Published in final edited form as:

Addiction. 2010 February ; 105(2): 270–278. doi:10.1111/j.1360-0443.2009.02772.x.

Community Alcohol Outlet Density and Underage Drinking

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Abstract

Aim—This study examined how community alcohol outlet density may be associated with drinking among youths.

Methods—Longitudinal data were collected from 1091 adolescents (aged 14–16 at baseline) recruited from 50 zip codes in California with varying levels of alcohol outlet density and median household income. Hierarchical linear models were used to examine the associations between zip code alcohol outlet density and frequency rates of general alcohol use and excessive drinking, taking into account zip code median household income and individual-level variables (age, gender, race/ethnicity, personal income, mobility, and perceived drinking by parents and peers).

Findings—When all other factors were controlled, higher initial levels of drinking and excessive drinking were observed among youths residing in zip codes with higher alcohol outlet densities. Growth in drinking and excessive drinking was on average more rapid in zip codes with lower alcohol outlet densities. The relation of zip code alcohol outlet density with drinking appeared to be mitigated by having friends with access to a car.

Conclusion—Alcohol outlet density may play a significant role in initiation of underage drinking during early teen ages, especially when youths have limited mobility. Youth who reside in areas with low alcohol outlet density may overcome geographic constraints through social networks that increase their mobility and the ability to seek alcohol and drinking opportunities beyond the local community.

Keywords

Community alcohol outlet density; underage drinking; excessive drinking

INTRODUCTION

Restricting youth access to alcohol is a widely advocated strategy to reduce underage drinking and related problems [1,2]. The underlying rationale of this approach is that reducing access increases personal or economic costs for youths to obtain alcohol [3,4]. Implementing and enforcing policies restricting youth alcohol access may also reinforce community norms against underage drinking and against providing alcohol to minors [1]. Many community-based intervention activities focus on reducing youth access to alcohol through responsible beverage service training and enforcement of underage sales laws. Such activities have reduced alcohol sales to youths [5–7]. Another commonly advocated community approach is to restrict the number or density of alcohol outlets. It is unclear, however, whether the number of outlets in a neighborhood matters for youth drinking. This paper addresses this question.

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Declarations of Interest

None.

An association between geographic alcohol availability and alcohol consumption has been documented in the literature. For example, analyzing aggregate data collected from 144 zip codes in California and South Carolina, Gruenewald et al. [8] reported a marginal positive association between alcohol availability (indicated by outlet counts per kilometer of roadway) and adult alcohol consumption. This association was, however, no longer significant when zip code income and socio-demographics were taken into account. In addition, using a multilevel analytic approach and data collected from 2607 residents of New Orleans, Scribner et al. [9] reported that individual alcohol use and drinking norms were not related to individual's exposure to alcohol outlets (i.e., distance to the closest outlet from respondent's residence), but to the aggregated mean exposure to alcohol outlets at the census tract level. That is, residents residing in the census tracts with shorter mean distance to closest alcohol outlet, on average, had more positive drinking norms and consumed greater quantity of alcohol. Positive associations between alcohol availability and drinking practices are also reported in studies focusing on young people. Based on aggregate data collected from eight US college campuses, Weitzman et al. [10] reported positive correlations between alcohol outlet counts within 2-mile radius of college campuses and heavy drinking, frequent drinking, and drinking-related problems among students. Integrating contextual variables into analytic models that consisted of individual-level outcomes and covariates, Truong and Strum [11] found that for youths aged 12–17 in California, likelihoods of binge drinking and driving after drinking were significantly and positively related to counts of alcohol retailers within 0.5-mile radius of home. Consistently, a multilevel analysis of data collected from youths aged 12–17 in Auckland, New Zealand reported that alcohol outlet density (defined by alcohol outlet count within 10-minute drive from the central point of each census block) was positively related to typical-occasion quantity of drinking [12]. The associations of alcohol outlet density with frequency of drinking and drunkenness were not significant. Authors of this study also noted that alcohol outlet density and measure of neighborhood deprivation were highly correlated and replacing alcohol outlet density with neighborhood deprivation in the analyses yielded similar results. Although the size of geographic area, definition of alcohol availability or alcohol outlet density, covariates, and analytic approaches differ among these studies, positive associations of alcohol outlets with alcohol consumption have generally been found, suggesting neighborhood alcohol outlet density may influence youth alcohol use.

