00 |
| **Ethnic Heterogeneity** | −0.05 | 0.03 | 0.16 | −0.10 | 0.03 | 0.00 |
| **Population Density** | 0.29 | 0.04 | 0.00 | 0.18 | 0.03 | 0.00 |
| ***Rho* Simple Density** | 0.40 | 0.05 | 0.00 | − | − | − |
| ***Rho* Aggravated Density** | − | − | − | 0.59 | 0.04 | 0.00 |

| | β | S.E. | p | | β | S.E. | p |
|---|---|---|---|---|---|---|---|
| Constant | 0.01 | 0.03 | 0.68 | 0.01 | 0.03 | 0.60 |
| R-Squared | | 0.51 | | | 0.61 | |
| Log Likelihood | | −613.26 | | | −560.95 | |
| AIC | | 1244.51 | | | 1139.91 | |
| Multicollinearity Co. No. | | 2.39 | | | 2.39 | |

When considering the role of alcohol availability in aggravated assaults presented in Model 4, the findings are like those for simple assaults. The relationship between on-premise outlet density and aggravated assault density was negative (β = −0.07, p = 0.02), and the relationship between off-premise density and aggravated assault density was positive (β = 0.12, p = 0.00). As in the previous models, the spatial lag term (*Rho*) was associated with aggravated assault density (β = 0.59, p = 0.00). Together, these variables explained 61% of the variance in aggravated assault density, and as with earlier models multicollinearity was not a problem in this model, suggested by the multicollinearity condition number of 2.39, much lower than the threshold value of 30 (Anselin, 2004).

Lastly, Table 4 shows the results for alcohol availability, neighborhood characteristics, and micro-places regressed on simple and aggravated assaults, to test the last hypothesis. These full models investigated the relationship between alcohol availability and violence, net of neighborhood characteristics and other micro-places that operate in neighborhoods. As suggested by the results in Model 5, the negative relationship between on-premise density and simple assaults remained statistically significant (β = −0.09, p = 0.00). The relationship between off-premise density and simple assaults was positive and statistically significant (β = 0.07, p = 0.02), and several micro-places seemed to be important predictors of simple assaults. For example, areas with high availability of gas stations and high availability of laundromats had high simple assaults (β = 0.05, p = 0.05 and β = 0.16, p = 0.00, respectively). However, some other types of micro-places were negatively associated with simple assaults. For example, areas with high availability of higher education institutions and with high availability of parks and playgrounds had lower density of simple assaults (β = −0.10, p = 0.00 and β = −0.07, p = 0.01, respectively). The significant relationships between most of the neighborhood characteristics and simple assaults remained consistent when comparing the full model (Model 5) with both the baseline (Model 1) and the alcohol availability models (Model 3). Importantly, the significant relationships between alcohol availability measures and simple assaults were consistent, when comparing the full model (Model 5) with the alcohol availability model (Model 3), suggesting an important role on- and off-premise alcohol outlets play in simple assaults. The spatial lag term (*Rho*) continued to be an important predictor of simple assaults (β = 0.47, p = 0.00), and the multicollinearity was not a problem, suggested by the multicollinearity condition number value of 2.78. The variables included in Model 5 explained 56% of the variance in simple assault density.

Table 4. Alcohol outlet density, neighborhood characteristics, and micro-places regressed on simple and aggravated assaults for Milwaukee block groups (N = 572).

