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Perpetration of intimate partner violence by young adult males: The association with alcohol outlet density and drinking behavior

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Abstract

Objective—This study examined the association between alcohol outlet density and male to female intimate partner violence (IPV).

Method—Data were analyzed from a national probability sample of males who reported a current heterosexual relationship (N=3,194). Multinomial logistic regression was used to examine the likelihood of having perpetrated IPV.

Results—High alcohol outlet density was associated with having perpetrated physical only IPV (odds ratio [OR] = 2.51; 95% confidence interval [CI]: 1.21–5.20). Outlet density was not associated with greater odds of sexual IPV perpetration.

Conclusions—Alcohol outlet density was found to be associated with perpetration of physical IPV. Developing environmental strategies with respect to alcohol outlets could potentially reduce perpetration of male-to-female physical IPV.

Keywords

Intimate partner violence; Alcohol outlet density; Alcohol consumption; Perpetration; Routine activities theory

Introduction

Intimate Partner Violence (IPV) against women is a widespread problem and linked to serious adverse physical and mental health outcomes. More than 1 in 3 women (35.6%) in the United States have experienced rape, physical violence, and/or stalking by an intimate partner in their lifetimes. According to the 2010 National Intimate Partner and Sexual Violence Surveillance Survey (NISVS), women who experience IPV are more likely to

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report asthma, irritable bowel syndrome, diabetes, frequent headaches, chronic pain, difficulty sleeping, and activity limitations than women who have not experienced IPV (Black et al, 2011).

Strong positive associations between individual alcohol use and perpetration of intimate partner violence (IPV) are well-established (Fals-Stewart, Leonard, & Birchler, 2005; Lipsky, Caetano, Field, & Larkin, 2005; McKinney, Caetano, Rodriguez, & Okoro, 2010; Murphy, Winters, O'Farrell, Fals-Stewart, & Murphy, 2005; Slep, Foran, Heyman, & Snarr, 2010; Stappenbeck & Fromme, 2010; Thompson & Kingree, 2006; Walton-Moss, Manganello, Frye, & Campbell, 2005). Greater alcohol consumption is associated with more male perpetrated violent acts and more severe violence, and alcohol use by the perpetrator increases the likelihood of injury (Graham, Bernards, Wilsnack, & Gmel, 2011; Leonard & Mudar, 2003; Leonard & Quigley, 1999; Martin et al., 2010; McKinney et al., 2010; Murphy et al., 2005; Testa et al., 2003; Thompson & Kingree, 2006; Tjaden & Thoennes, 2000). The co-occurrence of alcohol use and sexual IPV has been well documented in the research literature. Among female victims of IPV, aged 18 to 65, attending family practice clinics, Coker and colleagues (2000) found that compared to no drug or alcohol use by a partner, if the partner was reported to have an alcohol problem, the adjusted odds ratio of experiencing both sexual and physical IPV was 6.1 (3.3, 11.3) (Coker, Smith, McKeown, & King, 2000). Likewise, Parkhill and Abbey (2008) examining a sample of male college students found that 58% of the sample acknowledged sexually assaulting a dating partner and of those, 52% committed at least one sexual assault while intoxicated (Parkhill & Abbey, 2008).

Alcohol Outlet Density and Male to Female Intimate Partner Violence

The strong positive associations between individual alcohol use and violence have led researchers to examine whether and how access to alcohol is associated with various alcohol-related consequences. A number of studies have reported a relationship between the density of alcohol outlets and higher levels of alcohol consumption among adults and youth, a higher occurrence of alcohol-related crime, violence, injury, and child maltreatment to name a few (Freisthler, Midanik, & Gruenewald, 2004; Gorman, Speer, Gruenewald, & Labouvie, 2001; Gruenewald, Freisthler, Remer, LaScala, & Treno, 2006; Gruenewald, Remer, & Lipton, 2002; MacKinnon, Scribner, & Taft, 1995; Scribner, MacKinnon, & Dwyer, 1995; Treno, Gruenewald, & Johnson, 2001).

Exactly how alcohol outlet density and male to female partner violence (MFPV) are related is unclear. There is the possibility of a direct association between the two or an indirect relationship that is mediated by another factor, or both. Several theories describe the possible underlying mechanisms for the association between outlet density and violence in a general way that could be applied to MFPV as well. The association between outlet density and violence was initially thought to be due in large part to the increased availability of alcohol; that is, greater alcohol outlet density, whether on-premise or off-premise (for example, bars and liquor stores respectively), makes alcohol more easily accessible, leading to greater alcohol consumption and in turn, more of the associated consequences including MFPV. Elaborating on that supposition, Livingston, Chikritzhs, and Room (2007) suggested a posteriori two possible explanations for why this association may exist. First, the authors proposed that greater density may cause more competition among the alcohol outlets, which would result in price decreases and consequently, greater consumption of alcohol (Livingston, Chikritzhs, & Room, 2007). They also proposed an alternative hypothesis that outlet density may influence the quality and characteristics of the local community environment (Livingston et al., 2007). The latter presumes that alcohol outlets actually serve to attract trouble, and in particular, males at risk for perpetrating IPV. In other words, outlets may attract the "wrong crowd," increasing the likelihood of MFPV occurring regardless of

alcohol consumption. The first hypothesis that competition among more outlets leads to greater consumption would suggest an indirect link between alcohol outlet density and MFPV that is mediated by alcohol consumption. The second hypothesis would suggest potentially both an indirect and perhaps more interestingly, a direct association between alcohol outlet density and IPV by suggesting that high alcohol outlet density may attract people more likely to engage in MFPV irrespective of their drinking behavior.

Yet another explanative theory, for which there is support for in the research literature, is routine activities theory (Stockwell & Gruenwald, 2004). This theory posits that alcohol outlet density influences violence by altering one's "routine drinking activities". In other words, behaviors such as whether one drinks at home or at bars and restaurants, and whether one drinks socially with friends or alone are affected by the density, and possibly type, of outlets in the immediate environment (Stockwell & Gruenewald, 2004). This theory would predict a direct association between outlet density and MFPV perpetration and possibly, although not necessarily, an indirect relationship through increased drinking.

Neither Livingston et al. (2007) nor Stockwell and Gruenewald (2004) studied these theories within the context of MFPV. However, Cunradi (2010) specifically considered the relationship of alcohol outlet density to IPV. Drawing on Livingston et al.'s (2007) and Stockwell and Gruenewald's (2004) work as well as social disorganization theory, she proposed three explanations for why outlet density may be associated with IPV. Cunradi (2010) described three social mechanisms through which alcohol outlets, in conjunction with neighborhood conditions, may exacerbate IPV risk (Cunradi, 2010). First, the greater number of alcohol outlets in a neighborhood may indicate more accepting or tolerant community norms towards IPV in general and MFPV in particular (Cunradi, 2010). Building on the increased access to alcohol supposition, Cunradi further argued that greater outlet density may promote problem alcohol use among at-risk couples, increasing the likelihood of MFPV. Alternatively, this could be interpreted within the context of routine activities theory such that the routine drinking behaviors of at-risk couples change in areas of high alcohol outlet density leading to increased risk of MFPV. Finally, Cunradi (2010) argued that alcohol outlets provide environments where persons at-risk for perpetrating and experiencing IPV may gather and "mutually reinforce IPV-related attitudes, norms, and problem behaviors" (Cunradi, 2010). This would correspond to Livingston et al.'s (2007) theory that high alcohol outlet density may attract persons more likely to perpetrate or experience IPV. These explanations would suggest that both direct and indirect relationships between alcohol outlet density and IPV exist. Although not discussed by Cunradi (2010), there is also the possibility that the type of alcohol outlet is important. Off-premise outlets such as liquor stores may differ in their relationship to IPV compared to on-premise outlets such as bars or restaurants, although exactly how is uncertain. Finally, outlet density may influence males differently from females.