Adding to this literature, the present study used a multilevel analytic approach to examine how community alcohol outlet density may be related to drinking practices among youth using longitudinal data collected from a panel of adolescents (aged 14–16 at baseline) recruited from 50 zip codes in California with varying levels of alcohol outlet density and median household income. Three specific hypotheses were examined:

1. greater zip code alcohol outlet densities are associated with higher levels of drinking among youths at the beginning of the study;
2. greater zip code alcohol outlet densities are associated with higher levels of excessive alcohol use among youths at the beginning of the study; and
3. growth of drinking and excessive drinking is more rapid among youths residing in areas with greater alcohol outlet densities.

METHODS

Procedure

Data were collected through three computer-assisted telephone interviews (CATI) in English or Spanish conducted at approximately 1-year intervals from November 2003 through March 2006. The sampling plan included all Californian zip codes that had at least 200 youths of ages 14–16 ($N = 1076$) according to the 2000 Census [13]. Off-premise license data for the year

2000 were acquired from the California Department of Alcoholic Beverage Control. Alcohol outlet density was calculated as the count of active off-premise outlets per roadway mile within each zip code. We focused on off-premise outlets because few youths of this age group drink at bars, pubs, or restaurants [14,15]. Zip codes were stratified into “low,” “medium” and “high” outlet density groups, and “low,” “medium” and “high” income groups using the median household income data from the 2000 Census [16]. This resulted in a 3×3 matrix, representing areas that varied orthogonally across alcohol outlet density and household income. The central and diagonal cells (i.e., high density-high income, high density-low income, medium density-medium income, low density-high income, and low density-low income) were then selected. Ten zip codes were randomly selected from each cell and each selected zip code was separated by at least two unselected zip codes. About 300 interviews in each zip code group (~30 interviews per zip code) were completed.

Listed household telephone numbers within the selected zip codes were sampled from a commercially purchased list. When a residential household was contacted, a brief screening was conducted to determine eligibility (e.g., presence of a youth aged 14–16). When more than one qualified youth existed in a household, one was randomly selected. If this youth refused, the next eligible one was invited to participate. About 85% of the purchased telephone numbers were usable; of which 66% were ineligible (e.g., no eligible youth, language barrier, quota met) and 23% eligibility unknown. The cooperation rate among contacted households was 56%. Of the eligible households, 43% completed the interview ($N = 1541$). At Waves 2 and 3, 1300 (84%) and 1123 (73% of the baseline), respectively, completed the follow-up interviews.

Individual-level variables

Outcome variables—At each wave of survey, respondents who reported drinking in the past 12 months were asked about frequency of drinking (i.e., number of days they had at least a whole drink of alcohol) and frequency of excessive drinking (i.e., number of days they got drunk).

Time-varying covariates

Peer drinking: At each wave, respondents named up to five friends that they met regularly. For each friend, we asked about frequency of meeting with this person in a typical month, on a 7-point scale (0–6: not at all – everyday), and frequency of drinking by this person in the past 12 months (0–9: not at all – every day). Frequency of drinking by each friend was multiplied by frequency of meeting with this person and then a mean score was taken over multiple friends.

Personal income: Personal income was indicated by the amount of money that respondents received or earned in a typical week (0–7: \$0 – more than \$125), excluding money given to them for necessities (e.g., bus fare, lunch money).

Mobility: Mobility was measured by asking the respondents to indicate if they had a car and if any of their three closest friends had a car. These items were coded as two dummy variables representing having a car or access to friends with a car.

