Neighborhood Characteristics Contribute to Urban Alcohol Availability: Accounting for Race/Ethnicity and Social Disorganization

Aleksandra J. Snowden
Marquette University, aleksandra.snowden@marqutte.edu

Neighborhood Characteristics Contribute to Urban Alcohol Availability: Accounting for Race/Ethnicity and Social Disorganization

Aleksandra J. Snowden
Department of Criminal Justice, University of Wisconsin Milwaukee, Milwaukee, Wisconsin

Abstract

This study examined the role that race/ethnicity and social disorganization play in alcohol availability in Milwaukee, Wisconsin, census block groups. This study estimated negative binomial regression models to examine separately the relationship between neighborhood racial/ethnic composition and social disorganization levels for (1) total, (2) on-premise, and (3) off-premise alcohol outlets. Results of this study suggest that proportion Hispanic was positively associated with total and with off-premise alcohol outlets. Second, proportion African American was negatively associated with on-premise alcohol outlets and positively associated with off-premise alcohol outlets. Proportion Asian was not associated with total, on-premise, or off-premise alcohol outlets. However, the effects of

race/ethnicity on alcohol availability were either unrelated or negatively related to alcohol outlet availability once neighborhood social disorganization levels were taken into account, and social disorganization was positively and significantly associated with all alcohol outlet types. Neighborhood characteristics contribute to alcohol availability and must be considered in any efforts aimed toward prevention of alcohol-related negative health and social outcomes.

Keywords

Introduction

This study examined the association between neighborhood characteristics (i.e., race/ethnicity and social disorganization) and alcohol availability in Milwaukee, Wisconsin, census block groups. This is important because neighborhoods characterized by minority racial/ethnic composition have high concentration of alcohol availability despite the evidence that non-Hispanic whites report higher alcohol consumption than African Americans, Hispanics, or Asians (Berke et al.,2010; Romley, Cohen, Ringel, & Sturm, 2007). High alcohol availability in such neighborhoods appears not to be driven by market demand (Romley et al.,2007), and there may be other reasons (i.e., high levels of social disorganization) that better explain the disproportionately greater alcohol availability in racial/ethnic minority neighborhoods.

Social disorganization theory was developed in an early ecological study of crimes in Chicago neighborhoods, and it captures neighborhood-level characteristics such as ethnic heterogeneity, poverty, residential instability, and single-headed households (Sampson, Raudenbush, & Earls, 1997; Shaw & McKay,1942). High levels of poverty, residential instability, and racial/ethnic heterogeneity create neighborhoods with limited social interaction among community members, which in turn (1) reduces social ties and the attachment of community residents to their neighborhoods, (2) impedes the willingness of community members to intervene on behalf of others, and (3) limits community organization and involvement to realize common goals (Shaw & McKay, 1942). Because socially disorganized neighborhoods exhibit lack of collective efficacy, they may be unable to exercise influence over the behavior of community members or to make meaningful changes in the social and political processes in their neighborhoods (Sampson & Groves, 1989; Sampson et al., 1997). In such neighborhoods, we would expect to find a greater concentration of alcohol availability. Socially organized neighborhoods are likely better able to protect themselves from this less-than-desirable retail activity as they are better able to exercise control over residents, store owners, managers, staff, and public officials (Pridemore & Grubesic, 2012). Having strong social ties among community members and with key social institutions, socially organized neighborhoods are likely better able to make demands on store owners and managers for more responsible retail practices and to seek and receive the aid of formal social control agents like the police, alcohol regulatory agencies, and other local officials (Pridemore & Grubesic, 2012).

Prior literature review

Examining availability of alcohol across neighborhoods with different characteristics is important because alcohol availability is associated with a range of negative health outcomes, including higher

overall consumption (Ornstein & Hanssens, 1985; Trolldal, 2005), drinking frequency (Gruenewald, Johnson, & Treno, 2002), as well as alcohol-involved pedestrian collisions (LaScala, Johnson, & Gruenewald, 2001), alcohol-related motor vehicle crashes (Scribner, MacKinnon, & Dwyer, 1994), drunk driving (Gruenewald et al., 2002), and felony drunk driving arrest rates (Watts & Rabow, 1982). In addition, alcohol availability is associated with negative social outcomes, such as violent crime (Gorman, Speer, Gruenewald, & Labouvie, 2001; Snowden & Freiburger,; Snowden & Pridemore, 2013), child abuse or neglect (Freisthler, Needell, & Gruenewald, 2005), and intimate partner violence (Cunradi, Mair, Ponicki, & Remer, 2011; Livingston,; Snowden, 2016).

Further, evidence suggests that some neighborhoods exhibit high concentration of a specific type of retail activity and commodities. For example, relative to predominantly White and high-income neighborhoods, predominantly African American and low-income neighborhoods have a lesser number of supermarkets, greater average distance to supermarkets, and a more limited variety and quality of healthy foods available for purchase (Black et al., 2012; Morland, Wing, Roux, & Poole, 2001; Zenk et al., 2005). Predominantly African American and socially disorganized neighborhoods also experience a greater availability and exposure to fast-food restaurants (Block, Scribner, & DeSalvo, 2004; Smoyer-Tomic et al., 2008).

Similar observations hold true for availability of alcohol-selling places. Prior literature in this area has measured the physical availability of alcohol in neighborhoods in terms of the number of alcohol outlets (i.e., places that are licensed to sell alcoholic beverages) operating in neighborhoods. This body of literature has typically disaggregated alcohol outlets into on-premise (i.e., places that sell alcoholic beverages that are meant for consumption while visiting the place, such as bars or restaurants) and off-premise (i.e., places such as liquor or convenience stores that sell alcoholic beverages meant for consumption elsewhere). This growing body of literature has found that areas that have high proportions of African Americans and Latinos also have high alcohol outlet density (Berke et al., 2010). Indeed, all racial/ethnic minorities, including African American, Hispanic, Asian/Pacific Islander, and Native American, live in zip codes with a significantly higher density of liquor stores per 100 roadway miles (Romley et al., 2007). Moreover, off-premise alcohol outlet availability is higher in predominantly African American neighborhoods (LaVeist & Wallace, 2000; Nielsen, Hill, French, & Hernandez, 2010) as well as in Latino and Asian communities (Nielsen et al., 2010). These findings are troubling because living in a neighborhood with a higher proportion of African Americans is associated with heavy distilled spirits/liquor use and, in turn, reporting more negative drinking consequences (Jones-Webb & Karriker-Jaffe, 2013), and availability of outlets such as liquor stores has a significant effect on at-risk alcohol consumption among African Americans (Theall et al., 2011).