| | Model 5 Simple Assault | | | Model 6 Aggravated Assault | | |
|---|---|---|---|---|---|---|
| | β | S.E. | p | β | S.E. | p |

| | −0.09 | 0.03 | 0.00 | | | |
|---|---|---|---|---|---|---|
| **On Premise Density** | −0.09 | 0.03 | 0.00 | −0.05 | 0.03 | 0.12 |
| **Off Premise Density** | 0.07 | 0.03 | 0.02 | 0.12 | 0.03 | 0.00 |
| **Concentrated Disadvantage** | 0.25 | 0.03 | 0.00 | 0.19 | 0.03 | 0.00 |
| **Concentrated Immigration** | 0.01 | 0.04 | 0.85 | −0.03 | 0.03 | 0.43 |
| **Residential Stability** | −0.12 | 0.03 | 0.00 | −0.12 | 0.03 | 0.00 |
| **Ethnic Heterogeneity** | −0.05 | 0.03 | 0.09 | −0.10 | 0.03 | 0.00 |
| **Population Density** | 0.29 | 0.04 | 0.00 | 0.18 | 0.03 | 0.00 |
| **Colleges and Universities Density** | −0.10 | 0.03 | 0.00 | −0.06 | 0.03 | 0.04 |
| **Primary and Secondary Schools Density** | −0.01 | 0.03 | 0.81 | −0.02 | 0.03 | 0.48 |
| **Financial Services Density** | −0.05 | 0.03 | 0.13 | −0.03 | 0.03 | 0.20 |
| **Gas Stations Density** | 0.05 | 0.03 | 0.05 | 0.05 | 0.03 | 0.04 |
| **Hotels and Motels Density** | 0.05 | 0.03 | 0.48 | −0.01 | 0.03 | 0.80 |
| **Laundromats Density** | 0.16 | 0.03 | 0.00 | 0.10 | 0.03 | 0.00 |
| **Parks and Playgrounds Density** | −0.07 | 0.03 | 0.01 | −0.06 | 0.03 | 0.02 |
| **Rooming Houses Density** | 0.02 | 0.03 | 0.47 | −0.00 | 0.03 | 0.89 |
| *Rho* **Simple Density** | 0.47 | 0.05 | 0.00 | − | − | − |
| *Rho* **Aggravated Density** | − | − | − | 0.58 | 0.04 | 0.00 |
| **Constant** | 0.01 | 0.03 | 0.63 | 0.01 | 0.03 | 0.59 |
| **R-Squared** | | 0.56 | | | 0.63 | |
| **Log Likelihood** | | −586.15 | | | −544.42 | |
| **AIC** | | 1206.3 | | | 1122.85 | |
| **Multicollinearity Co. No.** | | 2.78 | | | 2.78 | |

Model 6 shows the results for neighborhood characteristics, alcohol availability, and micro-places regressed on aggravated assault density. Off premise alcohol outlet density continued to be an important contributor to the aggravated assault density model ($\beta = 0.12$, $p = 0.00$), but the negative association between on-premise density and aggravated assaults was no longer statistically significant ($\beta = -0.05$, $p = 0.12$). The influence of other micro-places on aggravated assaults is like that for simple assaults. Gas stations density and laundromats density measures were both associated with aggravated assault density ($\beta = 0.05$, $p = 0.04$ and $\beta = 0.10$, $p = 0.00$). The negative relationships between colleges and universities density and aggravated assault density, and between parks and playgrounds density and aggravated assault density were similar as those in Model 5 for simple assaults ($\beta = -0.06$, $p = 0.04$ and $\beta = -0.06$, $p = 0.02$, respectively). The full model for aggravated assault density (Model 6) also shows that most of the neighborhood characteristics continued to matter for aggravated assaults. The spatial lag term (*Rho*) for aggravated assaults was positively associated with aggravated assaults ($\beta = 0.58$, $p = 0.00$), and multicollinearity between the variables was not a problem, indicated by the value of 2.78. The variables included in Model 6 explained 63% of the variance in aggravated assaults.

When considering the regression diagnostics for Models 1–6, it seems that the full models shown in Table 4 seem to be best suited, relative to models shown in Table 2, Table 3, for providing the most complete picture about the neighborhood violence rates. For example, the full model for simple assault density, Model 5, explains 6% more of the variance in simple assault density, and the reduced values of Log Likelihood and Akaike information criterion (AIC) suggest that Model 5 better explains simple assault density relative to Model 1 (baseline, neighborhood characteristics only model) and relative to Model 3 (alcohol availability and neighborhood characteristics model).