Time-invariant correlates

Parent drinking: Respondents were asked number of days in the past 12 months they thought that each of their parents (or guardians) had at least one whole drink of alcohol (0–9: not at all – every day). A mean score was taken over two parents. For those having only one parent, parent drinking was indicated by that parent’s drinking. Those who reported no parents/guardians were given a score of 0. Preliminary analyses indicated that perception of parent drinking was relatively stable over time ($r = .71-.78$). We thus treated parent drinking as a time-invariant factor and calculated a mean over three annual surveys for each respondent.

Background variables: Gender, age, and race/ethnicity were included in the analyses as stable personal factors that may affect youth alcohol use. Gender was indicated by a dummy variable (male = 1). We created two dummy variables to represent Latino ethnicity and non-white races (non-Hispanic white was the reference group).

Community-level variables

Community alcohol outlet density was indicated by off-premise outlet counts per 1000 roadway miles at zip code level. Community income was indicated by zip code median household income. For data analysis purpose, income was rescaled by rounding to thousands of dollars. Consistent with our previous experience showing that increases or decreases of alcohol outlets within zip codes are minimal in a short period of time [8], very little change in zip code off-premise outlet density was observed from year 2000 through 2006. In addition, although 34 respondents during Waves 1–2 and 95 during Waves 2–3 moved to different zip codes within California, preliminary analyses indicated that they tended to move to areas with similar alcohol outlet densities except for three zip codes representing college campuses. Thus, environmental changes over time or due to within-state migration were negligible.

Studies of alcohol outlet densities and related problems have been pursued at city, zip code, census tract, block group and block levels. The findings are generally consistent across these units. The problems considered have mostly been those that occur among mobile adult populations (e.g., violence, alcohol related crashes). Due to restricted access to transportation, problems among underage youth may have a different geographic scale (smaller). The zip codes used in the current study had median areas of 17.3 square miles with a diameter of 4.2 miles. These areas seemed large with respect to the likely mobility of most 14–16 year olds. Alcohol outlet density within a shorter distance of respondents' homes may be a more reasonable measure. We geo-coded respondent's home address and obtained the off-premise outlet count within a 2-mile radius of the respondent's residence. Correlation between this 2-mile measure and the zip code measure was high ($r = .85$). We further replaced the zip code alcohol outlet density with this 2-mile measure in two-level analyses and obtained the same results as those presented in this paper. Thus, to this current study, the off-premise outlet count per 1,000 roadway miles at the zip code level appears to be an adequate and efficient indicator of the physical availability of alcohol in youth's living environment.

Data analysis

Cases were excluded from the analyses if they dropped out of study ($N = 418$) or moved out of California ($N = 32$). The study sample thus consisted of 1091 cases: 53% male; 33% Latino, 51% non-Hispanic white, 16% other (including 5% Asian, 5% Black, and 6% other races). Mean age at baseline was 14.9 years ($SD = .81$). Logistic regression analysis showed that those who were not included tended to be Latino ($OR [95\% CI] = 1.84 [1.44–2.36]$, $p < .001$) or other races ($OR [95\% CI] = 1.79 [1.31–2.44]$, $p < .001$), and aged 16 at baseline ($OR [95\% CI] = 1.62 [1.22–2.14]$, $p < .001$). Gender and drinker status at baseline did not differ significantly between those retained and not retained in the study.

The main data analyses used a 3-level linear growth model implemented with HLM 6 [17]. The data were three annual repeated observations for 1091 individuals who were nested within 50 zip codes. Frequency rates of drinking and excessive drinking were treated as count data with an over-dispersed Poisson distribution. Results from the unconditional models (i.e., no predictors were introduced) were first obtained for an overview of the initial levels and growth rates of the outcome variables. Data analyses for further conditional models were conducted in two steps. Step 1 (Model A) examined the associations between zip code variables and outcome measures without controlling for any individual-level factors and Step 2 (Model B)

examined the same associations taking into account individual-level factors. Equation 1 is the simplified model at level 1.