To date, only a small number of studies have examined the association between alcohol outlet density and IPV, most of which have been ecologic studies. Gorman and colleagues (1998) examined Uniform Crime Report (UCR) data from the 223 large municipalities in New Jersey and found no association between alcohol availability and IPV (Gorman, Labouvie, Speer, & Subaiya, 1998). This may be due to the geographic size examined; recent research has concluded that smaller geographic units may have a stronger association. Indeed, Cunradi (2011) found a significant positive association between off-premise alcohol outlet density and IPV-related police calls and crime reports based on electronic data processing grids (averaging 0.17 square miles) in Sacramento, California (Cunradi, Mair, Ponicki, & Remer, 2011). Livingston (2010, 2011) examined aggregate police-recorded domestic violence data by postal code in Melbourne, Australia and found a significant positive relationship between general (pub) license, on-premise and packaged liquor license

density with domestic violence rates (Livingston, 2011), though initial cross-sectional analyses found a positive association only for general license density (Livingston, 2010). Police and crime report data have limitations, however, including representing only cases reported to law enforcement, lacking individual-level data such as the perpetrator's gender and alcohol use characteristics, and, in the case of police calls, of possibly including multiple calls per event (Cunradi et al., 2011). Importantly, McKinney et al. (2009) examined a national population-based sample of 1,597 married or cohabiting couples in the U.S. and reported a significant positive association between alcohol outlet density at the zip code level and MFPV (McKinney, Caetano, Harris, & Ebama, 2009). The researchers also found that on-premise alcohol outlet density was positively associated with MFPV while off-premise seemed not to be. In order to address these gaps, further epidemiologic study of the outlet density and IPV relationship is needed using a dataset with information on individual-level and neighborhood-level characteristics and which includes the large segment of people who have an intimate partner but are not married or cohabiting.

Study Aims and Hypotheses

This study furthers our understanding of the role of alcohol outlet density specifically in MFPV among a U.S. nationally representative sample of young adult men (i.e. 18–27). To better understand the role of alcohol use and outlet density in different types of IPV, we distinguish between having perpetrated only physical IPV versus having perpetrated either sexual IPV only or both physical and sexual IPV. Specifically, we hypothesize that there should be a direct effect of alcohol outlet density at the census tract level on male perpetration of each of these combinations of violence, based on the suppositions of routine activities and social disorganization theories. We next examine the association between alcohol consumption patterns and MFPV and test whether there is an indirect association of outlet density and MFPV that is mediated through alcohol consumption patterns. This would test the theory that higher outlet density is associated with greater alcohol consumption, leading to greater IPV perpetration. We then controlled for other possible confounds mentioned in the research literature, including other measures of neighborhood social disorder, physical and sexual abuse experienced as a child, marital and cohabitating status, and socio-demographic measures (Brown & Bulanda, 2008; Caetano, Ramisetty-Mikler, & Harris, 2010; Cunradi, 2007; Livingston, 2010; Madkour, Martin, Halpern, & Schoenbach, 2010; Roberts, McLaughlin, Conron, & Koenen, 2011; Rothman et al., 2011; Yonas et al., 2011). Finally, a posteriori, we examine whether the relationship between outlet density and IPV differed by the type of alcohol outlet.

Methods

Data and Sample

Data were from Wave III of the National Longitudinal Study of Adolescent Health (Add Health), a prospective cohort study that has followed a nationally representative sample of U.S. adolescents into young adulthood. At Wave III, respondents were approximately 18–26 years old and were interviewed in 2001–2002 (N=14,322 with sampling weights). Add Health's original sample was drawn from 7th- to 12th-grade students on school enrollment rosters in 1994–1995. A sample of 80 high schools and 52 middle schools was selected with unequal probability of selection. Incorporating systematic sampling methods and implicit stratification into the study design ensured that selected schools were representative of U.S. schools with respect to region of country, urbanicity, school size, school type, and ethnicity. Add Health respondents provided written consent to be interviewed. Questionnaires were administered on laptop computers, and computer-assisted self-interviewing technology was used for asking survey items about sensitive topics, including sexual, substance use and violence behaviors. Additional information about the Add Health study is available

elsewhere (Harris et al., 2009). The institutional review board (IRB) of the University of North Carolina at Chapel Hill approved Add Health study procedures. The IRB of the Pacific Institute for Research and Evaluation determined that the protocols of the present study were exempt from IRB review.

For the Wave III survey, Add Health researchers sought to interview all original study participants living in the U.S., including homeless and incarcerated people. The response rate for Wave III was 77.4% (Harris et al., 2009).[1] Participants were asked to list all romantic relationships and sexual relationships since the summer of 1995 and then were asked if they were currently involved with each individual. One current sexual or romantic relationship per respondent was examined for present analyses. In order to select one current relationship in an approximately random way for respondents who reported more than one such relationship, we selected the first current relationship mentioned by the respondent. Respondents whose identified relationship was with a same-sex partner represented a very small percentage (1.4%) and were excluded from analyses. Of the 8463 Wave III respondents who reported at least one current relationship and had a valid sampling weight for the analyses, 3,578 were male. Present analyses were based on the 3,194 male participants in the Wave III national probability sample who had at least one reported current relationship, nonmissing data on our IPV perpetration and alcohol use variables, and an index relationship partner that was not of the same sex.

Measures

Intimate partner violence perpetration—The measure of IPV perpetration was based on the survey items “How often in the past year have you threatened <PARTNER> with violence, pushed or shoved [HIM/HER], or thrown something at [HIM/HER] that could hurt?, “How often in the past year have you slapped, hit, or kicked <PARTNER>?,” and “How often in the past year have you insisted on or made <PARTNER> have sexual relations with you when [HE/SHE] didn’t want to?” Responses were dichotomized as never or hasn’t happened in past year versus happened one or more times in the past year. A 3-category nominal variable was then created to represent type of IPV that respondents reported perpetrating in the past year in their relationship: physical IPV only, sexual IPV only or both physical and sexual IPV, and no IPV (referent category). We chose not to create a separate category for sexual only IPV because the prevalence for sexual only IPV was quite low and it most frequently occurred in combination with physical IPV.

Alcohol outlet density in neighborhood—Alcohol outlet licensing data at Wave III were gathered from individual states from September 2006 through June 2007. The physical address and the alcohol license category for each outlet (establishments possessing on- and/or off-premise alcohol licenses) were obtained when possible. Data were acquired from 43 states and the District of Columbia. Data were cleaned to remove duplicate entries, to remove non-outlet alcohol license types, and to standardize the data formatting for each state; this process provided 506,798 unique alcohol outlets for the 43 states and the District of Columbia. The addresses were geocoded with 472,853 matching at the Zip Code One level or better, for a geocoding rate of 93.3%. The data were subsequently aggregated to the census tract level and merged with demographic, housing and geographic data from the 2000 US Census. The outlet licensing data were collected from individual states during 2006–2007, which was five to six years after the Wave III interviews.