Similarly, the full model for aggravated assault density, Model 6, explains an additional 3% of the variance in aggravated assault density, relative to the other aggravated assault models, Model 2 (baseline, neighborhood characteristics only model) and Model 4 (alcohol availability and neighborhood characteristics model). In addition, the better fit of the full model for predicting aggravated assault density is also evident in the decreased values of Log Likelihood and AIC.

Most importantly, the results from these full models found in Table 4 suggest that off-premise alcohol outlet density matters for both simple and more serious acts of violence, even when we also consider other theoretically and empirically relevant variables such as neighborhood characteristics (concentrated disadvantage, residential stability, ethnic heterogeneity, and population density) and other types of micro-places (higher education institutions, gas stations, laundromats, and parks and playgrounds) that exist in the neighborhoods. On the other hand, these full models also suggest that the protective effect of on-premise alcohol outlet density is only evident for simple assaults but not for more serious types of assaults. Instead, other types of micro-places, such as laundromats and gas stations are better predictors of aggravated assaults, relative to on-premise alcohol outlets.

## 5. Discussion

Viewed through the lens of neighborhood- and place-based perspectives, this study suggests that some types of neighborhood characteristics and some types of places that exist within the neighborhoods matter for violence in Milwaukee, Wisconsin. The results of this study partially confirm the first hypothesis. That is, as expected, there was a positive relationship between concentrated disadvantage and violence, and a negative relationship between residential stability and violence. While the association between concentrated immigration and violence is in the unexpected direction (i.e., negative), the association between these two variables is not statistically significant, suggesting no relationship between these two measures. The association between ethnic heterogeneity and violence is also in the unexpected direction (i.e., negative), and the association is only significant for aggravated assaults (and it is not statistically significant for simple assaults). These findings suggest that Milwaukee areas that are characterized by high levels of violence also have high levels of concentrated disadvantage, but low levels of both residential stability and ethnic heterogeneity.

The results of this study also partially confirm the second hypothesis. The results of the study suggest that net of significant neighborhood characteristics, there was a positive relationship between off-premise outlets and violence. On the other hand, while I expected that there would be also a positive relationship between on-premise outlets and violence, the findings of this study suggest there is a negative relationship between these two measures. So, in Milwaukee, areas that have high rates of

violence also have high availability of off-premise outlets, but high availability of on-premises seems to have a protective effect on violence.

The last hypothesis was also partially confirmed by the results of this study. While I expected and subsequently confirmed that the relationship between off-premise outlets and violence would remain even when other micro-places are included in the analyses, net of neighborhood characteristics, the relationship between on-premises and aggravated assaults was no longer significant. That is, on-premise outlets were associated only with reduced levels of simple assaults, but not with reduced levels of aggravated assaults in the full models. When considering additional types of micro-places that also operate in neighborhoods side by side with alcohol selling establishments, it appears that areas with high availability of gas stations and high availability of laundromats also have high levels of violence. On the other hand, other types of neighborhood characteristics and micro-places seem to protect against violence. For example, areas marked by high levels of residential stability and high levels of ethnic heterogeneity seem to have lower rates of violence. Additionally, areas with higher availability of higher education institutions and areas with higher availability of parks and playgrounds also seem to have lower rates of violence. This suggests that high availability of off-premises, gas stations and laundromats are related to high levels of violence, and this may be due to the limited formal surveillance that is provided by these places over the events that are occurring at or near their locations. In contrast, on-premise outlets as well as parks, colleges and universities may have greater levels of guardianship over what happens in or near locations. For example, on-premises may have trained employees who can act on difficult encounters between patrons or staff before they escalate, and they may have patrons who frequent these outlets that are able to provide guardianship over other patrons who travel to and from on-premises. In addition, parks are public spaces that are formally surveilled by law enforcement officers who patrol these public spaces, while colleges and universities have formal university police officers or campus safety staff who patrols the areas around campus, in addition to students who can oversee what happens in this area.