$$Y_{ti} = \pi_{0i} + \pi_{1i}T_t + \pi_{2i}A_{ti} + e_{ti} \quad [1]$$

where Y_{ti} , the observed outcome measure at time t for person i ; π_{0i} is a person-specific intercept; π_{1i} , is a person-specific linear growth rate over the study period (where time variable T_t takes the values 0, 1, or 2); π_{2i} is the effect of time-varying covariate A_{ti} , and e_{ti} is an error term. In the present case, time-varying covariates included perceived peer drinking, personal income, respondent having a car and friends having a car. Change in a time-varying covariate is assumed to be associated with change in an outcome measure. To appropriately estimate the level-1 association of the outcome variable with a time-varying covariate, each time-varying covariate was centered around the individual mean and the individual mean was then added in the level-2 model as a predictor for the intercept.

Equations 2 and 3 are the simplified models at level 2.

$$\pi_{0i} = \beta_{00} + \beta_{01}X_i + \beta_{02}\bar{A}_i + r_{0i} \quad [2]$$

$$\pi_{1i} = \beta_{10} + \beta_{11}X_i + r_{1i} \quad [3]$$

Level-2 models assessed the between-person variations in intercepts and growth rates. β_{00} is the mean intercept and β_{10} is the mean growth rate estimated at level 2. β_{01} (or β_{11}) is the fixed effect of an individual-level explanatory variable, X_i (i.e., age, gender, perceived parent drinking). β_{02} is the fixed effect of the mean score of a time-varying covariate, $\bar{A}_i$. r_{0i} and r_{1i} are the random effects (i.e., error terms) at level 2. Level-3 models examined the between-zip code variations in intercepts and growth rates estimated at level-2 (Equations 4 and 5). Explanatory variables at zip code level (Z_i) included alcohol outlet density and median household income. u_{0i} and u_{1i} are the random effects at level 3.

$$\beta_{00} = \gamma_{000} + \gamma_{001}Z_i + u_{0i} \quad [4]$$

$$\beta_{10} = \gamma_{100} + \gamma_{101}Z_i + u_{1i} \quad [5]$$

Lastly, as it is commonly indicated in the literature that alcohol outlets tend to concentrate in neighborhoods with low income and/or large minority populations [8,9,11], additional analyses were conducted to examine the possible confounding between race/ethnicity and zip code alcohol outlet density and income.

Some cases ($N = 103$, 9%) had missing data on the variables of interest, but a great majority had missing data on only one variable and the rest had missing data on, at most, four variables. Missing data were replaced using the expectation-maximization imputation procedure implemented in SPSS 15.0 [18].

RESULTS

Prevalence rates of past-12-month drinking were 31%, 45%, and 55% at Waves 1, 2, and 3, respectively. In addition, 19%, 27%, and 36% at Waves 1, 2, and 3, respectively, reported ever being drunk during the same time period. Table 1 presents the results from the unconditional models. The mean growth rate of frequency of drinking was significantly different from zero, whereas the mean initial level was not. Nevertheless, there was a large between-person variation in the mean initial level of frequency of drinking. The mean initial level and mean growth rate of frequency of excessive drinking were both significantly different from zero.

Frequency of drinking

As it is shown in Table 2, alcohol outlet density was not significantly related to either initial level or growth of frequency of drinking in Model A. After controlling for individual factors and zip code median household income (Model B), however, the initial level of frequency of drinking was significantly and positively related to alcohol outlet density, and growth of frequency of drinking was significantly and negatively related to alcohol outlet density.

Results from the within-person model indicated that respondents' frequency of drinking increased as perceived peer drinking increased. Results from the between-person models indicated that individual differences in the initial level of frequency of drinking were positively related to age, perceived parent drinking, perceived peer drinking, personal income, and having friends with a car. Growth rates of frequency of drinking were greater among males.

