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Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment?[☆]

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Abstract

Objective: This study examines how the availability of alcohol and illicit drugs (as measured by alcohol outlet density and police incidents of drug sales and possessions) is related to neighborhood rates of child abuse and neglect, controlling for other neighborhood demographic characteristics.

Method: Data from substantiated reports of child abuse and neglect in 304 block groups in a northern California city were analyzed using spatial regression techniques.

Results: This study found that higher concentration of bars ($B = 6.66, p < .05$) and higher numbers of incidents of drug possession ($B = .53, p < .001$) were positively related to rates of child maltreatment in neighborhoods when controlling for neighborhood demographic characteristics. Thus, areas with more bars and drug possession incidents per 1000 population have higher rates of child maltreatment.

Conclusions: The presence of more bars per population may represent a lack of resources available to residents, may increase the stress on neighborhoods by “attracting” populations prone to participating in dangerous activities, or increase the frequency of alcohol use that then leads to maltreatment. Areas with more drug possession incidents may also contribute to the overall level of neighborhood stress and disorganization or act as a marker for drug use that leads to maltreatment. These results suggest that the neighborhood substance availability may deserve

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special attention when developing preventive interventions to reduce child abuse and neglect in neighborhood areas.

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Introduction

In 2002, Child Protective Service agencies throughout the United States received more than 1.8 million referrals of abuse or neglect involving more than 3 million children. From those referrals, 896,000 children had substantiated reports indicating that enough evidence existed to say that the abuse or neglect occurred (US Department of Health and Human Services, 2004). Substance abuse by parents can place children at greater risk of maltreatment and those children are more likely to be removed from their homes when child maltreatment occurs in comparison to children whose parents do not abuse alcohol and/or drugs (US Department of Health and Human Services, 1999).

Many of the interventions designed to reduce maltreatment for substance abusing parents in the child welfare system are individually focused (Dore & Doris, 1997; Gregoire & Schultz, 2001; Moore & Finkelstein, 2001). Yet, environmental interventions that focus upon changing neighborhood or community environments including those related to alcohol and drug availability may provide an alternative method of preventing or reducing child abuse and neglect. For example, Earls, McGuire, and Shay (1994) report on a program implemented at the neighborhood level to enhance community supports to prevent child maltreatment. Such a program has the ability to reduce child maltreatment through primary prevention efforts that focus upon neighborhood structures and processes, rather than individual behaviors, related to maltreatment.

Despite the link between child maltreatment and substance abuse, only a few studies have examined the relationship between drug activity or alcohol availability and maltreatment at the aggregate level. These studies have found a positive relationship between child maltreatment and density of alcohol outlets, particularly bars related to neglect and off-premise alcohol outlets (e.g., liquor and convenience stores) related to physical abuse (Freisthler, 2004; Freisthler, Midanik, & Gruenewald, 2004) and a negative relationship between excise tax on beer at the state level and violence and severe violence on children (Markowitz & Grossman, 1998). Albert and Barth (1996) found a positive relationship between the number of arrests for drug crimes by females and child maltreatment rates at the county level. These studies are limited because they have not examined alcohol and drug availability simultaneously, used units of analysis too large to be considered a neighborhood (Albert & Barth, 1996; Markowitz & Grossman, 1998), rely on older datasets (Markowitz & Grossman, 1998), or data that do not adequately measure availability (Albert & Barth, 1996).

The previous studies notwithstanding, neighborhood studies of child abuse and neglect have generally focused solely on how neighborhood socio-demographic characteristics are related to maltreatment. These studies have found that less social support (Garbarino & Kostelny, 1992; Vinson, Baldry, & Hargreaves, 1996), higher poverty rates (Coulton, Korbin, Su, & Chow, 1995; Coulton, Korbin, & Su, 1999; Deccio, Horner, & Wilson, 1994; Drake & Pandey, 1996; Garbarino & Kostelny, 1992; Young & Gately, 1988), higher rates of neighborhood unemployment (Gillham et al., 1998; Zuravin, 1989), residential instability (Coulton et al., 1995; Deccio et al., 1994; Ernst, 2001; Young & Gately, 1988; Zuravin, 1989), lower

immigrant concentration (Molnar, Buka, Brennan, Holton, & Earls, 2003) and more people per rooms (Zuravin, 1986) are associated with higher rates of abuse and neglect.