Nonetheless, individual-level data on overall consumption across racial/ethnic differences suggests that non-Hispanic whites report higher overall consumption, suggesting that concentrations of alcohol outlets in racial/ethnic communities are likely not driven by market demands (Pollack, Cubbin, Ahn, & Winkleby, 2005). However, racial/ethnic neighborhoods are heavily targeted by the alcohol industry (McKee, Jones-Webb, Hannan, & Pham, 2011), and representatives of ethnic communities express concerns about aggressive alcohol marketing campaigns that target the youth living in their neighborhoods (Alaniz & Wilkes, 1998; McKee et al., 2011; Moore, Williams, & Qualls, 1996). To be sure, regardless of their racial/ethnic composition, communities tend to see alcohol outlets as an

unwanted enterprise, but because racial/ethnic communities are also often characterized by social disorganization (Sampson et al., 1997), they may be less able to influence the opening of a new alcohol outlet in their neighborhoods. This theoretical proposition is supported by empirical evidence that shows that socially disorganized neighborhoods have the highest total alcohol outlet availability (Hay, Whigham, Kypri, & Langley, 2009; Pearce, Day, & Witten, 2008; Pollack et al., 2005) and a significantly higher availability of off-premise alcohol outlets (Gorman & Speer, 1997; Livingston,; Pollack et al., 2005), while race/ethnicity is found to be either unrelated or negatively associated with off-premise alcohol availability once social disorganization levels are accounted for (Nielsen et al., 2010).

The notion that social disorganization matters more for alcohol availability is supported by the finding that in the most disadvantaged neighborhoods, the distance to the nearest alcohol outlet is lowest relative to the least disadvantaged neighborhoods (Ellaway, Macdonald, Forsyth, & Macintyre, 2010; Truong & Sturm, 2009). The homes of ethnic minority and lower-income families have high alcohol availability in the immediate (e.g., within one to two city blocks) environment (Bryden, Roberts, McKee, & Petticrew, 2012; Truong & Sturm, 2009). The close proximity of alcohol outlets to the homes of ethnic minority and lower-income families is troubling given the empirical finding that neighborhoods with low mean distance to the closest off-premise alcohol outlet exhibit heavier drinking norms and heavier alcohol consumption (Scribner, Cohen, & Fisher, 2000). In addition, high availability of alcohol in such neighborhoods may also encourage the use of alcohol as a coping strategy to obtain relief and escape from the personal suffering and deprivation among groups that appear to be most vulnerable (Scribner et al., 2000). Thus, not only are the most vulnerable neighborhoods unable to protect themselves from negative social and health outcomes, they are disproportionately exposed to availability of commodities that typically produce these negative social and health outcomes.

This review of literature suggests that local neighborhood environments are important for alcohol availability. However, the research in this area has left three areas that need further exploration. The first relates to the issue of using large units of analysis (i.e., zip codes, census tracts) as carried out in previous studies to approximate neighborhood boundaries. The use of large units of analysis may obscure the fundamental nature of outlet density and can increase the likelihood of aggregation bias (Parker & Wolz, 1979). Instead, smaller units of analysis (such as census block groups, which are used in this study) might better represent natural neighborhood boundaries and reduce the likelihood of pattern obfuscation (Andersen & Malleson, 2011), making them a more appropriate spatial unit of analysis for estimating the association between neighborhood characteristics and alcohol availability. The second area relates to the role of both neighborhood race/ethnicity composition and social disorganization in alcohol availability, although there are some notable exceptions. While some prior studies have examined the role of race/ethnicity in alcohol availability and other studies have examined the role of socioeconomic characteristics, less is known about whether it is the race/ethnicity or social disorganization that best explains alcohol availability (see Nelson et al., 2010). The issue of measurement is important because prior studies in this area have produced different findings depending on which neighborhood characteristic measure they utilized, making it difficult to fully understand the relationship between race/ethnicity, social disorganization, and alcohol availability. The last area that needs further exploration relates to the alcohol outlet typology used in previous studies. Some studies have only examined total alcohol availability (e.g., Berke et al., 2010;

Bluthenthal et al., 2008), and others only off-premise alcohol availability (e.g., LaVeist & Wallace, 2000; Nielsen et al., 2010). Less is known about how these neighborhood characteristics are associated with the availability of all alcohol outlet types in one setting (i.e., total, on-premise, and off-premise). Understanding the associations that different neighborhood characteristics have with different alcohol outlet types is essential to determining appropriate policy responses.

This study contributes to the empirical literature in several ways. First, it extends the study of the association between neighborhood characteristics and alcohol availability by focusing on a smaller unit of aggregation than previously examined in the literature and using the most recent decennial census data. Second, it directly tests the association of neighborhood racial/ethnic characteristics and social disorganization with alcohol availability. Third, it estimates whether the role of race/ethnicity and social disorganization in alcohol availability exists across different alcohol outlet types. Lastly, this study uses U.S. census and alcohol availability data from Milwaukee, Wisconsin, a large urban city with social, economic, and political problems similar to those experienced by other large urban cities across the Unites States.

Data and methods

This cross-sectional study utilizes data from Milwaukee, Wisconsin, census block groups to examine whether race/ethnicity is associated with availability of alcohol outlets, including different alcohol outlet types, and whether the association changes with the introduction of the social disorganization variable.

Research site

Milwaukee, Wisconsin, is the largest city in the state, covering a land area of about 96 square miles with an estimated population of 598,916 individuals (U.S. Census Bureau, 2014). Relative to the rest of the state, the city of Milwaukee is exceptionally diverse, with 44.8% White residents, 40% African American residents, 17.3% Hispanic or Latino residents, and 3.5% Asian residents (U.S. Census Bureau, 2014). Within the state of Wisconsin, 86.2% of residents are White, 6.3% are African American, 5.9% are Hispanic or Latino, and 2.3% are Asian (U.S. Census Bureau, 2014). However, this diverse city has a lower homeownership rate relative to the rest of the state (44.5% in Milwaukee verses 68.6% in the state, U.S. Census Bureau, 2014). In addition, the median household income between 2008 and 2012 for Milwaukee was lower relative to the rest of the state, with the income being $35,823 for Milwaukee and $52,627 for the state. About 28% of Milwaukee residents live below the poverty level, while the percent of residents who live below the poverty level for the state of Wisconsin is much lower at 12.5% (U.S. Census Bureau, 2014).

Units of analysis

The units of analysis for this study are 571 census block groups that lie within the boundaries of the city of Milwaukee. Census block groups were chosen as the units of analysis as they are the smallest and most ecologically meaningful administrative units for approximating neighborhood boundaries. Sampson and Raudenbush (2004) and Grannis (1998) have shown that block groups adequately reflect the layout of neighborhoods. Moreover, Parker and Wolz (1979) argued that alcohol outlet density is related to locations that are small enough to be influenced by varying population structure and geographical stratification (Britt et al., 2005). This is especially important because using larger units of

analysis (e.g., zip codes, cities, states) may obscure the fundamental nature of outlet density (Parker and Wolz, 1979) and can increase the likelihood of aggregation bias.