[1]For additional information on attrition please see Chantala, Kalsbee, and Andraca, “Non-response in Wave III of the Add Health Study,” no date) https://www.cpc.unc.edu/projects/addhealth/data/guides/W3nonres.pdf

A total alcohol outlet density variable was created that combined on-premise outlets (e.g., bars and restaurants) and off-premise outlets (e.g., liquor/convenience/grocery stores). Median total outlet density corresponded to 0.76 outlets per square kilometer, and the 90th percentile in density corresponded to 7.57 outlets per square kilometer. To facilitate interpretation, a 3-category ordinal variable for neighborhood total outlet density was created indicating low presence of alcohol outlets (less than one outlet per square kilometer and the referent category), medium outlet density (1–8 outlets), or high outlet density (more than 8 outlets). Similarly constructed 3-category versions also were created specifically of on-premise outlet density (cutpoints were less than .3 outlets and more than 4 outlets) and off-premise density (cutpoints were less than .4 outlets and more than 5 outlets).

Alcohol use—Several dimensions of alcohol use were incorporated into a single measure: ever drinking alcohol, ever drinking in the past 12 months, frequency and quantity of drinking in the past 12 months, heavy episodic drinking (4 or more drinks on a single occasion in the past two weeks), and having ever been drunk in the past 12 months. The resulting 6-category variable was coded as follows: 1) lifetime abstainer or former (but not current) drinker (the reference category), (2) light drinker, (3) moderate drinker (4) infrequent heavy drinker, (5) occasional heavy drinker, and (6) frequent heavy drinker. Descriptions of the categories are presented in Table 1.

Control variables—Age was measured in years. Race/ethnicity, from respondents' self-report, was Hispanic (of any race) and non-Hispanic categories of white (the reference category), black, Asian or Pacific Islander, and American Indian/Native American. For multiracial participants, the category the respondent said best described his or her racial background was used. Marital status of the reference relationship was represented by these categories: never married nor ever lived with this partner (reference category), lived with this partner but never married the person, or ever married this partner. Three variables indicated the respondent's recollection of a parent or other adult caregiver's behavior before the respondent was in 6th grade pertaining to: (1) neglect (left the respondent home alone when an adult should have been present or did not take care of the respondent's basic needs), (2) "slapped, hit or kicked" the respondent, and (3) sexually abused the respondent, defined as the adult touching the child in a sexual way, forcing the child to touch the adult in a sexual way, or forcing the child to have sexual relations. Each neglect/abuse measure was dichotomized to indicate whether or not the event had ever occurred.

Studies that have examined the influence of alcohol outlet density on various outcomes have treated other neighborhood characteristics as potential confounds. These have typically included neighborhood level measures of social disorganization, such as perception of crime and drug selling in the neighborhood, vacant housing, graffiti, poverty, social cohesion, race/ethnicity distributions, single parent households, foreign born, and employment (Caetano et al., 2010; Cunradi, 2007, 2009, 2010; Cunradi, Caetano, Clark, & Schafer, 2000; Cunradi et al., 2011; Livingston, 2010, 2011; McKinney et al., 2009). Therefore, several neighborhood-level sociodemographic characteristics indicating social disorganization in the community were included as control variables. Using tract-level data from the census (Census of Population and Housing, 2000: Summary File 3) (Swisher, 2008), measures were prepared pertaining to (1) poverty (an index of the average of the standardized estimates for the unemployment rate, proportion of persons below the poverty level, and proportion of families with a child in a female-headed household; Cronbach's alpha = .72), (2) transience (an index reflecting the average of the standardized estimates for the proportion of the population who had moved in the past five years and the proportion of occupied units that were renter-occupied; Cronbach's alpha = .82), (3) proportion of residents who were foreign born, and (4) proportion of housing units vacant (Swisher, 2008). Factor analyses were used to guide selection of items for indices. An additional tract-level census variable that was

included as a control was population density because both on- and off-premise alcohol outlets may be more concentrated in urban than rural or suburban areas. Population density was measured as persons per square kilometer divided by 1000.

Data analyses

Frequencies of IPV perpetration, alcohol use, and alcohol outlet density in respondents' neighborhoods were obtained for the population. Using multinomial logistic regression, the following posited direct relationships were examined using bivariate analyses: (1) alcohol outlet density and IPV perpetration (total outlet density, on-premise density, and off-premise density), (2) outlet density and alcohol use, (3) alcohol use and IPV perpetration, and (4) neighborhood social disorganization and IPV perpetration. We planned to further examine whether alcohol use mediated the association between alcohol outlet density and IPV in our multivariable analyses only if both outlet density and alcohol use were significantly related to IPV perpetration in the bivariate analyses.

Next, multivariate analyses were conducted. Three multinomial logistic regressions were carried out using our 3-category measure of IPV perpetration as the dependent variable with a reference category of not having perpetrated IPV in the relationship. In Model 1 the only predictors examined were alcohol outlet density and alcohol use. Model 2 included alcohol outlet density and alcohol use, plus individual-level control variables of respondent's age, race/ethnicity, marital status, and whether or not the respondent had been neglected, sexually abused, or physically abused as a child. Model 3 included all of the variables used in Models 1 and 2 but also included the community-level control variables of neighborhood poverty, transience, foreign-born residents, housing vacancy, and population density. A posteriori analyses were conducted examining Model 3 stratified by on-premise outlet density and off-premise outlet density. Multilevel modeling was not used for community level variables because there were few census tracts with more than one respondent and data were not sufficiently nested to warrant this type of analysis (Cubbin, Brindis, Jain, Santelli, & Braveman, 2010; Cubbin, Santelli, Brindis, & Braveman, 2005).

Post-stratification sampling weights were used in order to yield estimates representative of the national population. Data analyses were conducted using SAS (version 9.13, Cary, NC), MPlus (version 6, Muthén and Muthén, 1998–2010, Los Angeles, CA), and Stata (version SE 11.1, StataCorp, College Station, TX). Procedures for survey data analysis in Mplus and Stata were used to account for Add Health's complex sampling design in the regression models. Weighted percentages and unweighted sample sizes are reported in results.

Results

In this nationally representative sample of young adult males, 11.6% reported having perpetrated physical IPV (but not sexual IPV) in the selected current relationship in the past year, 4.2% reported perpetrating either sexual IPV only or physical and sexual IPV, and 84.2% reported no IPV perpetration. Frequencies and means of variables based on the analysis sample are shown in Table 2.

Bivariate associations

We examined bivariate associations between alcohol outlet density and IPV perpetration for on-premise outlets and off-premise outlets. In each case, there was no significant bivariate association, and we also found no apparent difference in the relationship by type of outlet (on-premise vs. off-premise). Consequently, results (reported in Table 3) are reported for total alcohol outlet density (on-premise and off-premise combined); however, we do report the results of a posteriori analyses conducted separately by type of outlet.