The current study hypothesizes that the availability of alcohol and drugs in neighborhood areas are related to child abuse and neglect as increased densities of alcohol outlets and drug activity may increase the likelihood that residents will retreat from neighborhood interactions (Bennett, DiIulio, & Walters, 1996; Freisthler, 2004). In particular, this study examines how the density of bars, restaurants that serve alcohol, off-premise alcohol outlets, drug possession, and drug sale incidents are related to child maltreatment, when controlling for other neighborhood demographic characteristics, such as poverty, ratio of children to adults, and vacant housing.

Methods

Using a cross-sectional design, the current study examines neighborhood rates of child maltreatment for all 304 block groups in one northern California city. Block groups were chosen to represent neighborhoods of the homogeneity of population and housing characteristics at that level. An average block group has 400 households and 1100 residents (US Census Bureau, 1994). According to the 2000 Census, 48% of the residents were white, 17% were Asian, 16% were African American, 22% were Hispanic (of any race), and 27% were children under 18. Figure 1a shows the child population for each neighborhood area (mean = 366.18, $SD = 359.25$). The median income was \$37,000, while 23% of families with children under 18 lived below the poverty line, and 5% of residents were unemployed.

Measures

Substantiated allegations of child maltreatment from the year 2000 were obtained from the California's statewide child welfare database, the Child Welfare System/Case Management System (Needell et al., 2003). Under an interagency agreement, the California Department of Social Services shares extracts from this system with researchers at the Center for Social Services Research at the University of California, Berkeley. This database contains information concerning allegations of child maltreatment, including the type of maltreatment and the child's address at the time of the referral, along with the disposition (i.e., substantiated, inconclusive, or unfounded) that results from an investigation. Both inconclusive and unfounded reports are considered non-substantiated cases in California. California does not use "indicated" as an outcome category for Child Protective Service investigations.

Using substantiated allegations as a measure of abuse and neglect has been criticized because it may underestimate the actual prevalence of child maltreatment because only those referrals where an investigation by child welfare workers yielded evidence of maltreatment are counted. (Newberger, Reed, Daniel, Hyde, & Kotelchuck, 1977; O'Toole, Turbett, & Nalpeka, 1983). While this measure does not account for all child abuse and neglect incidents, it is generally accepted a valid way to measure child maltreatment (English, 1998; Pelton, 1981).

Using ArcView 3.2a (Environmental Systems Research Institute Inc., 1999), each child's address was geocoded and then rates of maltreatment per 1000 children in the population were calculated for each block group. All types of child maltreatment were examined together to produce the rates, based on the number of children with at least one substantiated allegation of child maltreatment. Ninety-six percent of addresses for children with substantiated allegations of maltreatment were geocoded. Figure 1b shows