The population of these census block groups ranges between 288 and 3,391, with a mean of 1,045.46 (U.S. Census Bureau, 2010). The size of these 571 census block groups ranges from 0.03 square miles to 3.7 square miles, with a mean of 0.17 square miles (U.S. Census Bureau, 2010).

Dependent variables

Data on all active alcohol outlet licenses were obtained from the Wisconsin Department of Revenue in summer 2013. The data included license address, which was geocoded using ArcMap 10 with 99.7% successful match, and license type (e.g., on-premise, such as bars and restaurants, or off-premise, such as liquor and convenience stores). The license type attribute allowed for disaggregation into three dependent variables: (1) total number of alcohol outlets, (2) on-premise alcohol outlets, such as bars, taverns, or restaurants, and (3) off-premise alcohol outlets, such as liquor or convenience stores. Total alcohol outlets were all outlets that were active and licensed to sell alcoholic beverages, regardless of their license type; on-premise alcohol outlets included all types of alcohol-selling places that allowed for consumption to take place while visiting the premises; off-premise alcohol outlets were all alcohol outlets licensed to sell alcoholic beverages for off-premise consumption. As such, on- and off-premise alcohol outlet variables were not further disaggregated.

There are theoretical and empirical reasons to believe that different neighborhood characteristics will have different associations with different outlet types. Theoretically, on-premise alcohol outlets are typically seen as more desirable retail outlets than off-premise alcohol outlets, and even though communities in general tend to be reprehensive about unwanted retail activity of this sort, they may be more comfortable with the opening of a new restaurant or a bar than they would be with the opening of a new liquor store. Indeed, neighborhood socioeconomic characteristics matter for availability of these alcohol outlet types as empirical evidence suggests that high-income areas are more likely to mount strong opposition to the opening of an outlet that sells cheap alcohol and lesser opposition to the opening of a more expensive outlet (such as high-end wine retailers) (Morrison, Ponicki, & Smith, 2015).

Independent variables

Data for the independent variables were obtained from 2010 U.S. decennial census data, with the exception of poverty data, which was collected in the 2000 decennial census data but not so in the 2010 decennial census data (in 2010, the U.S. Census Bureau collected poverty data through the American Community Survey). The limitation associated with the use of poverty data from 2000 was not considered to be a serious problem because the trends were relatively stable for Milwaukee for this particular variable between 2000 and 2010. In addition, while the more recent poverty data from the American Community Survey could have provided another source for up-to-date information on this particular variable, the use of this data would bring with it the limitations common to the American Community Survey (ACS) data, which are subject to sampling and nonsampling error. Sampling error in survey estimates arises due to the use of probability sampling. Nonsampling error may be introduced during the data collection process, such as incorrect data entry. Sampling error for

the ACS may affect parameter estimates and limit validity of the conclusions drawn. For these reasons, the 2000 decennial census poverty data was used in this study.

Several theoretically and empirically important neighborhood characteristics that may be associated with various levels of alcohol availability were examined. First, the proportion of block group residents that were Hispanic, African American, or Asian race/ethnicity, relative to the total block group population, was calculated. Second, a variable to directly measure social disorganization levels in census block groups was created. Initially, this social disorganization variable was conceptualized as an index consisting of four traditional measures of social disorganization at the block group level: ethnic heterogeneity, poverty, residential instability, and single-headed households. First, ethnic heterogeneity was calculated using the Lieberson Diversity Index (Lieberson, 1969), which is a common measure of ethnic heterogeneity in social science research. It was operationalized as one minus the sum of squared proportions of each of four races/ethnicities—White, African American, Asian, and Hispanic—as was done in previous research on alcohol outlets (see Nielsen, Martinez, & Lee, 2005; Emerick, Curry, Collins, & Rodriguez, 2014; Benson, Wooldredge, Thistlethwaite, & Fox, 2004; Roman, Reid, Bhati, & Tereshchenko, 2008). The second in the social disorganization index, poverty, was measured as the proportion of the population in each block group with income below the poverty level. The third measure of the index, residential instability, was measured as the proportion of housing that is renter occupied relative to total housing units. Finally, the last measure of the index, single-headed households, was measured as the proportion of single-headed households with children younger than 18 years of age relative to total households.

However, principal component analysis suggested that the total variance among the four variables can be explained by two factors. The variables of poverty, residential stability, and single-headed households loaded on the first factor, and the ethnic heterogeneity loaded on the second factor, together yielding Cronbach's alpha of 0.504. Subsequently, the ethnic heterogeneity variable was removed from the disorganization index calculation. This procedure resulted in the three variables loading on only one factor, with Cronbach's alpha of 0.716. While ethnic heterogeneity is often used in creating a measure of social disorganization, in the context of Milwaukee (a city marked by extreme spatial segregation along racial/ethnic characteristics), it appeared that the other three social disorganization variables (poverty, residential stability, and single-headed household) were better able to capture the concept of social disorganization. To be sure, additional sensitivity analyses were previously carried out to ensure stability of the models, and ultimately the social disorganization index utilized in the models comprised poverty, residential instability, and single-parent households.

Control variables

Data for the control variables were obtained from 2010 U.S. decennial census data and the Wisconsin Department of Revenue. All models controlled for (1) population density, calculated using the number of individuals residing in a census block group (the number was normalized using natural log transformation); (2) the size of Milwaukee block groups (in square miles); (3) the proportion of young block group residents, calculated using the number of individuals who were 15–24 years of age relative to total block group population, and (4) the spatial lag term (*Rho*) of total, on-premise, and off-premise alcohol outlets.

The models controlled for population density and the size of Milwaukee block groups in order to account for variation in alcohol availability across units of analysis with varying population and block group size; census block groups with high population density and large size are likely to have a high number of alcohol outlets. The models also controlled for the proportion of young block group residents because greater availability of alcohol outlets may be located in neighborhoods characterized by such populations. Finally, because the dependent variable used for this study contains spatially referenced data, spatial autocorrelation diagnostics were consulted and indicated that alcohol availability levels in one unit of analysis were influenced by the processes from another, indicating spatial autocorrelation in the dependent variables. This is because spatially distributed data (such as locations of alcohol outlets) generally exhibit patterned variation, or spatial autocorrelation, so that those data points that are closer together in space are more likely to have similar characteristics than those that are farther apart. Therefore, the estimated models also included the appropriate spatial lagged term (*Rho*) explanatory variables, which were calculated using the weighted average number of total, on-premise, and off-premise alcohol outlets in the neighboring census block groups. All models controlled for the influence of spatial autocorrelation of alcohol outlets in neighboring block groups. Once this spatial autocorrelation was identified, it was easy to control for it by adding a term for it (*Rho*) to the models. Thus, the models controlled for the effect of this *nuisance* on parameter estimates (Anselin, 1988).