In multinomial logistic regressions not adjusting for other variables, compared to low alcohol outlet density, neither medium total outlet density (relative risk ratio [RRR]=0.94, 95% confidence interval [CI]: 0.66–1.35) nor high total outlet density (RRR=1.37, CI: 0.81–2.31) had a statistically significant association with reports of physical IPV perpetration versus no IPV perpetration. Total alcohol outlet density also was not significantly related to sexual IPV only or physical and sexual IPV (RRR=0.91; 95% CI: 0.57–1.43 and RRR=0.69; 95% CI: 0.28–1.70 for medium and high outlet density, respectively). Outlet density was not significantly associated with alcohol use for any of the drinking categories (RRRs range from 0.56–1.21, all not significant at $p<.05$ [NS]). Infrequent heavy drinking (RRR=1.92; 95% CI: 1.11–3.31) and frequent heavy drinking (RRR=2.25; 95% CI 1.28–3.95) were significantly associated with physical only IPV perpetration versus no IPV. Alcohol use was not associated with sexual only or physical and sexual IPV. No statistically significant bivariate associations were found between the neighborhood variables and IPV, although one approached significance (poverty and physical IPV, $p< .07$). However, because the neighborhood measures have been found in previous research to be associated with violence and other health outcomes and have theoretical support, we continued examining their association in the larger model. Because we did not find both alcohol outlet density and alcohol use to be significantly related to IPV perpetration in the bivariate analyses, we did not examine or test for alcohol use as a mediator of outlet density and IPV in the multivariable models.

Multivariate models

Results from the three multivariate multinomial logistic regression models are presented in Table 3. In Model 1, which included only outlet density and alcohol use as predictors, alcohol outlet density was not statistically significant as a predictor of IPV perpetration among the young men. In Model 2, which included individual-level characteristics of respondents, individuals in high alcohol outlet density neighborhoods had significantly increased odds of perpetrating physical IPV compared to individuals in low outlet density neighborhoods (odds ratio [OR]=1.86; 95% CI: 1.05–3.27). In Model 3, which controlled for community-level and individual-level characteristics, high outlet density was still associated with increased odds of physical IPV perpetration (OR=2.51; 95% CI: 1.21–5.20).

The three heavy drinking groups (compared to abstention) were associated with perpetrating physical IPV. Infrequent heavy drinkers (OR=1.84; 95% CI: 1.04–3.27 in Model 1, OR=2.22; 95% CI: 1.17–4.23 in Model 2 and OR=2.26; 95% CI: 1.19–4.30 in Model 3), occasional heavy drinkers (OR=2.74; 95% CI: 1.61–4.65 in Model 2, and OR=2.83; 95% CI: 1.66–4.82 in Model 3), and frequent heavy drinkers (OR=2.59; 95% CI: 1.46–4.59 in Model 1, OR=4.37; 95% CI: 2.38–8.04 in Model 2, and OR=4.46; 95% CI: 2.44–8.14 in Model 3) all showed increased odds of reporting physical IPV perpetration compared to alcohol abstainers.

For the control variables, Model 2 and Model 3 results were very similar; only the Model 3 results are noted here. Compared to non-Hispanic whites, blacks (OR=2.46; 95% CI: 1.55–3.89) and Native Americans (OR=10.11; 95% CI: 4.19–24.38) were more likely to report perpetrating physical IPV. Cohabiting with one's partner also was associated with greater odds of physical IPV perpetration (OR=2.84; 95% CI: 1.98–4.09) and sexual IPV perpetration (OR=1.93; 95% CI: 1.00–3.71) compared to never having married the partner. Marriage also was associated with greater likelihood of perpetrating physical IPV (OR=3.83; 95% CI: 2.44–6.02) and sexual only or physical and sexual IPV (OR=2.40; 95% CI: 1.24–4.67). None of the neighborhood control variables were found to be significantly associated with IPV perpetration in the model that included those measures.

Results of post-hoc analyses examining on-premise and off-premise outlet alcohol outlet density separately for Model 3 indicated that neither type of density was significantly related to IPV (ORs ranged from 1.04–1.28 for physical IPV and 0.63–0.96 for sexual IPV, all NS) except that high off-premise outlet density was negatively associated with sexual only or physical and sexual IPV versus no IPV (OR=0.26, p<.05).

Discussion

The present study examined whether young adult males living in areas characterized by high alcohol outlet density are more likely to perpetrate IPV. There was no evidence in the bivariate analyses that the relationship between outlet density and IPV was partially mediated by individuals' alcohol use behaviors. We found a direct association however, that high alcohol outlet density, defined as more than 8 outlets per square kilometer, was associated with twice the odds of perpetrating physical only MFPV but not sexual only or sexual and physical IPV. Thus there is supporting evidence for the associations proposed by routine activities theory (Stockwell & Gruenwald, 2004) and social disorganization theory. On the other hand, we did not find support for the hypothesis that drinking behavior would mediate the relationship. Alcohol outlet density was not significantly associated with our measures of drinking as has been found previously in the literature. This may be an indication that our combined measure of quantity and frequency has diluted the effect of quantity and frequency separately. Previous studies have found similar effects of frequency and quantity when examined separately (Kypri, Bell, Hay, & Baxter, 2008; Weitzman, Folkman, Folkman, & Wechsler, 2003). There are also many other determinates of drinking which may mask the effects of outlet density. In Models 2 and 3, we may also have a suppression effect. Outlet density only becomes significantly associated with the IPV once additional measures are controlled for in the model. A common cause of suppression is when one of the expected relationships expected is going in the opposite direction. In this case, it may be that respondents living in locations with high alcohol outlet density actually drink less, yet drinking is still associated with increased odds of IPV. By controlling for drinking levels as well as other control measures, we are better able to distinguish the effect of outlet density on IPV than what was observed in the bivariate analyses.

There were, however, increased odds of perpetrating physical only MFPV among all heavy drinker categories. Infrequent heavy drinkers were over twice as likely to report perpetrating MFPV, occasional heavy drinkers were almost 3 times as likely, and frequent heavy drinkers were four and a half times as likely as nondrinkers to report perpetration of MFPV. Occasional heavy drinking is by far the most common drinking pattern among this young adult male sample; combined with infrequent and frequent heavy drinkers, these patterns capture over 63% of the analysis sample. Therefore, the strong association between heavy drinking and physical MFPV is of considerable concern.

This study improves on the methodology of previous research in several ways. We examined smaller geographical units (i.e., census tract) than used previously by McKinney et al. (2009) and Gorman et al. (1998) (Gorman et al., 1998; McKinney et al., 2009). Using a smaller geographical unit when studying IPV may more accurately assess the influence of the immediate environment on individual behavior. Like McKinney and colleagues (2009), we utilized self-reports of IPV rather than only cases reported to law enforcement which will miss incidents that go unreported. Also like McKinney et al., we used a national probability sample, but our sample size is substantially larger and includes individuals in romantic and/or sexual relationships who are not married or cohabiting. By using a stratified nationally representative sample as the unit of analysis instead of area units, problems associated with analyzing spatial data are less of a concern. Specifically, individuals are spread across spatial areas and are less likely to be clustered within locations or located in adjacent areas.

Thus, spatial autocorrelation (i.e., correlations that arise between adjacent units because of similar characteristics) is minimized (Alaniz, Cartmill, & Parker, 1998; Freisthler, Lery, Gruenewald, & Chow, 2006).