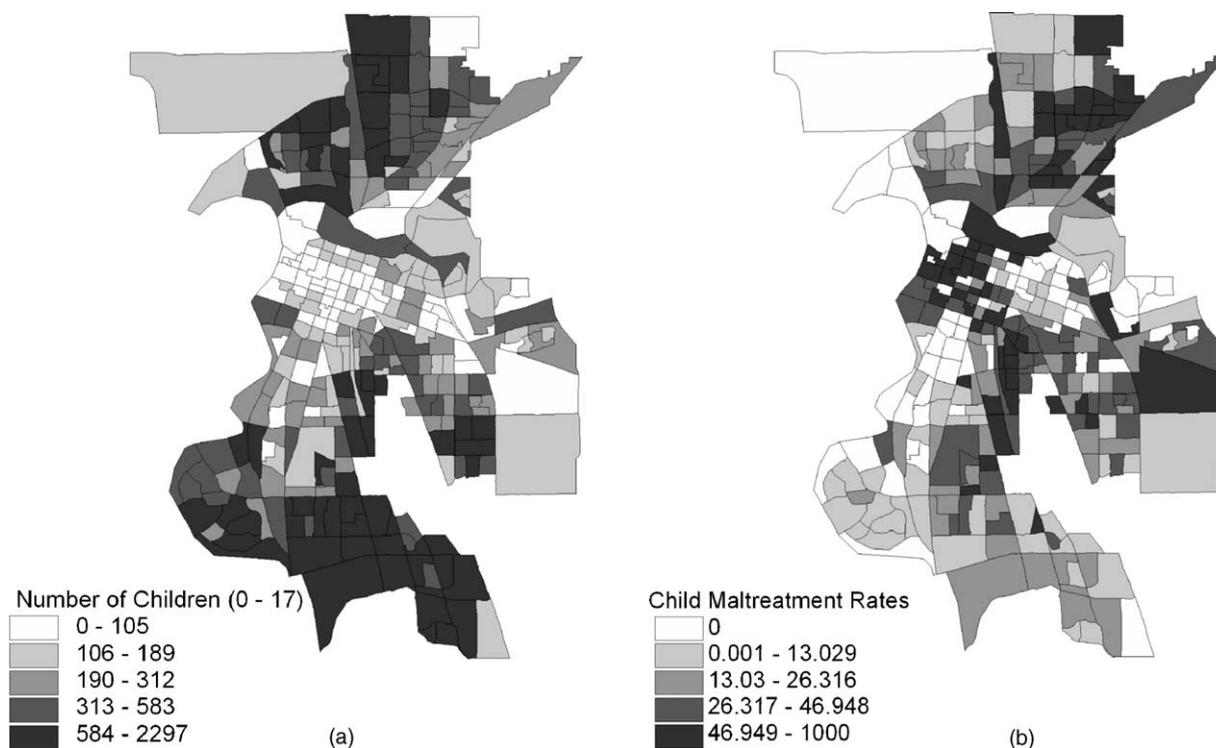


Figure 1. Child population and neighborhood rates of child maltreatment (per 1000 children). (a) Child population by neighborhood. (b) Rates of child maltreatment (per 1000 children).

the rates of maltreatment per 1000 children by block group (mean = 33.69, $SD = 72.07$). Those areas with the highest rate of child maltreatment are not necessarily the areas with greatest child population.

Neighborhood demographic variables were constructed using 2000 Census data, Summary Files 1 and 3. The variables describing neighborhood demographic characteristics are the percent of female headed families, percent of persons living in poverty, percent of unemployed persons over the age of 16, percent of vacant housing units, percent of African American residents, percent of Hispanic residents, ratio of adult men (21–64 years) to adult women (21–64 years), the ratio of the number of children under 12 years to the ratio of adults aged 21 years and older, the percent of persons who moved in the past 5 years, and the percent of owner-occupied housing units. Table 1 provides the demographic information for the 304 block groups. On average, 19% of block group residents live in poverty and 52% have moved within the past 5 years.

For this study, the density of alcohol outlets in each neighborhood is used as a measure of the physical availability of alcohol. Data on licensed alcohol outlets were obtained from the California Department of Alcohol Beverage Control. Alcohol outlets are those retail establishments that sell alcoholic beverages, including beer, wine, and spirits. For the purposes of this study, three types of alcohol outlets were analyzed separately: bars, restaurants that serve alcohol, and off-premise outlets. Bars have license types 23, 40, 42, 48, 61, and 75. Outlets with license type 41 or 47 were coded as restaurants and those with license type 20 or 21 were coded as off-premise outlets. Off-premise are those where the alcohol that has been purchased is taken off-site for consumption and includes grocery, convenience, and liquor stores.

