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Alcohol outlet density and related use in an urban Black population in Philadelphia public housing communities

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Abstract

Adolescent alcohol use behaviors are influenced by familial patterns and neighborhood factors. This work explored the influence of individual, family, and environment on alcohol use. Baseline data from a randomized controlled trial with Black mothers son dyads (*n*=382) were paired with census tract and alcohol control board data. Among mothers, younger age, along with neighborhood factors of alcohol outlet density, race, and education were significantly associated with use. Among sons, older age and alcohol outlet density in the neighborhood predicted use. Findings highlight neighborhood influence, beyond family qualities, as a significant determinant of disadvantaged Black mothers' alcohol use. Implications for public health policy are discussed.

Keywords

Alcohol outlets; Alcohol use; Family; Environment

1. Introduction

Social determinants of health at the family and neighborhood levels are well-known influences on health behaviors (U.S. Department of Health and Human Services, 2013).

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Branas et al. (2008), O'Leary et al. (2012), Pennsylvania Spatial Access Data Source (2011), Schonlau et al. (2008), Scribner et al. (1995)

Alcohol use behaviors are influenced by familial patterns of communication and role modeling and contextual neighborhood factors such as poverty density, housing status, and alcohol outlet density (Luk et al., 2010; Resko et al., 2010; Theall et al., 2011). The goal of this study was to use individual, family, and neighborhood variables in conjunction with GIS analysis to explore alcohol use from an ecological perspective. Although previous studies have undertaken such methods to examine alcohol density and use (Livingston et al., 2007; Popova et al., 2009), none has explored factors at the individual, familial, and environmental levels using data from both parents and children. This study addressed that gap in the literature by exploring the influence of individual, intrafamilial, and environmental factors on alcohol use among Black mothers and sons living in public housing communities.

1.1. Influence of family on adolescent alcohol use

Parenting factors have been found to contribute to alcohol use among adolescents. Parent–child communication has been cited as a significant factor in adolescent alcohol use behavior, although the directionality of these outcomes has been questioned (Luk et al., 2010; Martyn et al., 2009; Miller-Day and Kam, 2010; Song et al., 2012). This inconsistency may indicate that other family processes serve as protective mechanisms against adolescent alcohol use. Family qualities shown to influence alcohol use include parent–child relationship quality (Kuendig and Kuntsche, 2006), parental role modeling (Latendresse et al., 2008), and monitoring (Kuntsche et al., 2008). The only study examining the effects of family factors and proximity to alcohol outlets on adolescent alcohol use found that although proximity to alcohol outlets was associated with alcohol use, consistent parenting reduced the risk of alcohol use by nearly 50% (West et al., 2010).

1.2. Influence of neighborhood on alcohol use

Neighborhood geographic variables have been repeatedly noted as predictors of adult alcohol use, with neighborhood disadvantage usually measured as the cumulative effect of four census variables: percentage of residents living below the poverty line, percentage of woman-headed households, unemployment rate, and percentage of families receiving public assistance (Boardman et al., 2001). Theorists (e.g., Gruenewald, 2007; Scribner et al., 2010) also note that alcohol outlets are associated with alcohol use and related problems. As noted by Gruenewald (2011), alcohol outlets are more often found in areas where rents are lower, creating a higher concentration of alcohol outlets in low-income areas (Gorman and Speer, 1997). This has been shown to contribute to increase public health issues among already vulnerable populations, including increases in child abuse (Freisther et al., 2008), partner violence (Cunradi et al., 2011; Livingston, 2011; McKinney et al., 2009), and gun violence (Branas et al., 2009; Grubesic et al., 2013). Alcohol outlet density has also been shown to contribute to alcohol use, but less consistently. Although some studies found that the number of alcohol outlets in close proximity to an individual's residence was associated with alcohol use and heavy drinking (Scribner et al., 2000; Weitzman et al., 2003), particularly among women (Theall et al., 2011), factors other than outlet density were more significant predictors (Picone et al., 2010; Pollack et al., 2005). Type of outlet (on-site such as a bar vs. off-site such as a liquor store) was also related to problem drinking, with on-site sales being more predictive of excessive alcohol consumption (Truong and Sturm, 2007).

Findings regarding the effect of neighborhood qualities on adolescent alcohol use have been mixed. Although attributes of neighborhoods and schools have been significantly related to early initiation of alcohol use, contrary to expectations, higher rates of lifetime alcohol use were found among both youths and adults in neighborhoods that offered more social advantages (Kuntsche et al., 2008). In one study the perception of restaurant and bar density in an adolescent's community was related to alcohol consumption (Kuntsche et al., 2008), yet another study found no association between perceptions of the density of liquor stores or other off-premise alcohol outlets and consumption (Truong and Sturm, 2007). Additionally, perceived neighborhood disorder was related to adolescent alcohol, tobacco, and marijuana use (Ennett et al., 1997). As such, ecological studies of alcohol outlets are of fundamental importance (Gruenewald, 2011); this work approaches the work from an ecological approach, considering the individual, parent, and community level influences on alcohol use among Black adolescent boys.