Statistical analyses

ArcMap 10.0 and Geoda (Anselin, Syabri, & Kho, 2006) software were used to clean, geocode, and manage data, and SPSS 20.0 software was used to estimate all models. Although alcohol availability in neighborhoods is often operationalized as alcohol outlet density (standardized by either area size or population; e.g., Snowden & Freiburger, 2015), the dependent variables of interest (i.e., number of total, on-premise, and off-premise alcohol outlets) were raw counts because of census block groups that had no alcohol outlets, and preliminary diagnostics suggested overdispersion in the dependent variables. Thus, all models were estimated using negative binomial regression that accounted for overdispersion in the variables instead of Poisson regression (Long, 1997), and this approach is in line with the recent neighborhood-level research on alcohol availability (see Nielsen et al., 2010).

The spatial lags (*Rho*) for all three of the alcohol outlet types were created in GeoDa using queen contiguity first-order weight matrix and were subsequently included in the negative binomial regression models. The contiguity spatial weight matrix was chosen because the units of analysis (i.e., census block groups) are arranged in a grid-like manner; we used first-order queen contiguity because we wanted to allow for equal influence of neighboring alcohol outlet levels on our units of analysis. The use of the first-order rook contiguity matrix was considered but not used because rook weights would have produced fewer neighbors relative to the queen weights. As such, on average, each neighboring observation would have more influence on the census block groups.

The first set of analyses included Models 1 and 2 and examined the association among the total number of all alcohol outlet types in Milwaukee block groups, race/ethnicity, and social disorganization, net of control variables. The second set of analyses included Models 3 and 4 and examined the association among the number of on-premise alcohol outlets in Milwaukee block groups, race/ethnicity, and social disorganization, net of control variables. The last set of analyses included

Models 5 and 6 and examined the association among the number of off-premise alcohol outlets in Milwaukee block groups, race/ethnicity, and social disorganization, net of control variables.

Results

Descriptive statistics for the dependent, independent, and control variables used in the regression models are presented in Table 1. On average, the 571 Milwaukee block groups contained about two alcohol outlets of any type, most of which were on-premise alcohol outlets (e.g., bars and restaurants). On average, the 571 Milwaukee block groups contained about 16% residents of Hispanic ethnicity, 43% residents of African American ethnicity, and about 3% residents of Asian ethnicity. Social disorganization for the 571 Milwaukee block groups ranged from −1.69 (suggesting low levels of social disorganization) to 3.31 (suggesting high levels of social disorganization).

Table 1. Descriptive statistics for Milwaukee block groups (N = 571).

	Minimum	Maximum	Mean	Standard deviation
# Total outlets	0.00	61.00	2.32	4.87
# On-premise outlets	0.00	60.00	1.78	4.62
# Off-premise outlets	0.00	7.00	0.53	0.85
Social disorganization	−1.69	3.31	0.00	0.80
% Hispanic	0.33	83.40	15.92	22.92
% African American	0.33	98.53	42.63	36.88
% Asian	0.00	56.88	3.28	5.25
% Young population	2.69	88.09	17.39	10.27
# Persons (ln)	5.66	8.13	6.89	0.35
Area size (sq. miles)	0.03	3.70	0.17	0.26
Rho total outlets	0.00	27.00	2.42	3.29
Rho on-premise	0.00	26.00	1.88	3.18
Rho off-premise	0.00	1.83	0.54	0.42

Table 2 shows the correlation matrix for Milwaukee block groups. As expected, the total number of alcohol outlets of any type was positively associated with most of the neighborhood variables, such as proportion Hispanic, proportion young population, population density, geographical size of block groups, and spatial autocorrelation terms (*Rho*) for all three categories of alcohol outlets (i.e., total, on-premise, and off-premise). The results of these bivariate correlations suggest that a greater number of alcohol outlets of any type was common in Milwaukee block groups that were large in size, had a high number of residents who are young and who are of Hispanic ethnicity, and neighbored block groups with an equally high number of alcohol outlets. These results also suggest that a greater number of alcohol outlets of any type was common in Milwaukee block groups that had a low proportion of residents who were African American.

Table 2. Correlation matrix for Milwaukee block groups (N = 571).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. #Total outlets	1												
2. #On-premise outlets	.985**	1											
3. #Off-premise outlets	.369**	.204**	1										
4. Social disorganization	.012	−.033	.252**	1									
5. Proportion Hispanic	.084*	.069	.106*	.103*	1								
6. Proportion African American	−.196**	−.224**	.099*	.567**	−.489**	1							
7. Proportion Asian	.017	.008	.054	.065	−.092*	−.034	1						
8. Proportion Young	.181**	.175**	.085*	.163**	−.008	−.109**	.100*	1					
9. # Persons (ln)	.217**	.215**	.074	.032	.192**	−.203**	.122**	.495**	1				
10. Area size (sq. miles)	.163**	.175**	−.019	−.113**	−.089*	−.045	.049	.044	.351**	1			
11. Rho total outlets	.693**	.702**	.150**	.034	.165**	−.287**	−.017	.170**	.135**	.076	1		
12. Rho on-premise	.696**	.708**	.138**	−.022	.138**	−.321**	−.015	.166**	.134**	.083*	.992**	1	
13. Rho off-premise	.155**	.139**	.131**	.435**	.247**	.183**	−.018	.071	.044	−.032	.320**	.199**	1

*Correlation is significant at the .05 level (2-tailed); **correlation is significant at the .01 level (2-tailed).

In terms of the number of on-premise alcohol outlets (e.g., bars, restaurants), the results of the bivariate correlations are similar to those for the total alcohol outlets. The only exception was the proportion of Hispanic variable—the bivariate association between the number of on-premise alcohol outlets and proportion Hispanic was not statistically significant. Finally, the number of off-premise alcohol outlets (e.g., convenience stores, liquor stores) was positively associated with social disorganization, proportion Hispanic, proportion African American, proportion young population, and spatial autocorrelation terms (*Rho*) for all three categories of alcohol outlets (i.e., total, on-premise, and off-premise). These bivariate results suggest that a greater number of off-premise alcohol outlets was found in block groups that contained a high number of young, Hispanic, and African American residents. The block groups with high availability of off-premise alcohol outlets were also neighboring block groups with equally high availability of all alcohol outlet types.

Table 3 shows results of the negative binomial regression for two models that examined the relationship between total alcohol outlets and neighborhood characteristics for Milwaukee block groups. Model 1 examined the association between neighborhood racial/ethnic characteristics and the total number of alcohol outlets, net of control variables (i.e., population density, proportion young, block group size, and spatial lag term, *Rho*, for neighboring total alcohol outlets). Results of Model 1 suggest that proportion Hispanic was positively and significantly associated with total alcohol outlets, although proportion African American and proportion Asian were not. Table 3 also shows results of Model 2, which examined the relationship among total alcohol outlets, social disorganization, and race/ethnicity, net of control variables. Results of Model 2 suggest that social disorganization was positively and significantly associated with total alcohol outlets, net of control and race/ethnicity variables. In addition, once social disorganization was accounted for, proportion Hispanic and proportion Asian were not associated with the total number of alcohol outlets, while proportion African American was negatively and significantly associated with total alcohol outlets. In both models, the spatial lag term (*Rho*) associated with total alcohol outlets was a positive and significant contributor to the models, revealing the importance of controlling for spatial autocorrelation when examining this relationship at the block group level.