We were also able to control for other individual characteristics, neighborhood measures of social disorganization, and population density helping us to better isolate the effect of outlet density beyond that of correlated neighborhood conditions. Similar to previous research findings, we found that cohabiting with one's partner, with or without marriage, is associated with considerably greater odds of males perpetrating physical only IPV. Compared to non-Hispanic whites, non-Hispanic blacks had significantly greater odds of perpetrating physical only MFPV but it is Native Americans who stand out as having much higher odds of perpetration compared to non-Hispanic whites, even with considerably large confidence intervals. This increase in odds combined with high rates of both IPV and problem drinking among Native American and Alaskan Native populations bears further consideration and exploration. While race and ethnic differences in IPV are commonly found in IPV research, understanding the causal pathway is complex. Race/ethnicity could be a proxy for cultural norms that are more tolerant of physical IPV or race/ethnicity may reflect other community characteristics not captured in our models. It may also reflect the unique stressors associated with minority race/ethnicity status.

Interestingly, our neighborhood level control measures were not associated with IPV as has been found in prior studies (Caetano et al., 2010; Cunradi, 2007; Cunradi et al., 2011; Livingston, 2010, 2011; McKinney et al., 2009). Why this is the case is not clear. Indeed McKinney and colleagues (2009) found that two measures of social disorganization they examined, poverty and owner occupied homes, were positively correlated with MFPV (McKinney et al., 2009). Similarly, Cunradi and colleagues (2011) found that higher percentages of Hispanics, those living below the 150% poverty line, and unemployment were all associated with increased IPV related calls to police (Cunradi et al., 2011) while Caetano and colleagues (2010) also found neighborhood poverty to be associated with increased IPV (Caetano et al., 2010; Cunradi et al., 2011). Two of our measures of social disorganization, neighborhood poverty and transience were an index of multiple indicators. Although both factors had good Cronbach's alpha coefficients, it is possible that by creating indexes we actually diluted the effects of poverty, owner occupied homes, and unemployment.

For perpetration of sexual only or physical and sexual IPV, cohabiting or being married were the only significant risk factors found in our analyses. Sexual violence may be less closely linked to alcohol use and community characteristics as previously thought at least among young adult males. More related risk factors likely exist for male perpetrators of sexual violence but were either not measured in Add Health or were not included in our analyses. For example, previous research has found that factors such as hostility towards women, positive attitudes towards impersonal sex, and high masculinity are factors associated with the perpetration of sexual assault among men (Malamuth, Sockloskie, Koss, & Tanaka, 1991). In addition, multivariate analyses conducted separately for on-premise and off-premise outlet density indicated that respondents in neighborhoods with high off-premise outlet density were less likely to report perpetrating sexual partner violence. Given that this was a pa posteriori analysis, caution is advised regarding interpreting this finding, and further research is needed examining outlet density by type of outlet in relation to sexual versus physical partner violence.

The different associations between alcohol outlet density and physical and sexual IPV perpetration supports our decision to examine the categories of IPV violence separately. Furthermore, the results of this study indicate that studying the perpetrators of IPV by sex of

the perpetrator is critically important. Using only victims of IPV to understand the risk factors for perpetration provides insufficient information. As a case in point, in a previous study by the authors (Authors, 2012) examining IPV victimization among females in the same Add Health sample, we found that female heavy drinking was *not* associated with physical IPV, but was associated with greater odds of sexual only or physical and sexual victimization in direct contrast to male perpetrators of sexual only or physical and sexual IPV (Authors, 2012). Furthermore, outlet density was not associated with physical or sexual IPV victimization among young women, yet other neighborhood social disorganization factors were, whereas among male perpetrators, neighborhood characteristics were not associated (Authors, 2012). The unique risk factors for male perpetrators compared to female victims speaks to the need for prevention efforts to be tailored to the sex of victim or perpetrator and even possibly to the type of IPV.

Limitations

Some limitations of this study must be mentioned. First, this is a cross-sectional study only and we are limited in our ability to judge the directionality of the relationships. Furthermore, Add Health did not assess whether IPV and alcohol use co-occurred. Thus, while a global association between outlet density and IPV perpetration exists in our sample, it does not necessarily mean that alcohol use was involved during a specific IPV event. A more complete conceptual model would include alcohol use by both the respondent and his partner, as previous research indicates that use by both persons exacerbates the likelihood of IPV (McKinney et al., 2010). One implication of this limitation is that the direct effect of outlet density on IPV perpetration that was identified in this paper could be due in part to the mediating (but unmeasured) influence of the partner's alcohol use.

An additional limitation is that we did not include individual measures of education and other SES indicators, which could affect the specificity of the model. However, the literature's findings on the association between educational attainment and IPV have been inconsistent, and two studies specifically using young adult Add Health data did not find a significant association between respondent education and IPV perpetration (Brown & Bulanda, 2008; Melander, Noel, & Tyler, 2010). Our models nevertheless did control for neighborhood SES, which we suspect is highly correlated with individual SES. We also did not control for the urbanicity of the respondent's home; however, we feel that population density should serve as a proxy for this measure.

Another potential limitation is that outlet density data were gathered at a different time point than were respondent data. Wave III respondent data were collected between 2001 and 2002, whereas alcohol outlet density data were collected between 2006 and 2007. There is potentially a 6 year gap between data collections, which could account for the lack of associations particularly between outlet density and IPV. Gruenewald and Remer (2006) found in their study examining changes in outlet density in California over a six year period, that there was considerable percent change in outlet density over six years; therefore, it is likely some misclassification into either higher or lower categories occurred in our study although the absolute number of outlets was unlikely to change radically given how few outlets there were in general in our sample. Unfortunately, we are relying on secondary data for these analyses and are unable to acquire outlet data from 2001 and 2002. Another limitation is that the outlet data were only sourced for 43 states plus the District of Columbia and were not obtained from seven states. However, only about 8% of the Wave III sample of respondents lacked outlet density data. Furthermore, although we found a significant and positive relationship high alcohol outlet density in relation to physical IPV when on- and off-premise outlets were combined in the multivariate model, we did not find this association to be significant when on-premise and off-premise outlets were examined

separately. It is possible that our examination of outlets by type lacked power to detect associations.

Finally, how IPV is measured can have strong implications for the prevalence found in any population. Our measures were limited in scope compared with some studies reporting a higher prevalence of male perpetration (e.g., Parkhill and Abbey, 2008). Ultimately, the relative rarity of reporting IPV in general and sexual IPV in particular, in our sample may reflect an underreporting of perpetrators in our sample. Yet the time frame for perpetration in this study is only in the past 12 months rather than lifetime prevalence. Compared with estimates using the same time frame from the National Violence Against Women (NVAW) survey (Tjaden & Thoennes, 2000) our estimates are quite large by comparison. About 1% of women in the NVAW sample reported experiencing physical IPV in the past twelve months compared with almost 12% of males reporting having perpetrated physical IPV against their female partner in the previous twelve months. Additionally, 1.5% of women in the NVAW survey sample reported having experienced a rape and/or physical assault in the previous 12 months compared to our nationally representative sample of men, of whom just over 4% reported perpetrating sexual only, or sexual and physical IPV against their female partner. Finally, another limitation related to our measure of IPV is that our physical IPV measure is confounded with psychological aggression due to the way the question was asked at Wave III.