The finding of the consistent positive association between off-premise alcohol outlet density and simple and aggravated assaults is similar to the prior studies in this area. For example, Grubesic and colleagues found that off-premises were more strongly associated with aggravated assaults relative to on-premises (Grubesic et al., 2013), and other scholars have found off-premises to be associated also with robberies (Franklin et al., 2010) and with simple and aggravated assaults (Pridemore and Grubesic, 2013). The statistically insignificant association between on-premise alcohol outlet density and aggravated assaults is surprising, given that prior studies in this area have found this to be an important contributor to neighborhood violence rates (e.g., Toomey et al., 2012) and future studies should examine these findings in more detail.

The findings of this study also highlighted the important role of not only neighborhood characteristics but also that of other types of micro-places in violence. Off-premise density association with both simple and aggravated assaults was significant even when the effect of these other micro-places on violence was examined, suggesting that in order to have a more informed understanding of neighborhood rates of violence, it is not only important for research in this area to include neighborhood co-variates of violence, such as those included in this study, but also other types of places that operate in neighborhoods, including but not limited to alcohol selling establishments.

Considering these findings in the light of place-based understanding of crime suggests that off-premise alcohol outlets may be viewed as crime attractors that operate in the neighborhoods (Brantingham and Brantingham, 1995). Off-premise alcohol outlets may serve as crime attractors that bring to these premises the motivated offenders in search of vulnerable targets in places that lack capable guardians (Cohen and Felson, 1979). In the context of off-premise alcohol outlets, the guardianship over vulnerable targets is limited as the patrons' visits to the outlets typically last just long enough to purchase the product. The guardianship ends once the patrons leave the guarded nature of the outlet and consumes the intoxicating commodity (Babor, 2010) in a setting that lacks capable guardians (e.g., nearby parks, parking lots, or at home). Some off-premise alcohol outlets may specialize in the sale of single-serve products that are designed for immediate consumption (Parker et al., 2011), and may attract the patrons to the premise in search of the product that can be consumed immediately following the purchase in the near vicinity of the outlet, creating the opportunity for motivated offenders to act upon. Additionally, the immediate environment around the off-premise alcohol outlets may serve as a social gathering spot, where individuals gather and socialize, consume their beverages, and settle prior arguments or differences. Perhaps it is because alcohol is not an ordinary commodity due to its pharmacological effect (Babor, 2010), that the greater availability of this product through off-premise establishments allows for a greater consumption away from the public oversight and greater social problems, including violence (Stockwell and Gruenewald, 2004). The association between these types of alcohol establishments and neighborhood rates of violence holds even when we consider the role that neighborhood characteristics and other places that operate in the neighborhood play in violence, highlighting the important role that these types of deviant places (Stark, 1987) have in violence in urban neighborhoods.

Like other studies, this study is not without limitations. First, the alcohol availability data only allowed for the examination of the broad categories of on- and off-premise alcohol outlets, which may obscure the nuances of the relationship between alcohol availability and violence. In fact, a preliminary and exploratory spatial data analysis of data collected on off-premise alcohol outlets in Milwaukee suggests these outlets vary in the types of environments in which they are embedded, the business practices, and the staff and patron characteristics. Future studies in this area should consider investigating the influence of these place-based characteristics on violence occurring near off-premise alcohol outlets. Second, the focus of this study on assaults recorded by the local police department may provide a conservative estimate of the relationship between alcohol availability and assaults, as some assaults are likely to not be reported to the police (e.g., those occurring within a domestic setting, or within the exchange of illicit activities). Third, this study uses data from the census block groups located within Milwaukee, which could influence analyses and ability to detect clustering. Milwaukee is bordered by various cities and villages and limiting the analyses only to the research site of Milwaukee raises the issue of edge effects (Baddeley, 1999), because the analyses of neighborhood crime rates around the edges of Milwaukee does not fully tell the story of the regional crime rates that become excluded from the analyses as a result of occurring in a nearby city, yet on the other side of the edge of Milwaukee boundary. Lastly, the cross-sectional design of this study doesn't allow for an exploration of the simultaneous influences of space and time on violence, so that less is known about how and when alcohol outlets exert their influence on violent outcomes. Nevertheless, this study is carefully designed

to explore the role that neighborhood characteristics, alcohol outlets, and other micro-places that operate in neighborhoods have in neighborhood rates of violence.