Table 3. Negative binomial regression results for total alcohol outlets (N = 571).

	Model 1	Model 2
Proportion Hispanic	0.570* (0.2604)	−0.153 (0.3342)
Proportion African American	−0.141 (0.1774)	−0.895* (0.2840)
Proportion Asian	−0.542 (1.1009)	−1.250 (1.1042)
Persons (ln)	0.469* (0.1689)	0.451* (0.1689)
Proportion young	1.523* (0.4992)	0.599 (0.5571)
Area size (sq. miles)	0.421* (0.1976)	0.471* (0.1961)
Rho—total alcohol outlets	0.140** (0.0147)	0.127** (0.0150)
Social disorganization	—	0.408** (0.1131)
Constant	−3.397* (1.1412)	−2.652* (1.1674)
Likelihood ratio X^2	269.805**	280.813**
Degrees of freedom	7	8

Notes: Coefficients shown with standard errors in parentheses. *$p < .05$; **$p < .01$.

Given the results of this global model, four additional models with different alcohol outlet types (on-premise and off-premise) as the dependent variables were estimated to provide a more nuanced analysis of the relationship among alcohol availability, race/ethnicity, and social disorganization, net of control variables. These models are presented in Table 4 and in Table 5.

Table 4. Negative binomial regression results for on-premise alcohol outlets (N = 571).

	Model 3	Model 4
Proportion Hispanic	0.314 (0.2730)	−0.475 (0.3586)
Proportion African American	−0.789** (0.1976)	−0.1618** (0.3192)
Proportion Asian	−2.638 (1.4894)	−3.276* (1.4552)
Persons (ln)	0.582* (0.1823)	0.568* (0.1823)
Proportion young	1.489 * (0.5112)	0.478 (0.5776)
Area size (sq. miles)	0.496* (0.2025)	0.552* (0.2007)
Rho—on premise alcohol outlets	0.158** (0.0153)	0.144** (0.0157)
Social disorganization	—	0.445** (0.1261)
Constant	−4.193* (1.2310)	−3.428* (1.2608)
Likelihood ratio X^2	372.789**	383.775**
Degrees of freedom	7	8

Notes: Coefficients shown with standard errors in parentheses. *$p < .05$; **$p < .01$.

Table 5. Negative binomial regression results for off-premise alcohol outlets (N = 571).

	Model 5	Model 6
Proportion Hispanic	1.607** (0.4108)	0.924 (0.4819)
Proportion African American	1.168** (0.2746)	0.470 (0.3830)
Proportion Asian	1.708 (1.2398)	1.013 (1.2559)
Persons (ln)	0.323 (0.2378)	0.277 (0.2370)
Proportion young	2.103* (0.6890)	1.187 * (0.7755)
Area size (sq. miles)	0.078 (0.3075)	0.103 (0.2977)
Rho—off premise alcohol outlets	0.089 (0.1905)	0.015 (0.1946)
Social disorganization	—	0.398* (0.1459)
Constant	−4.200* (1.6136)	−3.271* (1.6435)
Likelihood ratio X^2	37.560**	44.034**
Degrees of freedom	7	8

Notes: Coefficients shown with standard errors in parentheses. *$p < .05$; **$p < .01$.

Table 4 shows the results of negative binomial regression for on-premise alcohol outlets. Model 3 examined the association between on-premise alcohol outlets and racial/ethnic composition of Milwaukee block groups, net of control variables. In Model 3, results show that proportion African American was negatively and significantly associated with the number of on-premise alcohol outlets. In addition, there was no association between on-premise alcohol outlets and proportion Hispanic, and between on-premise alcohol outlets and proportion Asian. Model 4 examined the association among on-premise alcohol outlets, social disorganization, and racial/ethnic composition of Milwaukee block groups, net of control variables. Results of Model 4 suggest that social disorganization was positively and significantly associated with on-premise alcohol outlets, net of control and race/ethnicity variables. In addition, proportion Hispanic was not significantly associated with on-premise alcohol

outlets. However, proportion African American and proportion Asian were negatively and significantly associated with on-premise alcohol outlets. As with total alcohol outlets, the spatial lag term (*Rho*) associated with on-premise alcohol outlets was a positive and significant contributor to the models, suggesting that block group availability of on-premise alcohol outlets can be predicted according to the availability of on-premise alcohol outlets in neighboring block groups.

Finally, Table 5 shows results of negative binomial regression for off-premise alcohol outlets. Model 5 examined the association between off-premise alcohol outlets and racial/ethnic characteristic for Milwaukee block groups, net of control variables. Results of Model 5 suggest that both proportion Hispanic and proportion African American were positively and significantly associated with off-premise alcohol outlets, although proportion Asian was not. Model 6 examined the association among off-premise alcohol outlets, social disorganization, and racial/ethnic characteristics for Milwaukee block groups, net of control variables. Results of Model 6 suggest that social disorganization was significantly associated with off-premise alcohol outlets, net of control variables and race/ethnicity variables. In addition, the inclusion of social disorganization in the model rendered race/ethnicity proportion variables nonsignificant. Unlike with total and on-premise alcohol outlet models shown in Table 3 and 4, respectively, the spatial lag term (Rho) associated with off-premise alcohol outlets was not a significant contributor to the models.

To summarize, taken together these results suggest that race/ethnicity of neighborhoods is either unrelated or negatively related to total, on-premise, and off-premise alcohol outlets once social disorganization of neighborhoods is accounted for. That is, areas marked with high levels of social disorganization are also characterized by high levels of total, on-premise, and off-premise alcohol outlets, independent of racial/ethnic composition of the neighborhoods.

Discussion and conclusion

This study examined the role that neighborhood racial/ethnic composition and social disorganization levels play in alcohol availability in Milwaukee, Wisconsin. This study extends the literature on the association between neighborhood characteristics and alcohol availability by (1) directly testing the role of race/ethnicity and social disorganization in alcohol availability, (2) focusing on a smaller unit of aggregation using most recent decennial census data, and (3) estimating separately the relationship among race/ethnicity, social disorganization, and alcohol outlet types (i.e., total, on-premise, and off-premise).