Conclusions

These findings advance the study of IPV and the role of ecological factors in contributing to the likelihood of violence perpetration. Specifically, high outlet density is associated with an increased likelihood that young men will perpetrate physical violence against their female partners even after controlling for the influence of other relevant ecological and demographic factors. Heavy alcohol consumption was also positively associated with perpetration of physical IPV yet did not mediate the relationship between alcohol outlet density and physical IPV perpetration. Furthermore, the other ecological factors frequently found to be associated with violence in general, and thus controlled for in our analyses, were not significantly associated with male perpetration of either type of IPV. This would appear to support the idea that male perpetration of IPV is different from other forms of violence found to be associated with measures of social disorganization. Sexual only or sexual and physical IPV perpetration by males is not associated with alcohol outlet density, nor with male drinking patterns, implying that risk factors for males perpetrating sexual IPV are not the same as for physical IPV.

Clearly the role that alcohol outlet density and alcohol use plays in the perpetration of IPV is more complicated than we are able to examine in this study. Future research should continue to examine couples as a unit to assess how alcohol outlet density, other ecological characteristics, and alcohol consumption patterns of both partners influence the perpetration of IPV. Furthermore, additional research should be conducted among subgroups to continue to clarify the predictive role, if any, of alcohol use in male perpetration of IPV and, in particular, sexual IPV. How associations between alcohol and IPV differ by sex, type of IPV, and whether perpetration or victimization occurred, should be considered as well. The finding that alcohol outlet density is associated with greater odds of physical IPV perpetration should be considered when advising liquor license management and creating public policy and prevention strategies. Limiting the number of establishments selling alcohol in a given area and targeting prevention and/or law enforcement efforts in high alcohol density areas are potential effective interventions.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

References

Alaniz ML, Cartmill RS, Parker RN. Immigrants and violence: The importance of neighborhood context. Hispanic Journal of Behavioral Sciences. 1998; 20:155–174.

Relationships among Alcohol Outlet Density, Alcohol Use, and Intimate Partner Violence Victimization Among Young Women in the U.S. Journal of Interpersonal Violence. 2012; 27(10): 2062–2086. Authors. [PubMed: 22204949]

Black, MC.; Basile, KC.; Breiding, MJ.; Smith, SG.; Walters, ML.; Merrick, MT.; Chen, J.; Stevens, MR. The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. Atlanta, GA: National Center for Injury Prevention and Control, Centers for Disease Control and Prevention; 2011.

Brown SL, Bulanda JR. Relationship violence in young adulthood: A comparison of daters, cohabitors, and marrieds. Social Science Research. 2008; 37(1):73–87.

Caetano R, Ramisetty-Mikler S, Harris TR. Neighborhood characteristics as predictors of male to female and female to male partner violence. Journal of Interpersonal Violence. 2010; 25(11):1989–2009.

Coker AL, Smith PH, McKeown RE, King MJ. Frequency and correlates of initimate partner violence by type: Physical, sexual, and psychological battering. American Journal of Public Health. 2000; 90(4):553–559. [PubMed: 10754969]

Cubbin C, Brindis CD, Jain S, Santelli J, Braveman P. Neighborhood Poverty, Aspirations and Expectations, and Initiation of Sex. Journal of Adolescent Health. 2010; 47(4):399–406. [PubMed: 20864010]

Cubbin C, Santelli J, Brindis CD, Braveman P. Neighborhood Context and Sexual Behaviors Among Adolescents: Findings from the National Longitudinal Study of Adolescent Health. Perspectives on Sexual & Reproductive Health. 2005; 37(3):125–134. [PubMed: 16150660]

Cunradi CB. Drinking level, neighborhood social disorder, and mutual intimate partner violence. Alcoholism: Clinical and Experimental Research. 2007; 31(6):1012–1019.

Cunradi CB. Intimate partner violence among Hispanic men and women: The role of drinking, neighborhood disorder, and acculturation-related factors. Violence and Victims. 2009; 24(1)

Cunradi CB. Neighborhoods, alcohol outlets and intimate partner violence: Addressing research gaps in explanatory mechanisms. International Journal of Environmental Research and Public Health. 2010; 7(3):799–813. [PubMed: 20617004]

Cunradi CB, Caetano R, Clark C, Schafer J. Neighborhood poverty as a predictor of intimate partner violence among White, Black, and Hispanic couples in the United States: a multilevel analysis. Annals Of Epidemiology. 2000; 10(5):297–308. [PubMed: 10942878]

Cunradi CB, Mair C, Ponicki W, Remer L. Alcohol Outlets, Neighborhood Characteristics, and Intimate Partner Violence: Ecological Analysis of a California City. Journal of Urban Health-Bulletin of the New York Academy of Medicine. 2011; 88(2):191–200. [PubMed: 21347557]

Fals-Stewart W, Leonard KE, Birchler GR. The occurrence of male-to-female intimate partner violence on days of men's drinking: the moderating effects of antisocial personality disorder. J Consult Clin Psychol. 2005; 73(2):239–248. [PubMed: 15796631]

Freisthler B, Lery B, Gruenewald PJ, Chow J. Methods and challenges of analyzing spatial data for social work problems: The case of examining child maltreatment geographically. Social Work Research. 2006; 30(4):198–210.

Freisthler B, Midanik LT, Gruenewald PJ. Alcohol outlets and child physical abuse and neglect: applying routine activities theory to the study of child maltreatment. J Stud Alcohol. 2004; 65(5): 586–592. [PubMed: 15536767]

Gorman DM, Labouvie EW, Speer PW, Subaiya AP. Alcohol availability and domestic violence. Am J of Drug Alcohol Abuse. 1998; 24(4):661–673. [PubMed: 9849776]

Gorman DM, Speer PW, Gruenewald PJ, Labouvie EW. Spatial dynamics of alcohol availability, neighborhood structure and violent crime. J Stud Alcohol. 2001; 62(5):628–636. [PubMed: 11702802]

Graham K, Bernards S, Wilsnack SC, Gmel G. Alcohol may not cause partner violence but it seems to make it worse: A cross national comparison of the relationship between alcohol and severity of partner violence. Journal of Interpersonal Violence. 2011; 26(8):1503–1523. [PubMed: 20522883]

Gruenewald PJ, Freisthler B, Remer L, LaScala EA, Treno A. Ecological models of alcohol outlets and violent assaults: crime potentials and geospatial analysis. Addiction. 2006; 101(5):666–677.10.1111/j.1360-0443.2006.01405.x [PubMed: 16669900]

Gruenewald PJ, Remer L. Changes in outlet densitys affect violence rates. Alcoholism: Clinical and Experimental Research. 2006; 30(7):1184–1193.