Note that the associations between alcohol outlet density and the initial level or growth in frequency of drinking were not significant in Model A. These associations became significant when perceived parent drinking, perceived peer drinking, personal income, and having friends with a car were added to the model. Further investigation indicated that "friends had a car" was the key variable in this regard. "Friends had a car" was negatively related to alcohol outlet density ($r = -.16, p < .001$). Because having friends with a car suggests increased mobility and access to drinking opportunities, we further examined how respondent's drinking was related to another mobility variable, respondent having a car him/herself. The zero-order correlations showed that alcohol outlet density was also negatively related to respondent's having a car ($r = -.23$) and respondent's having a car and having friends with a car were correlated by .34. The associations of frequency of drinking with respondent's having a car increased over time, whereas those with having friends with a car decreased over time. On average, the association of drinking with having friends with a car was greater than that with having a car oneself (.19 vs. .11). This pattern suggests that having friends with a car may play an especially significant role in underage drinking during early teen ages when youths have relatively limited mobility.

Frequency of excessive drinking

Results from Model A for excessive drinking showed that initial level of frequency of excessive drinking was not significantly related to alcohol outlet density, but growth of frequency of excessive drinking was negatively related to alcohol outlet density. When individual-level factors were considered (Model B), initial level of frequency of excessive drinking was positively related to alcohol outlet density and growth of frequency of drinking was negatively related to alcohol outlet density.

Results from the within-person model indicated that frequency of excessive drinking increased as perceived peer drinking increased. Results from the between-person models indicated that individual differences in the initial level of frequency of excessive drinking were positively related to age, perceived parent drinking, perceived peer drinking, personal income, and having friends with a car; growth rates were greater among males.

Further investigation indicated that when either having friends with a car, or perceived peer drinking, or personal income was added to the model the association between alcohol outlet density and initial level of frequency of excessive drinking became significant. As alcohol outlet density was not significantly related to either perceived peer drinking or personal income, having friends with a car was, again, was the key factor that led to the significant association between alcohol outlet density and excessive drinking.

Examining the effects of race/ethnicity

The mean (SD) of zip code alcohol outlet density for each racial/ethnic subgroups was 195.74 (254.64) per 1000 roadway miles for non-Hispanic white, 302.46 (240.92) for Latino, and 250.87 (220.57) for other races. Variables for race/ethnicity were added to each Model B as predictors of between-person differences in the initial level of outcome variable. As shown in Table 3, being “other” (i.e., neither non-Hispanic white nor Latino) was not significant in either model. In contrast, Latino ethnicity was associated with greater initial level of frequency of drinking. With “Latino” in the model, the association between frequency of drinking and alcohol outlet density became non-significant, as did the association between frequency of drinking and median household income. Given that Latino youths tended to reside in zip codes with greater alcohol outlet densities than did non-Latino youths, it is likely that the significant associations between zip code variables and frequency of drinking reflected the high drinking rates in Latino youths as well as the characteristics of the zip codes where Latinos tended to live. Latinos, however, engaged in excessive drinking no more frequently than non-Latino youths did.

DISCUSSION

This study examined how community alcohol outlet density may be associated with general alcohol use and excessive drinking among youths. Results from the multilevel analyses showed that only controlling for zip code median household income, zip code alcohol outlet density was not significantly related to the outcome variables. When individual-level factors were controlled, zip code alcohol outlet density was significantly and positively related to initial levels of frequency of drinking and frequency of excessive drinking. These findings supported our Hypotheses 1 and 2, indicating that at the beginning of the study and when all other factors were held equal, greater levels of drinking and excessive drinking were observed among youths residing in zip codes with higher alcohol outlet densities. The associations between alcohol outlet density and growth rates of drinking measures were all in the negative direction (some associations were significant), indicating that growth in drinking and excessive drinking was on average more rapid in zip codes with lower alcohol outlet densities. Our Hypothesis 3 thus was not supported by the data. The negative association between alcohol outlet density and growth in the outcome measures may have occurred because alcohol outlet density affected age of initiation. That is, youths in higher density areas in our study had higher initial levels of drinking, thus had slower growth over time. Future studies should examine how alcohol outlet density at the neighborhood level may be related to the initiation of drinking and drinking trajectories among younger adolescents and children.