Results of this study suggest that neighborhood characteristics play an important role in alcohol availability across urban census block groups. Examination of the relationship between race/ethnicity and alcohol availability suggests several conclusions. First, neighborhoods characterized by a high proportion of Hispanic residents are also characterized by high availability of all types of alcohol outlets and of off-premise alcohol outlets, although this association becomes nonsignificant after controlling for social disorganization. Second, neighborhoods that are characterized by a high proportion of African American residents have a low availability of on-premise alcohol outlets and a high availability of off-premise alcohol outlets. The negative relationship between proportion African American and on-premise alcohol outlets remained significant even after controlling for social disorganization levels. However, the positive relationship between proportion African American and off-premise alcohol

outlets became nonsignificant after controlling for social disorganization levels. Third, proportion Asian was not associated with total, on-premise, or off-premise alcohol outlets, although the association between total alcohol outlets and proportion Asian becomes significant after controlling for social disorganization levels.

These results also suggest that the association between race/ethnicity and alcohol availability may be spurious because the effects of race/ethnicity on alcohol availability are either unrelated or negatively related to alcohol outlet availability once social disorganization levels are taken into account. Moreover, social disorganization was positively and significantly associated with all alcohol outlet types. This finding is similar to the findings of prior empirical research that highlighted important neighborhood characteristics in creating various levels of alcohol availability. For example, socioeconomic disadvantage levels predicted availability of alcohol outlets found in neighborhoods (Livingston, 2012), with the availability of alcohol outlets being greatest in the most socioeconomically deprived neighborhoods, even though overall alcohol consumption is lower in such neighborhoods (Pollack et al., 2005). The finding that suggests race/ethnicity to be either unrelated or negatively related to alcohol availability after accounting for social disorganization is similar to a recent study by (Nielsen et al. 2010), which examined off-premise alcohol outlet availability and drew similar conclusions.

It appears that alcohol availability is better explained by social disorganization than by race/ethnicity because socially disorganized neighborhoods lack social capital and sufficient collective efficacy to organize politically and influence policy decisions about alcohol availability in the neighborhoods (Pridemore & Grubesic, 2012). Lacking the economic support, social ties, and social involvement in key community institutions, the health of neighborhoods deteriorates and allows for unwanted retail activity. At the same time, however, social institutions allow the citizens in organized neighborhoods to attend local alcohol board meetings and exert influence over whether an additional alcohol outlet can open in their neighborhood. In addition, socioeconomically disadvantaged areas have lower priced alcohol (Morrison et al., 2015) so that not only are such areas disproportionately exposed to alcohol outlets but they also provide alcohol at a lower price, potentially creating a host of other negative health and social outcomes (e.g., Cunradi et al., 2011; Gruenewald et al., 2002; Scribner et al., 1995; Snowden, 2016; Snowden & Freiburger, 2015; Snowden & Pridemore, 2013; Stockwell, Auld, Zhao, & Martin, 2012).

Alternatively, high availability of alcohol in socially disorganized areas can also be explained by other processes, including land use and business cost, and future studies should examine their association with alcohol availability. Since alcohol consumption is higher in neighborhoods that typically have greater population and disposable income (Morrison et al., 2015), we would expect to find more alcohol outlets in socially organized neighborhoods to satisfy the demand. However, retail operating cost is likely to be higher in such areas due to higher land and structure rents common in socioeconomically advantaged areas, leading businesses to weigh the costs of operating in those neighborhoods instead of neighborhoods where their operating costs would be lower (Morrison et al., 2015). In addition, socioeconomically advantaged neighborhoods may have a greater ability to limit nuisance businesses and unwanted retail activity (DiPasquale & Wheaton, 1992), creating greater

exposure to alcohol outlets in socially disorganized areas that service demand from surrounding areas and bear the risk related to the presence of alcohol outlets (Morrison et al., 2015).

Even though organizing inner city neighborhoods to make changes related to alcohol problems is a difficult process (Clapp, 1995), Piat's (2000) study showed how community action can be called upon in opposing unwelcome developments in neighborhoods. In studying how communities respond to implementation of housing for deinstitutionalized people through the lenses of the "Not in My Back Yard" (NIMBY) phenomenon, Piat (2000) found that community residents organized their efforts to oppose the existence of such facilities by circulating petitions and holding public information meetings. Perhaps more such studies are necessary to better explain how community organization influences alcohol availability and alcohol selling in the neighborhoods (Drabble & Herd, 2014).

This study has a few limitations. First, this study uses census block groups as units of analysis to approximate neighborhood boundaries. The census block groups are artificially imposed boundaries that may not accurately approximate neighborhood processes. However, this focus on smaller units of analysis is in line with recent work in environmental and spatial literature that argues that smaller units of analysis (such as census block groups) are more appropriate both theoretically and empirically in assessment of neighborhood-level influences relative to larger units (such as tracts, zip codes, etc.) (Andersen & Malleson, 2011; Weisburd, Bernasco, & Bruinsma, 2008). Second, this study uses a cross-sectional approach. It is possible that the availability of alcohol determines social disorganization levels, rather than being determined by those. Greater availability of alcohol may break up families, sever interpersonal relationships, and lead to single-family households with limited financial resources creating socioeconomic disadvantage and social disorganization. Third, this study uses data from a racially segregated city, an experience common to many Rust Belt urban cities. This makes Milwaukee a particularly interesting research site for the examination of the role of race/ethnicity, social disorganization, and alcohol availability. Finally, this study examines the f broad alcohol outlet typology (i.e., on- and off-premise) and less is known about how access to particular subtypes of these alcohol outlet types varies across neighborhoods. Future studies should examine how these neighborhood characteristics explain availability of specific on- and off-premise alcohol outlets, such as taverns, pubs, bars, and restaurants (for on-premise outlets) and liquor stores, convenience stores, and beer/wine-only outlets (for off-premise outlets).

Despite these limitations, this study is carefully designed to shed additional light on the role of neighborhood characteristics in alcohol availability by focusing on the role of race/ethnicity and social disorganization in urban census block groups. Neighborhood characteristics, such as race/ethnicity and social disorganization, appear to contribute to alcohol availability. These characteristics must be considered in any efforts aimed toward prevention of alcohol-related health and social outcomes in general, and in neighborhoods marked by social disorganization, in particular.

References

Alaniz, M. L., & Wilkes, C. (1998). Pro-drinking messages and message environments for young adults: The case of alcohol industry advertising in African American, Latino, and Native American communities. *Journal of Public Health Policy*, 19(4), 447–472. doi:10.2307/3343076

Andersen, M. A., & Malleson, N. (2011). Testing the stability of crime patterns: Implications for theory and policy. *Journal of Research in Crime and Delinquency*, 48(1), 58–82. doi:10.1177/0022427810384136

Anselin, L. (1988). *Spatial econometrics: Methods and models* (Vol. 4). Dordrecht, the Netherlands: Springer.