Gruenewald PJ, Remer L, Lipton R. Evaluating the alcohol environment: community geography and alcohol problems. Alcohol Res Health. 2002; 26(1):42–48. [PubMed: 12154650]

Harris, KM.; Halpern, CT.; Whitsel, E.; Hussey, J.; Tabor, J.; Entzel, P.; Udry, JR. The National Longitudinal Study of Adolescent Health: Research Design. 2009. Retrieved May 7, 2010, from <http://www.cpc.unc.edu/projects/addhealth/design

Kypri K, Bell ML, Hay GC, Baxter J. Alcohol outlet density and university student drinking: a national study. Addiction. 2008; 103(7):1131–1138. [PubMed: 18554346]

Leonard KE, Mudar P. Peer and partner drinking and the transition to marriage: a longitudinal examination of selection and influence processes. Psychol Addict Behav. 2003; 17(2):115–125. [PubMed: 12814275]

Leonard KE, Quigley BM. Drinking and marital aggression in newlyweds: an event-based analysis of drinking and the occurrence of husband marital aggression. J Stud Alcohol. 1999; 60(4):537–545. [PubMed: 10463811]

Lipsky S, Caetano R, Field CA, Larkin GL. Is there a relationship between victim and partner alcohol use during an intimate partner violence event? Findings from an urban emergency department study of abused women. J Stud Alcohol. 2005; 66(3):407–412. [PubMed: 16047531]

Livingston M. The ecology of domestic violence: the role of alcohol outlet density. Geospatial Health. 2010; 5(1):139–149. [PubMed: 21080328]

Livingston M. A longitudinal analysis of alcohol outlet density and domestic violence. Addiction. 2011; 106(5):919–925. [PubMed: 21205052]

Livingston M, Chikritzhs T, Room R. Changing the density of alcohol outlets to reduce alcohol-related problems. Drug and Alcohol Review. 2007; 26:557–566. [PubMed: 17701520]

MacKinnon DP, Scribner R, Taft KA. Development and applications of a city-level alcohol availability and alcohol problems database. Stat Med. 1995; 14(5–7):591–604. [PubMed: 7792450]

Madkour AS, Martin SL, Halpern CT, Schoenbach VJ. Area disadvantage and intimate partner homicide: an ecological analysis of North Carolina counties, 2004–2006. Violence Vict. 2010; 25(3):363–377. [PubMed: 20565007]

Malamuth NM, Sockloskie RJ, Koss MP, Tanaka JS. Characteristics of aggressors against women: Testing a model using a national sample of college students. Journal of Consulting and Clinical Psychology. 1991; 59:670–681. [PubMed: 1955602]

Martin SL, Gibbs DA, Johnson RE, Sullivan K, Clinton-Sherrod M, Walters JLH, Rentz ED. Substance use by soldiers who abuse their spouses. Violence against Women. 2010; 16(11):1295–1310. [PubMed: 21097964]

McKinney CM, Caetano R, Harris TR, Ebama MS. Alcohol availability and intimate partner violence among US couples. Alcoholism, Clinical And Experimental Research. 2009; 33(1):169–176.

McKinney CM, Caetano R, Rodriguez LA, Okoro N. Does alcohol involvement increase the severity of intimate partner violence? Alcoholism-Clinical and Experimental Research. 2010; 34(4):655–658.

Melander LA, Noel H, Tyler KA. Bidiration, unidirectional, and nonviolence: A comparison of the predictors among partnered young adults. Violence and Victims. 2010; 25(5):617–630. [PubMed: 21061868]

Murphy CM, Winters J, O'Farrell TJ, Fals-Stewart W, Murphy M. Alcohol consumption and intimate partner violence by alcoholic men: comparing violent and nonviolent conflicts. Psychol Addict Behav. 2005; 19(1):35–42. [PubMed: 15783276]

Parkhill MR, Abbey A. Does alcohol contribute to the confluence model of sexaul assault perpetration? Journal of Social and Clinical Psychology. 2008; 27(6):529–554.

Roberts AL, McLaughlin KA, Conron KJ, Koenen KC. Adulthood Stressors, History of Childhood Adversity, and Risk of Perpetration of Intimate Partner Violence. American Journal of Preventive Medicine. 2011; 40(2):128–138. [PubMed: 21238860]

Rothman EF, Johnson RM, Young R, Weinberg J, Azrael D, Molnar BE. Neighborhood-Level Factors Associated with Physical Dating Violence Perpetration: Results of a Representative Survey Conducted in Boston, MA. Journal of Urban Health-Bulletin of the New York Academy of Medicine. 2011; 88(2):201–213. [PubMed: 21331747]

Scribner RA, MacKinnon DP, Dwyer JH. The risk of assaultive violence and alcohol availability in Los Angeles County. Am J Public Health. 1995; 85(3):335–340. [PubMed: 7892915]

Slep AMS, Foran HM, Heyman RE, Snarr JD. Unique Risk and Protective Factors for Partner Aggression in a Large Scale Air Force Survey. Journal of Community Health. 2010; 35(4):375–383. [PubMed: 20373136]

Stappenbeck CA, Fromme K. A longitudinal investigation of heavy drinking and physical dating violence in men and women. Addictive Behaviors. 2010; 35:479–485. [PubMed: 20079971]

Stockwell, T.; Gruenewald, PJ. Controls on the physical availability of alcohol. In: Heather, N.; Stockwell, T., editors. The essential handbook of treatment and prevention of alcohol problems. Chichester: Wiley and Sons; 2004. p. 213-233.

Swisher, RR. Wave III Contextual Database Codebook, Part 1. University of North Carolina; Chapel Hill: Carolina Population Center; 2008.

Thompson MP, Kingree JB. The roles of victim and perpetrator alcohol use in intimate partner violence outcomes. J Interpers Violence. 2006; 21(2):163–177. [PubMed: 16368759]

Tjaden, P.; Thoennes, N. Extent, nature, and consequences of intimate partner violence: Findings from the National Violence Against Women Survey. (NCJ181867). Washington, DC: 2000.

Treno AJ, Gruenewald PJ, Johnson FW. Alcohol availability and injury: the role of local outlet densities. Alcohol Clin Exp Res. 2001; 25(10):1467–1471. [PubMed: 11696666]

Walton-Moss BJ, Manganello J, Frye V, Campbell JC. Risk factors for intimate partner violence and associated injury among urban women. J Community Health. 2005; 30(5):377–389. [PubMed: 16175959]

Weitzman ER, Folkman A, Folkman MP, Wechsler H. The relationship of alcohol outlet density to heavy and frequent drinking and drinking-related problems among college students at eight universities. Health Place. 2003; 9(1):1–6. [PubMed: 12609468]

Yonas M, Akers AY, Burke JG, Chang JC, Thomas AL, O'Campo P. Perceptions of Prominent Neighborhood Individuals Regarding Neighborhood Factors and Intimate Partner Violence. Journal of Urban Health-Bulletin of the New York Academy of Medicine. 2011; 88(2):214–224. [PubMed: 21327974]

Table 1

Alcohol use categories.

Category	Description
1. Lifetime Abstainers or Ex-Drinkers	Lifetime Abstainers were respondents who reported never drinking alcohol during adolescence, never drinking alcohol as an adult, and not drinking in the past 12 months. Ex-Drinkers were respondents who at Wave I and/or Wave III indicated they drank alcohol but had not drunk any alcohol in the past 12 months.
2. Light Drinkers	Reported drinking in the past 12 months but having only 1 or 2 drinks at a time and not having been drunk in the past year nor engaging in heavy episodic drinking in the past two weeks.
3. Moderate Drinkers	Reported drinking in the past 12 months (typically drinking 3 or more drinks at a time), but not having been drunk in the past year nor engaging in heavy episodic drinking in the past two weeks.
4. Infrequent Heavy Drinkers	Reported drinking infrequently (3 to 12 times) over the past 12 months but reported being drunk in the past year and/or heavy episodic drinking in the past two weeks.
5. Occasional Heavy Drinkers	Reported drinking more frequently (2 or 3 days a month up to 1 to 2 days a week) over the past 12 months and having been drunk in the past year and/or heavy episodic drinking in the past two weeks.
6. Frequent Heavy Drinkers	Reported drinking frequently (3–7 days a week on average) over the past 12 months and having been drunk in the past year and/or heavy episodic drinking in the past two weeks.