Table 1
Descriptive statistics for independent measures

	Mean	SD	Minimum	Maximum
Demographics				
%Female headed households with children	15.68	10.90	0	54.68
%Persons living in poverty	19.46	14.83	0	71.28
%Unemployed residents	4.85	4.88	0	38.73
%Vacant housing units	5.76	4.92	0	28.40
%African American residents	14.25	11.55	0	61.67
%Hispanic residents	20.63	11.55	0	56.48
Adult males (≥ 21 years)/adult females (≥ 21 years)	1.01	.54	0	7.64
Ratio children (0–12 years)/adults (21 years)	.27	.18	0	.84
%Owner occupied housing	49.63	25.14	0	100.00
%Persons who moved between 1995 and 2000	51.66	15.47	0	100.00
Alcohol availability				
Number of bars/1000 population	.40	1.80	0	21.28
Number of restaurants/1000 population	6.33	58.36	0	1000.00
Number of off-premise outlets/1000 population	2.99	28.82	0	500.00
Drug availability				
Number of drug possession incidents/1000 population	11.80	33.23	0	500.00
Number of drug sale incidents/1000 population	1.01	3.78	0	44.44

The number of outlets per population determined the neighborhood density of outlets. Data about the location of outlet was used to geocode 99% of all outlets. Figure 2 shows the location of outlets in relation to neighborhood rates of maltreatment. On average, a block group has .40 bars per 1000 population, 1.5 restaurants, and .92 off-premise outlets.

Drug availability was operationalized as two different variables, one for drug sale incidents and one for drug possession incidents using 2000 incident data from the city Police Department. These data provide the location of the event for each incident, 99% of which were successfully geocoded. Police incidents are designated with specific codes that make it possible to differentiate possession from sale. Drug possession incidents were police codes HS 11350(A) to HS 11351.5, HS 11357(A) to HS 11359, and HS 11375(A) to HS 11378. Incidents having codes HS 11352(A) to HS 11379(A) to 1138 were recoded as drug sale incidents. Figure 3 shows the location of drug possession and drug sale incidents by neighborhood rates of maltreatment. The average neighborhood had 11.8 possession incidents per 1000 population and one drug sale incident for every 1000 residents during the 2000 calendar year.

Data analysis procedures

This study uses spatial regression models to examine how drug and alcohol availability is related to rates of child maltreatment in neighborhoods. Spatial regression models are estimated using generalized least squares (GLS) and control for spatial autocorrelation (ρ_s). Spatial autocorrelation occurs when measures from adjacent spatial units (i.e., neighborhoods that share a boundary) are correlated. Errors in measurement from statistical models may also be correlated between adjacent units (Cliff & Ord, 1973). Using ordinary least squares (OLS) regression procedures in the presence of significant spatial autocorrelation