Anselin, L., Syabri, I., & Kho, Y. (2006). GeoDa: An introduction to spatial data analysis. *Geographical Analysis*, 38(1), 5–22. doi:10.1111/j.0016-7363.2005.00671.x

Benson, M. L., Wooldredge, J., Thistlethwaite, A. B., & Fox, G. L. (2004). The correlation between race and domestic violence is confounded with community context. *Social Problems*, 51(3), 326–342. doi:10.1525/sp.2004.51.3.326

Berke, E., Tanski, S., Demidenko, E., Alford-Teaster, J., Shi, X., & Sargent, J. (2010). Alcohol retail density and demographic predictors of health disparities: A geographic analysis. *American Journal of Public Health*, 100(10), 1967–1971.

Black, C., Ntani, G., Kenny, R., Tinati, T., Jarman, M., Lawrence, W., ... Baird, J. (2012). Variety and quality of healthy foods differ according to neighborhood deprivation. *Health and Place*, 18, 1292–1299. doi:10.1016/j.healthplace.2012.09.003

Block, J., Scribner, R., & DeSalvo, K. (2004). Fast food, race/ethnicity, and income: A geographic analysis. *American Journal of Preventive Medicine*, 27(3), 211–217. doi:10.1016/s0749-3797(04)00139-4

Bluthenthal, R. N., Cohen, D. A., Farley, T. A., Scribner, R., Beighley, C., Schonlau, M., & Robinson, P. L. (2008). Alcohol availability and neighborhood characteristics in Los Angeles, California and Southern Louisiana. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, 85(2), 191–205. doi:10.1007/s11524-008-9255-1

Britt, H. R., Carlin, B. P., Toomey, T. L., & Wagenaar, A. C. (2005). Neighborhood level spatial analysis of the relationship between alcohol outlet density and criminal violence. *Environmental and Ecological Statistics*, 12, 411–426.

Bryden, A., Roberts, B., McKee, M., & Petticrew, M. (2012). A systematic review of the influence on alcohol use of community level availability and marketing of alcohol. *Health & Place*, 18(2), 349–357. doi:10.1016/j.healthplace.2011.11.003

Clapp, J. D. (1995). Organizing inner city neighborhoods to reduce alcohol and drug problems. *Journal of Community Practice*, 2(1), 43–60. doi:10.1300/j125v02n01_03

Cunradi, C. B., Mair, C., Ponicki, W., & Remer, L. (2012). Alcohol outlet density and intimate partner violence-related emergency department visits. *Alcoholism: Clinical and Experimental Research*, 36(5), 847–853. doi:10.1111/j.1530-0277.2011.01683.x

DiPasquale, D., & Wheaton, W. C. (1992). The markets for real estate assets and space: A conceptual framework. *Real Estate Economics*, 20(2), 181–198. doi:10.1111/1540-6229.00579

Drabble, L., & Herd, D. (2014). Strategies employed by inner-city activists to reduce alcohol-related problems and advance social justice. *Journal of Ethnicity in Substance Abuse*, 13(4), 362–384. doi:10.1080/15332640.2014.958637

Ellaway, A., Macdonald, L., Forsyth, A., & Macintyre, S. (2010). The socio-spatial distribution of alcohol outlets in Glasgow city. *Health & Place*, 16, 167–172. doi:10.1016/j.healthplace.2009.08.007

Emerick, N. A., Curry, T. R., Collins, T. W., & Rodriguez, S. F. (2014). Homicide and social disorganization on the border: Implications for Latino and immigrant populations. *Social Science Quarterly*, 95(2), 360–379. doi:10.1111/ssqu.12051

Freisthler, B., Needell, B., & Gruenewald, P. J. (2005). Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment? *Child Abuse & Neglect*, 29(9), 1049–1060. doi:10.1016/j.chiabu.2004.12.014

Gorman, D. M., & Speer, P. W. (1997). The concentration of liquor outlets in an economically disadvantaged city in the northeastern United States. *Substance Use & Misuse*, 32(14), 2033–2046. doi:10.3109/10826089709035618

Gorman, D. M., Speer, P. W., Gruenewald, P. J., & Labouvie, E. W. (2001). Spatial dynamics of alcohol availability, neighborhood structure and violent crime. *Journal of Studies on Alcohol and Drugs*, 62, 628–636. doi:10.15288/jsa.2001.62.628

Grannis, R. (1998). The importance of trivial streets: Residential streets and residential segregation. *American Journal of Sociology*, 103(6), 1530–1564. doi:10.1086/231400

Gruenewald, P. J., Johnson, F. W., & Treno, A. J. (2002). Outlets, drinking and driving: A multilevel analysis of availability. *Journal of Studies on Alcohol and Drugs*, 63(4), 460–468. doi:10.15288/jsa.2002.63.460

Hay, G. C., Whigham, P. A., Kypri, K., & Langley, J. D. (2009). Neighborhood deprivation and access to alcohol outlets: A national study. *Health & Place*, 15, 1086–1093. doi:10.1016/j.healthplace.2009.05.008

Jones-Webb, R., & Karriker-Jaffe, K. J. (2013). Neighborhood disadvantage, high alcohol content beverage consumption, drinking norms, and drinking consequences: a mediation analysis. *Journal of Urban Health*, 90(4), 667–684. doi:10.1007/s11524-013-9786-y

LaScala, E. A., Johnson, F. W., & Gruenewald, P. J. (2001). Neighborhood characteristics of alcohol-related pedestrian injury collisions: A geostatistical analysis. *Prevention Science*, 2(2), 123–134.

LaVeist, T. A., & Wallace, J. M., Jr. (2000). Health risk and inequitable distribution of liquor stores in African American neighborhoods. *Social Science & Medicine*, 51, 613–617. doi:

Lieberson, S. (1969). Measuring population diversity. *American Sociological Review*, 34(6), 850–862. doi:10.2307/2095977

Livingston, M. (2011). A longitudinal analysis of alcohol outlet density and domestic violence. *Addiction*, 106, 919–925. doi:10.1111/j.1360-0443.2010.03333.x

Livingston, M. (2012). The social gradient of alcohol availability in Victoria, Australia. *Australian and New Zealand Journal of Public Health*, 36(1), 41–47. doi:10.1111/j.1753-6405.2011.00776.x

Long, J. S. (1997). *Regression models for categorical and limited dependent variables*. Thousand Oaks, CA: Sage Publications.

McKee, P., Jones-Webb, R., Hannan, P., & Pham, L. (2011). Malt liquor marketing in inner cities: The role of neighborhood racial composition. *Journal of Ethnicity in Substance Abuse*, 10(1), 24–38.

Moore, D. J., Williams, J. D., & Qualls, W. J. (1996). Target marketing of tobacco and alcohol-related products to ethnic minority groups in the United States. *Ethnicity and Disease*, 6, 83–98.

Morland, K., Wing, S., Roux, A., & Poole, C. (2001). Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine*, 22(1), 23–29.