The constraint of neighborhood alcohol availability on youth drinking in low alcohol outlet density areas appeared to be mitigated by having friends with a car. Presumably, having friends with a car increases mobility and thus the ability to seek alcohol beyond one’s immediate neighborhood. High mobility and the ability to seek alcohol beyond the local community may mitigate the success of neighborhood efforts to reduce underage drinking through restrictions on physical availability. That is, neighborhood alcohol outlet density may matter more for underage drinking when a youth’s mobility is constrained or when alcohol can be obtained easily through social networks. This pattern is consistent with studies showing that social

sources (e.g., peers, parents, or even strangers) are the primary suppliers of alcohol for youth [14,15,19,20].

The associations among zip code variables, race/ethnicity, and drinking practices were examined. Both Latino and African American youths in this study were over-represented in zip codes with lower household incomes and higher alcohol outlet densities. The sample size of African Americans was too small to be analyzed, but findings for Latinos are noteworthy. Latino youths drank alcohol more frequently. They also tended to live in zip codes with higher alcohol outlet densities and lower median household income. The effect of Latino ethnicity may confound with the effects of zip code alcohol outlet density and median household income. Our findings may simply reflect Latinos' drinking and Latinos' concentration in zip codes with high alcohol outlet density and low household income. Further investigation of this issue is warranted.

Findings from this study should be considered in light of several limitations. The first limitation relates to telephone survey's low response rate, which may lead to bias. Although our survey response rate is somewhat low, it approximates the response rate of national surveys such as the Behavioral Risk Factor Surveillance Survey [21]. Secondly, using listed telephone numbers excludes unlisted numbers. Telephone survey methods, more generally, exclude households without telephone service. We were unable to address biases associated with non-responders, i.e., households which might have met our criteria but were never reached. Thirdly, the study sample may not be representative of youths in California, as it under-represented African and Asian Americans. Rates of drinking among participants of this study were, however, comparable with the National Survey on Drug Use and Health (NSDUH) data. At baseline, 10%, 20% and 28% of our 14-to-16 year olds reported past-30-day drinking compared to 13%, 21%, and 29% in the 2003 NSDUH [22]. Two years later, 24%, 40% and 49% of our 16-to-18 year olds reported such behavior compared to 27%, 32% and 46% in the 2006 NSDUH [23]. Moreover, we used a geostatistically-based sampling design to recruit adolescent participants from areas with varying levels of alcohol outlet density and household income, which provides a large variation in the neighborhood variables of interest. Furthermore, using longitudinal data, our study provides insights into how community characteristics and individual factors together shape drinking practices among youths.

Acknowledgments

The research work was supported by the National Institute of Alcohol Abuse and Alcoholism, grant # P60-AA006282-25. The content of this article is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute on Alcohol Abuse and Alcoholism or the National Institutes of Health.

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Table 1

Linear model of growth in drinking and excessive drinking (unconditional model)

<i>Frequency of Drinking</i>				
Fixed Effect	Coefficient	S.E.	t-ratio	
Mean initial status	-0.0714	0.0916	-0.779	
Mean growth rate	0.6432	0.0394	16.312	
Random Effect	Variance Component	d.f.	χ^2	<i>p</i> value
Within-person error	3.4187			
Between-person variation				
Initial level	4.3147	1041	33964.688	0.000
Growth rate	0.5821	1041	2785.916	0.000
Between-zip code variation				
Initial level	0.0824	49	59.127	0.152
Growth rate	0.0067	49	51.382	0.380
<i>Frequency of Excessive Drinking</i>				
Fixed Effect	Coefficient	S.E.	t-ratio	
Mean initial status	-1.9403	0.1277	-15.189	
Mean growth rate	0.7952	0.0554	14.329	
Random Effect	Variance Component	d.f.	χ^2	<i>p</i> value
Within-person error	1.0837			
Between-person variation				
Initial level	5.8460	1041	52599.656	0.000
Growth rate	0.9489	1041	3095.137	0.000
Between-zip code variation				
Initial level	0.2442	49	73.331	0.014
Growth rate	0.0245	49	58.535	0.165