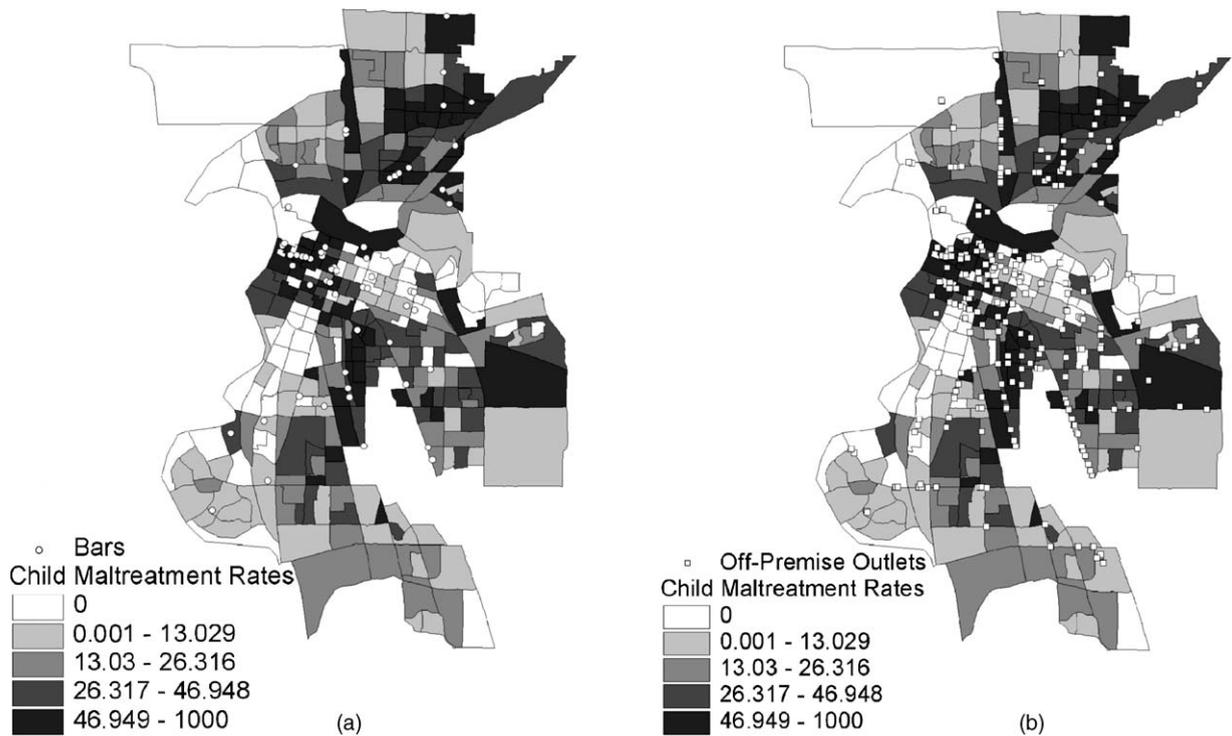


Figure 2. Location of bars and off premise alcohol outlets by neighborhood rates of child maltreatment (per 1000 children). (a) Location of bars. (b) Location of off premise outlets.

biases the statistical tests of the coefficients (Griffith, 1988). For this study, Spatial Statistical Systems (S^3) version 4.32, proprietary software, was used to conduct the analyses (Ponicki & Gruenewald, 2002) because in the presence of significant spatial autocorrelation, S^3 statistically controls for this effect, giving less biased estimates of the statistical tests.

In addition to spatial autocorrelation another challenge with conducting analyses of small areas is that neighborhoods with small populations are given the same weight in the analysis as neighborhoods with large populations (see Greene, 1993). This assumes constant variance across units, which is often not the case in spatial models. To control for this heteroskedasticity (the condition that variances are not constant across units), each model is weighted by the square root of the child population for that area. In a cross sectional analysis, appropriate weighting for heteroskedasticity provides an overall unbiased assessment of effects in statistical models (across all areas). In the base model (Spatial Model I), demographic variables are regressed on neighborhood rates of maltreatment (per 1000 children). Spatial Model II adds the variables measuring the physical availability of alcohol, while Spatial Model III includes variables for drug availability. Rao's likelihood χ^2 ratio (ΔG^2) is used to test model fit of each subsequent nested model to determine whether or not the addition of alcohol and drug availability improves the fit of the model (Fienberg, 1980). This test produces a χ^2 ratio where the degrees of freedom equals the change in degrees of freedom from one model to the next (e.g., Spatial Model I has 16 degrees of freedom and Spatial Model II has 19, so the change in degrees of freedom would be 3). Thus, significance is determined using the χ^2 distribution for the appropriate degrees of freedom.