Morrison, C., Ponicki, W. R., & Smith, K. (2015). Social disadvantage and exposure to lower priced alcohol in off-premise outlets. *Drug and Alcohol Review*, 34(4), 375–378. doi:10.1111/dar.12256

Nielsen, A. L., Hill, T. D., French, M. T., & Hernandez, M. N. (2010). Racial/ethnic composition, social disorganization, and offsite alcohol availability in San Diego County, California. *Social Science Research*, 39, 165–175. doi:10.1016/j.ssresearch.2009.04.006

Nielsen, A. L., Martinez, R., Jr., & Lee, M. T. (2005). Alcohol, ethnicity, and violence: The role of alcohol availability for Latino and Black aggravated assaults and robberies. *The Sociological Quarterly*, 46(3), 479–502. doi:10.1111/j.1533-8525.2005.00023.x

Ornstein, S. I., & Hanssens, D. M. (1985). Alcohol control laws and the consumption of distilled spirits and beer. *Journal of Consumer Research*, 12(2), 200–213.

Parker, D. A., & Wolz, M. W. (1979). Alcohol problems and the availability of alcohol. *Alcohol Clinical Experimental Research*, 3, 309–312.

Pearce, J., Day, P., & Witten, K. (2008). Neighborhood provision of food and alcohol retailing and social deprivation in Urban New Zealand. *Urban Policy and Research*, 26(2), 213–227. doi:10.1080/08111140701697610

Piat, M. (2000). The NIMBY phenomenon: Community residents' concerns about housing for deinstitutionalized people. *Health and Social Work*, 25, 127–138. doi:10.1093/hsw/25.2.127

Pollack, C. E., Cubbin, C., Ahn, D., & Winkleby, M. (2005). Neighborhood deprivation and alcohol consumption: Does the availability of alcohol play a role? *International Journal of Epidemiology*, 34, 772–780.

Pridemore, W. A., & Grubesic, T. (2012). Community organization moderates the effect of alcohol outlet density on violence. *British Journal of Sociology*, 63(4), 680–703. doi:10.1111/j.1468-4446.2012.01432.x

Rabow, J., & Watts, R. K. (1982). Alcohol availability, alcoholic beverage sales and alcohol-related problems. *Journal of Studies on Alcohol*, 43(7), 767–801.

Roman, C. G., Reid, S., Bhati, A., & Tereshchenko, B. (2008). *Alcohol outlets as attractors of violence and disorder: A closer look at the neighborhood environment*. Washington, DC: Urban Institute. Retrieved December 1, 2009, from http://www.urban.org/publications/411663.html

Romley, J. A., Cohen, D., Ringel, J., & Sturm, R. (2007). Alcohol and environmental justice: The density of liquor stores and bars in urban neighborhoods in the United States. *Journal of Studies on Alcohol and Drugs*, 68(1), 48–55. doi:10.15288/jsad.2007.68.48

Sampson, R. J., & Raudenbush, S. W. (2004). Seeing disorder: Neighborhood stigma and the social construction of "broken windows". *Social Psychology Quarterly*, 67(4), 319–342. doi:10.1177/019027250406700401

Sampson, R. J., Raudenbush, S., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 277, 918–924. doi:10.1126/science.277.5328.918

Sampson, R. J., & Groves, W. B. (1989). Community structure and crime: Testing social-disorganization theory. *The American Journal of Sociology*, 94, 774–802. doi:10.1086/229068

Scribner, R. A., MacKinnon, D. P., & Dwyer, J. H. (1995). The risk of assaultive violence and alcohol availability in Los Angeles County. *American Journal of Public Health*, 85, 335–340.

Scribner, R. A., Cohen, D. A., & Fisher, W. (2000). Evidence of a structural effect for alcohol outlet density: A multilevel analysis. *Alcoholism: Clinical and Experimental Research*, 24(2), 188–195. doi:10.1111/j.1530-0277.2000.tb04590.x

Shaw, C. R., & Mckay, H. D. (1942). *Juvenile Delinquency and Urban Areas*. Chicago: The University of Chicago Press.

Smoyer-Tomic, K. E., Spence, J. C., Raine, K. D., Amrhein, C., Cameron, N., Yasenovskiy, V., ... Healy, J. (2008). The association between neighborhood socioeconomic status and exposure to supermarkets and fast food outlets. *Health and Place*, 14, 740–754. doi:10.1016/j.healthplace.2007.12.001

Snowden, A. J. (2016) Alcohol outlet density and intimate partner violence in a non-metropolitan college town: Accounting for neighborhood characteristics and alcohol outlet types. Forthcoming in *Violence and Victims*, 37(1).

Snowden, A. J., & Freiburger, T. L. (2015). Alcohol outlets, social disorganization, and robberies: Accounting for neighborhood characteristics and alcohol outlet types. *Social Science Research*, 51, 145–162. doi:10.1016/j.ssresearch.2015.01.011

Snowden, A. J., & Pridemore, W. A. (2013). Alcohol outlets, social disorganization, land use, and violence in a large college town: Direct and moderating effects. *Criminal Justice Review*, 38(1), 29–49. doi:10.1177/0734016812467198

Stockwell, T., Auld, M. C., Zhao, J., & Martin, G. (2012). Does minimum pricing reduce alcohol consumption? The experience of a Canadian province. *Addiction*, 107(5), 912–920. doi:10.1111/j.1360-0443.2011.03763.x

Theall, K. P., Lancaster, B. P., Lynch, S., Haines, R. T., Scribner, S., Scribner, R., & Kishore, V. (2011). The neighborhood alcohol environment and at-risk drinking among African-Americans. *Alcoholism: Clinical and Experimental Research*, 35(5), 996–1003. doi:10.1111/j.1530-0277.2010.01430.x

Trolldal, B. (2005). The privatization of wine sales in Quebec in 1978 and 1983 to 1984. *Alcoholism: Clinical and Experimental Research*, 29, 410–416. doi:10.1097/01.alc.0000156084.27547.ec

Truong, K. D., & Sturm, R. (2009). Alcohol environments and disparities in exposure associated with adolescent drinking in California. *American Journal of Public Health*, 99(2), 264–270. doi:10.2105/ajph.2007.122077

US Census Bureau. (2010). American FacFinder. Retrieved July 28, 2013, from http://factfinder2.census.gov/faces/nav/jsf/pages/community%5ffacts.xhtml

US Census Bureau. (2014, January). State and County QuickFacts. Retrieved from http://quickfacts.census.gov/qfd/states/55/5553000.html

Weisburd, D., Bernasco, W., & Bruinsma, G. J. (Eds.) (2008). Units of analysis in geographic criminology: Historical development, critical issues, and open questions. In *Putting crime in its place* (pp. 3–31). New York: Springer.

Zenk, S. N., Schultz, A. J., Israel, B. A., James, S. A., Bao, S., & Wilson, M. L. (2005). Neighborhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health*, 95(4), 660–667. doi:10.2105/ajph.2004.042150