Table 2

Characteristics of analysis sample of young men in the National Longitudinal Study of Adolescent Health, 2001–2002 (*N*=3,194).

Characteristic	Weighted % or Mean (standard error)
Intimate Partner Violence Perpetration	
No IPV	84.2
Physical IPV only	11.6
Sexual IPV only or physical and sexual IPV	4.2
Alcohol use	
Lifetime abstainer or ex-drinker	22.6
Light drinker	8.1
Moderate drinker	6.1
Infrequent heavy drinker	14.0
Occasional heavy drinker	35.2
Frequent heavy drinker	14.0
Total alcohol outlet density in neighborhood (outlets per square kilometer)	
Less than 1 outlet	55.3
1–8 outlets	35.7
More than 8 outlets	9.1
Age in years	
18–20	24.4
21	16.6
22	16.1
23	16.1
24–27	26.8
Race/ethnicity	
Hispanic	12.6
White	68.6
Black	14.6
Asian	3.0
American Indian	1.2
Marital status	
Never married or lived with this partner	46.3
Ever lived with this partner but never married to him or her	31.6
Ever married to this partner	22.2
Neglected as a child (percent yes)	45.1
Sexually abused as a child (percent yes)	4.5
Physically abused as a child (percent yes)	29.3
Neighborhood characteristics control variables	
Proportion of population in poverty, standardized [mean (SE)]	−0.53 (0.90)

Characteristic	Weighted % or Mean (standard error)
Transience index, standardized [mean (SE)]	−0.14 (1.09)
Proportion population foreign-born [mean (SE)]	0.10 (0.01)
Proportion housing units vacant [mean (SE)]	0.08 (0.00)
Persons per square kilometer/1000 [mean (SE)]	1.81 (0.24)

Notes: Based on the sample of young adult men at Wave III in the national probability sample with at least one reported current relationship, with nonmissing data on the present study's intimate partner violence victimization and alcohol use variables, and whose index relationship was not a same-sex relationship.

SE = linearized standard error.

Table 3

Odds ratios from multinomial logistic regression models of intimate partner violence perpetration among young men in the National Longitudinal Study of Adolescent Health, 2001–2002.

Predictor Variable	Model 1: Outlet density, alcohol use		Model 2: Outlet density, alcohol use, individual-level control variables		Model 3: Outlet density, alcohol use, individual- and community-level control variables	
	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)
Total alcohol outlet density (ref=low)						
Medium	0.99 (0.69–1.41)	0.93 (0.59–1.46)	1.06 (0.71–1.57)	0.90 (0.56–1.44)	1.20 (0.78–1.85)	0.93 (0.57–1.52)
High	1.49 (0.87–2.53)	0.70 (0.29–1.71)	1.86 (1.05–3.27) *	0.73 (0.27–1.94)	2.51 (1.21–5.20) *	0.57 (0.17–1.88)
Alcohol use (*ref*=abstainer)						
Light drinking	1.15 (0.56–2.33)	0.85 (0.37–1.95)	1.36 (0.59–.09)	0.88 (0.38–2.04)	1.39 (0.61–3.18)	0.83 (0.37–1.89)
Moderate drinking	1.65 (0.82–3.30)	0.63 (0.24–1.65)	1.98 (0.85–4.62)	0.48 (0.17–1.37)	2.01 (0.86–4.67)	0.47 (0.16–1.33)
Infrequent heavy drinking	1.84 (1.04–3.27) *	0.92 (0.40–2.14)	2.22 (1.17–4.23) *	0.70 (0.32–1.53)	2.26 (1.19–4.30) *	0.62 (0.28–1.35)
Occasional heavy drinking	1.56 (0.97–2.51)	0.51 (0.26–1.02)	2.74 (1.61–4.65) ***	0.62 (0.30–1.32)	2.83 (1.66–4.82) ***	0.59 (0.28–1.23)
Frequent heavy drinking	2.59 (1.46–4.59) **	1.18 (0.58–2.41)	4.37 (2.38–8.04) ***	1.54 (0.71–3.34)	4.46 (2.44–8.14) ***	1.52 (0.70–3.27)
Age in years			0.92 (0.84–1.01)	1.03 (0.89–1.20)	0.93 (0.85–1.01)	1.02 (0.88–1.19)
Race/ethnicity (*ref*=NH white)						
Hispanic			1.45 (0.90–2.34)	1.30 (0.68–2.51)	1.56 (0.93–2.65)	1.06 (0.52–2.16)
Non-Hispanic black			2.53 (1.62–3.95) ***	1.47 (0.79–2.74)	2.46 (1.55–3.89) ***	1.82 (0.97–3.41)
Non-Hispanic Asian			0.68 (0.27–1.69)	2.39 (0.94–6.07)	0.74 (0.28–1.94)	1.66 (0.59–4.65)
Non-Hispanic Native American			10.63 (4.29–26.35) ***	2.51 (0.61–10.30)	10.11 (4.19–24.38) ***	2.79 (0.65–11.91)
Marital status (*ref*=never married to partner)						
Cohabited with partner			2.84 (1.97–4.10) ***	1.81 (0.94–3.49)	2.84 (1.98–4.09) ***	1.93 (1.00–3.71) *
Ever married to partner			3.85 (2.46–6.02) ***	2.35 (1.20–4.63) *	3.83 (2.44–6.02) ***	2.40 (1.24–4.67) *
Neglect as child (yes vs. no)			1.18 (0.86–1.62)	1.44 (0.86–2.42)	1.17 (0.85–1.61)	1.42 (0.84–2.40)
Sexual abuse as child (yes vs. no)			1.32 (0.54–3.22)	1.78 (0.67–4.76)	1.31 (0.54–3.20)	1.88 (0.71–5.01)
Physical abuse as child (yes vs. no)			1.39 (0.95–2.02)	1.38 (0.78–2.43)	1.40 (0.96–2.04)	1.35 (0.76–2.41)

Predictor Variable	Model 1: Outlet density, alcohol use		Model 2: Outlet density, alcohol use, individual-level control variables		Model 3: Outlet density, alcohol use, individual- and community-level control variables	
	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)	Physical IPV only vs. no IPV (95% CI)	Sexual only or physical & sexual IPV vs. no IPV (95% CI)
Neighborhood poverty					1.00 (0.99–1.01)	0.99 (0.97–1.00)
Neighborhood transience					0.99 (0.99–1.00)	1.00 (0.99–1.01)
Neighborhood foreign-born					0.74 (0.16–3.48)	5.84 (0.71–48.13)
Neighborhood vacant housing					1.02 (0.06–18.67)	2.90 (0.20–42.07)
Population density					0.98 (0.94–1.03)	1.02 (0.96–1.08)

Notes: CI=confidence interval; *NH*=non-Hispanic.

* $p<.05$.;

** $p<.01$.;

*** $p<.001$.