1.3. Purpose

While researchers have noted the influence of alcohol outlet density on a number of serious public health issues (e.g. violence), there has been a dearth of research exploring multilevel influences on adolescent alcohol use, and no study has used primary data from both parents and children alongside neighborhood-level factors collected through administrative data to explore this issue. Therefore, the specific aims of this study were to: (1) examine individual factors associated with alcohol use among Black adolescent mothers and sons (ages 11–15) residing in public housing communities; (2) explore the influence of family factors (i.e., mother–son alcohol communication, maternal alcohol use [role modeling], monitoring, and mother–son relationship) on sons' alcohol use; and (3) examine the distribution of alcohol outlets throughout the city of Philadelphia and how alcohol outlet density is associated with adult and adolescent alcohol use. We hypothesized that: (1) older sons and those living in a one-parent home would be more likely to report drinking alcohol; (2) parental monitoring would be associated with less reported alcohol consumption among sons; and (3) higher alcohol outlet density and lower neighborhood education would be associated with alcohol use among both mothers and sons.

This study was unique in several ways. First, because the sample participants were mother-and-son dyads, we were able to explore their behaviors at the individual and dyadic level, allowing us to test the social ecological model (Bronfenbrenner, 1986). Second, this sample was distinct from the general population in that it consisted of individuals with disadvantaged race and ethnicity and socioeconomic status (all participants self-identified as Black and resided in public housing communities). Results from this study have implications for community planning and policies regarding prevention of alcohol use in government-assisted housing communities and prevention at the dyadic level.

2. Methods

2.1. Study design

This work is an analysis of data from a randomized control trial (RCT) and administrative sources. The RCT evaluated the effectiveness of a peer-delivered HIV-risk-reduction

intervention. The original study (1998–2002) included 526 Black mothers who resided in public housing communities in Philadelphia, PA, and her adolescent son 11–15 years of age. Mothers were recruited through lists of women generated by the Philadelphia Housing Authority for each of the 42 public housing communities. Women were selected at random from each housing community and invited to participate health promotion intervention. If potential participants did not have telephones, the site coordinator went door to door to extend an invitation. To enroll, both the mother and her son had to agree to participate; if the mother had more than one son between 11 and 15 years old living with her, the oldest son was invited to participate. Consent/assent was obtained prior to enrollment. Once enrolled, mothers were randomly assigned to either a (1) HIV-risk-reduction condition or (2) control condition in which they received a general health promotion intervention to reduce their and their son's risk of behavior-linked diseases, including tobacco, alcohol, and drug use, and to promote exercise and healthy eating. The interventions, led by specially trained Black facilitators from the housing developments, were structurally similar. All data were collected via self-administered survey; mothers and sons were not seated together during survey completion and both were encouraged to provide honest answers (no data was shared between the dyad). Institutional review board approval was provided by the University of Pennsylvania for the original study and [*blinded for review*] for the secondary analyses.

In the current study, we used baseline data to explore associations between individual, familial, and environmental factors and adolescent alcohol use. Of the 526 mother–son dyads from whom data was collected (all mothers participated in the intervention), we included participants from 35 housing communities. Participants who resided in scatter-site public housing were not included in the geographic analysis because their exact address could not be confirmed (n=144 dyads) leaving us with a final sample size of 382 dyads for these analyses. Bivariate analyses revealed no statistical differences in demographic variables when comparing scatter-site residents to housing community residents, except housing community resident mothers were twice as likely to be employed (OR=1.94; p<0.05) and half as likely to have less than a high school education (OR=0.49; p<0.01). The final sample for this work consisted of 382 dyads. Administrative census data from 2000 (middle of study years) and alcohol outlet data from 2003–2006 complemented the RCT baseline data.

2.2. Participants

Data for these analyses were provided by Black mothers and their sons who resided in public housing communities in Philadelphia, PA. The average age of mothers was 38 years and the average age of sons was slightly less than 14 years (see Table 1). Twenty-eight percent of mothers had less than a high school education; 34% were employed. Thirty percent reported residing with a man in the home. Regarding alcohol use, 89% of mothers and 33% of sons reported having ever used alcohol and 43% of mothers and 19% of sons reported alcohol use during the previous 30 days.