## 6. Conclusion

This study advances the alcohol-violence literature by exploring in more detail violent crimes occurring in urban neighborhoods. In the context of Milwaukee, on-premise alcohol outlets seem to be related to lower rates of less serious violent crimes, and when considering more serious acts of violent crimes there appear to be other types of places that predict such violent outcome better than on-premise alcohol outlets. On the other hand, off-premise alcohol outlets have an important role in violence, both in the less serious and in the more serious acts of violence.

From the theoretical perspectives proposed in the environmental criminology literature, this study illustrates the importance of off-premise alcohol outlets in attracting and generating crime to the neighborhoods in which these outlets are located. It confirms Brantingham and Brantingham's (1995) ideas that some places provide environmental backcloth which encourages opportunities for victimization, and we see in this study that off-premise alcohol outlets predict violence even when assessing the simultaneous role of other possible crime generators and attractors in the neighborhoods (such as gas stations and laundromats). The consistent relationship between off-premise outlets and violence also strengthens the theoretical and empirical arguments that there is something unique about off-premises or their concentration across neighborhoods that not only attracts crime but also helps generate crime that otherwise would not have taken place (also see Grubesic et al., 2013). It could be that place managers in off-premise outlets are less able to provide capable guardianship over their patrons and the subsequent events occurring in the neighborhoods in which the outlets are located, as they interact with their patrons for a very limited period during the purchasing transaction. It also could be that off-premises provide alcohol beverages that are less expensive than their counterparts at on-premises, and patrons can buy greater volumes of this intoxicated commodity and consume it in a less guarded environments (see Trangenstein et al., 2018), so off-premises should be carefully be considered in any theoretical and empirical research on neighborhood rates of violence.

Areas that have high off-premise alcohol outlet availability also have high rates of violent crimes, and future studies should examine how the larger neighborhood dynamics influence these relationships. For example, neighborhood conditions may moderate the association between alcohol outlets and assaults (Pridemore and Grubesic, 2012), and the segregated nature of Milwaukee suggests a structural interdependence between Milwaukee neighborhoods (e.g., neighborhood characteristics may be related to not only the local crime rates, but also to the crime rates in the nearby neighborhoods). In addition, more research is warranted to better understand the relationship between off-premise alcohol outlets and violence. Is the relationship between off-premise alcohol outlets and violence due to the larger environmental backcloth in which these outlets are located, is it due to their business practices, or is it due to characteristics of their staff and patrons? The accumulation of the scientific evidence suggests an important role that these outlets play in increased rates of violence, yet we know less about what, specifically, is it about these outlets that provides the opportunity for violent victimization. Future studies in this area should consider the importance of a

better understanding of off-premise alcohol outlets to better understand violence occurring in urban neighborhoods.

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## Notes

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[2]The following census block group-level variables were downloaded: B01003 – total population; B02001 – race; B03003 – Hispanic or Latino origin; B07201 – geographic mobility in the past year for current residence; B1103 – family type by presence and age of own children under 18 years; B15003 – educational attainment for the population 25 years and over; B17017 – poverty status in the past 12 months by household type by age of householder; B19001 – household income in the past 12 months; B19056 – supplemental security income (SSI) in the past 12 months for households; B19057 – public assistance income in the past 12 months for households; B23025 – employment status for the population 16 years and over; B25003 – tenure; B99051 – imputation of citizenship status; and C24030 – sex by industry for the civilian employed population 16 years and over.