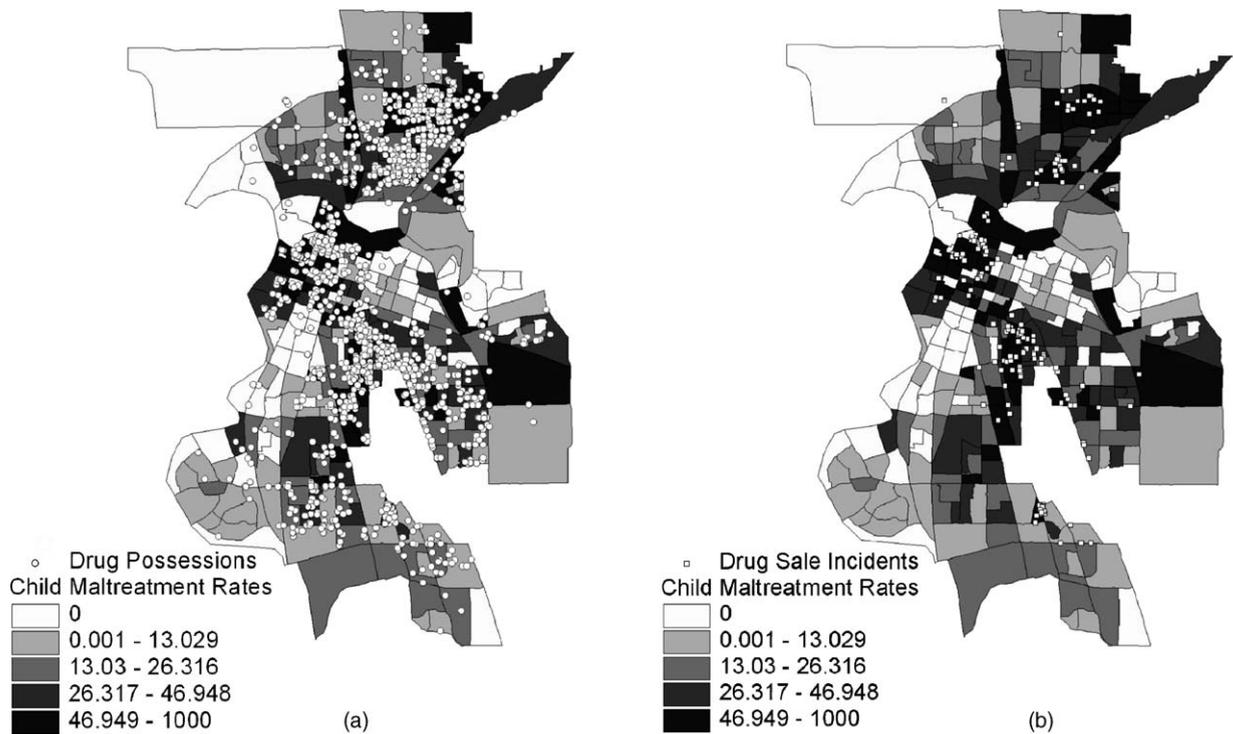


Figure 3. Location of drug possession and drug sale incidents by neighborhood rates of child maltreatment (per 1000 children). (a) Location of drug possession incidents. (b) Location of drug sale incidents.

Results

Table 2 shows the result of the Spatial Models I, II and III, the pseudo- R^2 , and model fit statistics (ΔG^2). In Spatial Model I, higher percentages of people living in poverty, Hispanic residents, vacant housing, and persons who moved in the last 5 years are significantly associated with neighborhood rates of child abuse and neglect. Higher ratios of men compared to women in the neighborhood is also positively associated with higher rates of maltreatment, while the ratio of children to adults is negatively related to rates of maltreatment.

In Spatial Model II, the variables that were statistically significant in the first model remain significant. The number of bars per population is positively associated with neighborhood rates of child abuse and neglect ($p < .01$). Rao's likelihood ratio is also significant ($\Delta G^2 = 12.062$, $p = .007$), indicating that the model that includes the alcohol outlet density variables provides a better fit for these data.