Table 2

The estimated fixed effects from the conditional models

	Frequency of Drinking				Frequency of Excessive Drinking			
	Model A		Model B		Model A		Model B	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Mean initial level	-0.0600	0.497	-0.0237	0.827	-1.9349	0.000	-2.1054	0.000
Mean growth rate	0.6312	0.000	0.3450	0.000	0.7809	0.000	0.4896	0.000
<i>Within-person change</i>								
Perceived peer drinking			0.0355	0.000			0.0201	0.017
Personal income			-0.0024	0.944			0.0186	0.654
Had a car			0.0169	0.909			-0.1250	0.612
Friends had a car			0.3377	0.103			0.3189	0.267
<i>Between-person variation</i>								
Model for initial level								
Age			0.2344	0.017			0.3233	0.016
Male			-0.0939	0.494			-0.1392	0.417
Perceived parent drinking			0.0955	0.000			0.0639	0.014
Mean-perceived peer drinking			0.1445	0.000			0.1766	0.000
Mean-personal income			0.0906	0.007			0.1299	0.002
Mean-had a car			-0.0983	0.569			-0.1361	0.505
Mean-friends had a car			0.6796	0.001			0.9768	0.000
Model for growth rate								
Age			-0.0226	0.663			-0.1231	0.057
Male			0.1966	0.007			0.3550	0.002
<i>Between-zip code variation</i>								
Model for initial level								
Alcohol outlet density	0.0002	0.577	0.0003	0.045	0.0007	0.087	0.0009	0.000
Median household income	-0.0076	0.075	-0.0073	0.011	-0.0017	0.777	0.0008	0.848
Model for growth rate								
Alcohol outlet density	-0.0002	0.083	-0.0002	0.028	-0.0004	0.008	-0.0004	0.008

	Frequency of Drinking				Frequency of Excessive Drinking			
	Model A		Model B		Model A		Model B	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Median household income	0.0057	0.000	0.0042	0.001	0.0060	0.006	0.0053	0.012

Table 3

The estimated fixed effects from the models examining the effects of race/ethnicity

	Frequency of Drinking		Frequency of Excessive Drinking	
	Coefficient	p-value	Coefficient	p-value
Mean initial level	-0.1357	0.267	-2.1321	0.000
Mean growth rate	0.3435	0.000	0.4893	0.000
<i>Within-person change</i>				
Perceived peer drinking	0.0355	0.000	0.0202	0.017
Personal income	-0.0025	0.941	0.0186	0.654
Had a car	0.0184	0.901	-0.1250	0.611
Friends had a car	0.3385	0.103	0.3190	0.266
<i>Between-person variation</i>				
Model for initial level				
Age	0.2379	0.018	0.3225	0.015
Male	-0.0802	0.556	-0.1383	0.421
Latino [‡]	0.3043	0.005	0.0446	0.771
Other races [‡]	-0.0013	0.993	0.0621	0.759
Perceived parent drinking	0.0981	0.000	0.0656	0.012
Mean-perceived peer drinking	0.1446	0.000	0.1768	0.000
Mean-personal income	0.0927	0.005	0.1299	0.002
Mean-had a car	-0.0410	0.824	-0.1248	0.564
Mean-friends had a car	0.6640	0.001	0.9811	0.000
Model for growth rate				
Age	-0.0234	0.655	-0.1229	0.057
Male	0.1971	0.007	0.3552	0.002
<i>Between-zip code variation</i>				
Model for initial level				
Alcohol outlet density	0.0003	0.062	0.0009	0.000
Median household income	-0.0047	0.108	0.0011	0.778
Model for growth rate				
Alcohol outlet density	-0.0002	0.028	-0.0004	0.008

Frequency of Excessive Drinking			
Frequency of Drinking			
	Coefficient	p-value	
Median household income	0.0042	0.001	0.012

[†] Caucasian youth were the comparison group.