Spatial Model III adds the two drug availability measures to the analysis. This model shows that the percentage of poverty, vacant housing, Hispanic residents, ratio of men to women, and bars per 1000 population retain significance. Numbers of drug possession incidents are positively related to neighborhood rates of child abuse and neglect ($p < .001$). The inclusion of the drug availability variables provides a better fit for the data ($\Delta G^2 = 13.602$, $p = .001$) and explains 55% of the variance between neighborhoods. Importantly, an assessment of residual spatial autocorrelation from this model was positive and significant

Table 2

Spatial regression of neighborhood demographics, alcohol and drug availability on rates of child maltreatment per 1000 children ($n = 304$)

	Rate of child abuse (per 1000 children)					
	Spatial Model I (base model)		Spatial Model II (+alcohol availability)		Spatial Model III (+drug availability)	
	B	SE B	B	SE B	B	SE B
Constant	−38.39	13.03**	−38.77	12.80**	−32.510	12.520
Demographics						
%Female-headed families	.24	.19	.31	.18	.29	.18
%Persons living in poverty	.53	.14***	.55	.14***	.42	.14**
%Unemployed persons	.34	.43	.14	.42	.20	.42
%Vacant housing units	1.04	.34**	1.04	.34**	.82	.34*
%African American residents	.23	.14	.23	.13	.18	.13
%Hispanic residents	.44	.13***	.44	.13***	.36	.12**
Ratio of children to adults	−24.23	10.56*	−22.31	10.55*	−16.18	10.47
Ratio of adult men to adult women	14.06	5.73*	14.21	5.69*	13.08	5.64*
%Persons moved last 5 years	.29	.13*	.25	.13*	.22	.13
%Owner occupied housing	.11	.96	.12	.09	.09	.09
Alcohol availability						
Bars/population			8.42	2.65**	6.66	2.67*
Restaurants/population			.17	.63	.21	.62
Off-premise outlets/population			−.77	1.04	−1.44	1.05
Drug availability						
Drug possession incidents/population					.53	.16***
Drug sale incidents/population					−.49	.62
Model fit statistics						
Pseudo- R^2	.51		.53		.55	
ΔG^2 (Δdf , p)			12.06 (3, .007)		13.60 (2, .001)	

* $p < .05$.** $p < .01$.*** $p < .001$.

($\rho_s = .272$, $t = 3.13$, $p = .002$, two-tailed test) indicating that a spatial GLS model is appropriate to provide less biased estimates of the statistical tests. An OLS regression model would have resulted in Type I errors (Griffith, 1998).

Discussion

Using spatial regression models that control for spatial autocorrelation, this study found that density of bars, density of drug possession incidents, percent poverty, persons moving within the last 5 years, vacant housing units, Hispanic residents, and a higher ratio of men to women are positively associated with neighborhood rates of child maltreatment. By using spatial analysis to estimate these relationships, this study reduces biases often found in other neighborhood studies, providing better estimates of the tests for the relationship of alcohol and drug availability on child maltreatment.

Similar to previous studies, this study found a positive relationship between neighborhood poverty and neighborhood rates of child maltreatment (Coulton et al., 1995; Ernst, 2001). Neighborhoods with high levels of poverty may not have enough resources to support families, resulting in higher rates of maltreatment. Higher concentrations of Hispanic residents in neighborhood areas were associated with substantiated reports of child maltreatment, but higher concentrations of African American residents was not. More research is needed to examine the role of race/ethnicity in neighborhood studies and child maltreatment.

The presence of higher numbers of bars per population may represent a lack of resources available to residents, as they take up space where agencies providing social services or businesses that invest in the community and its resources could reside or a lack of informal social control by neighborhood residents (Freisthler, 2004; Gorman, Speer, Gruenewald, & Labouvie, 2001; Lipton & Gruenewald, 2002; Scribner, MacKinnon, & Dwyer, 1995). Additionally, bars may increase the stress on neighborhoods by “attracting” populations prone to participating in dangerous activities, such as assaults, prostitution, and drug use (Parker, 1995) or increase the frequency of alcohol use (Gruenewald, Johnson, & Treno, 2002). In this instance, the presence of bars may act as markers for negative interactions that may occur if family members venture outside the home. The important function of bars, then, may not be as ‘attractors’ of local populations but as ‘detractors’ from positive social contacts, thus increasing isolation among families. While the number of bars per population was positively associated with rates of maltreatment, this study found no relationship between the number of restaurants and off-premise alcohol outlets and child maltreatment. Restaurants and off-premise outlets may be located in all retail areas, possibly indicating a universal need for and use of these services.

Areas with more drug activity may also increase levels of child maltreatment by contributing to the overall level of neighborhood stress and disorganization, making it more difficult for neighbors to interact with each other and provide support. As an ecological study, it is not possible to determine the mechanism by which drug possessions are related to rates of child maltreatment; however, areas with higher rates of drug possession incidents may also have higher rates of drug use. Thus, it may be that drug possession is surrogate measure for neighborhood drug use.

This study affirms that child abuse and neglect prevention efforts should be targeted at the neighborhood level, particularly in neighborhoods with multiple sources of disadvantage. Alcohol and drug availability in neighborhoods may serve to further isolate families living in disadvantaged areas leading to abuse and neglect, regardless of an individual parent’s substance use behaviors. Community practitioners and health professionals can collaborate with city officials and law enforcement agencies to design and

enforce policies that limit the number of alcohol outlets, particularly bars, and to provide more enforcement for drug activity in disadvantaged neighborhoods. A stronger community presence may make such neighborhoods a less attractive place for other criminal behaviors, which in turn may make creating support networks that help to prevent child maltreatment easier.

The current study is limited in that it only examines associations between alcohol and drug availability at the neighborhood level. Because of this, we are not able to determine the mechanism by which substance availability leads to increased rates of maltreatment. In order to better understand the mechanisms by which this relationship occurs, future studies need to examine simultaneously the contribution of both parental substance use and neighborhood substance availability. Police incident data of drug sales and possessions are likely to undercount the actual availability of illicit drugs in these neighborhoods as they reflect only those incidents that came to the attention of law enforcement. Finally, there may be discrepancies between what residents view as their neighborhood and those neighborhood boundaries that are enforced upon the data from the outside (e.g., using census block groups) that should be further explored.

Longitudinal studies of neighborhoods need to be conducted to disaggregate the impact of alcohol and drug availability. For instance, if the number of bars in a neighborhood decreases, are rates of maltreatment reduced? Similarly, does greater police enforcement reduce drug availability and is that related to changes in neighborhood rates of child abuse and neglect? The cross-sectional nature of the current study provides a static view of neighborhood structures and processes. Children and families can move in and out of neighborhood areas altering the neighborhood environment to which they are exposed. By more fully examining the length of time children spend in particular neighborhood environments, researchers can begin to determine how much and how long exposure to neighborhood drug and alcohol availability must be before child maltreatment results.

Future research on how the location of the neighborhood next to similarly disadvantaged neighborhoods or to more prosperous neighborhoods may also help explain differences in maltreatment rates. While this study uses census block groups, arguing that a smaller spatial unit is a better approximation of neighborhoods, others have used census tracts (Coulton et al., 1995) or zip codes (Drake & Pandey, 1996). Future research should focus on how spatial scale may impact the findings to develop a better, more robust measure of “neighborhood.” If results of analyses at different spatial scales are different, then the administrative unit that best approximates a true “neighborhood” should be used when conducting neighborhood studies. However, if results remain consistent across these various spatial scales, then choice of spatial unit for analysis becomes less critical.

While this study certainly does not provide a definitive answer to how alcohol and drug availability may be related to rates of maltreatment, it does imply a new view of how community practitioners and health professionals can develop macro-interventions to ameliorate social problems. Perhaps most importantly, the relationship of bar density and drug possessions presents a new line of inquiry into child abuse and neglect that moves the field away from focusing solely on individual factors related to abuse and neglect and towards an environmental solution for preventing the occurrence of maltreatment at the neighborhood level.

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Résumé

French-language abstract not available at time of publication.

Resumen

Spanish-language abstract not available at time of publication.