2.3. Dependent variable

The primary dependent variable was sons' lifetime and mothers' current alcohol use. Mothers and sons were asked parallel single-item measures: (1) "Have you ever drunk

alcohol?" (*yes* or *no*) and (2) "In the past month (30 days), on how many days did you drink alcohol (beer, wine, wine coolers, malt liquor, and hard liquor)?" Response choices for the second question were (1) *I have never drunk alcohol*, (2) *I did not drink any alcohol in the past month*, (3) *1 day*, (4) *2 days*, (5) *3 to 4 days*, (6) *5 to 10 days*, and (7) 11 or *more days*. After evaluating response distribution, the measure was recoded to reflect *having drunk alcohol on 3 or more days* during the previous month. Although these were brief measures, the use of single-item measures has been successful in prior substance use assessments (Flewelling and Bauman, 1990; Seale et al., 2006; Wilson et al., 2005).

2.4. Individual and family variables

Individual-level variables included age and mothers' current employment. The family-level variable included in the models for mothers was living with a man in the home. In the sons' models, along with the aforementioned variables, mothers' recent alcohol use and parental monitoring were included. Parental monitoring was a measure of maternal strictness rated using an 8-item scale used in previous studies (Jemmott and Jemmott, 1992; Williams and Vinson, 2001). Examples of questions included: How strict are you about your son (1) being home by a certain hour, (2) going to his friends' homes, (3) having company, and (4) letting your son do thing his friends are doing. Responses ranged from 1=*not strict at all* to 5=*very strict*. The 8-items were summed to create a score ranging from 8 to 40. Internal reliability in this dataset was acceptable (DeVellis, 2003) at α=0.78.

2.5. Geographic data sources

2.5.1. Philadelphia alcohol outlets—In Pennsylvania, distribution of liquor is monitored by a state agency, the Pennsylvania Liquor Control Board. There are four major outlet types in Philadelphia: clubs (5.9%), state-run distributors (5.6%), eating places (6.5%), and restaurants and bars (75%) (Grubesic et al., 2012). It should be noted that in Philadelphia, bars, clubs, eating places, and restaurants are permitted to sell six-packs of beer to go. *A shapefile* of 2115 outlets within the city limits of Philadelphia was obtained from the University of Pennsylvania Cartographic Modeling Lab. The file reflected data collected from the Pennsylvania Liquor Control Board between 2003 and 2006 (C. Branas, personal communication. While the dates of collected information differ slightly from the time of baseline data collection in this study, alcohol outlet density has remained fairly stable over time (Grubesic and Pridemore, 2011).

2.5.2. Mother–son dyad addresses—The address of the housing community of each participant during the original 1998–2002 study was imported into ArcGIS and geocoded using the ESRI Business Analyst geocoder. The feature utilized was USA Geoding Service in ArcGIS version 10.2.1. The average match score was 85.1 with a range from 71 to 100.

2.5.3. Census data—Philadelphia census data from the 2000 Decennial Census were obtained at the census block group level from the U.S. Census Bureau's American Fact Finder website (U.S. Census Bureau, 2000). Census tract variables included in the current study were from 2000 Summary File 3 and included number of population 25 years or older with less than a high school diploma, number of households with median incomes below the federal poverty threshold, and number of Black population. Since buffer boundaries did not

coincide with census block group boundaries, different GIS tools (intersect, dissolve, calculate field) were applied to calculate the proportion of the census block groups that fell within each of the buffers. Then, the proportions were applied to the demographic data and the various numbers summed for each buffer. Later the percentage of Black population, households with incomes below the federal poverty threshold and percentage of population with less than a high school diploma were calculated.

2.6. Geographic and statistical analysis

The analysis occurred in multiple steps. First, using a geoprocessing tool, a boundary was created for each dyad's address and the number of alcohol distribution outlets located within each zone was calculated. Given that an individual could live at the border of a census tract (making a tract a less-specific measurement of distance and density), a 400-m distance was chosen based on research by Austin et al. (2005) indicating that the average adult can walk 400 m in 5 min. A series of network buffers (calculating 400 m distances along the street network) was created around each dyad address using the ArcGIS service area tools in the Network Analysis extension. The road network data that were used was the TIGER Line Data file from the U.S. Census Bureau. Then the number of alcohol outlet inside each network buffer was calculated. 3. The density of alcohol outlet was created by dividing number of alcohol outlet inside network buffer to area of those network buffers displayed in Fig. 1. Weighted population census data were then linked to each dyad according to the census block group in which their address was located. This was determined to be the most accurate depiction of each dyad's neighborhood environment because census tracts are highly localized.

The new variables (alcohol outlet per 400-m radius density and census variables) were then merged with the original dataset in SPSS v. 20. Bivariate correlations were calculated between the outlet density and census variables to determine whether geographic variables were related. Univariable logistic regressions were used to individually test associations of each independent variable with the two outcome variables. Because this sample was naturally clustered (dyads and housing clustering), we assessed interclass correlation (ICC). Although the result was statistically significant ($p<0.003$), the clustering only explained 2% of the variance in the data. When the ICC was added to the models, no changes in outcome were observed.

We further explored ways in which variables may influence one another through the creation of three interaction variables: (1) outlet density and maternal monitoring behavior, (2) outlet density and maternal alcohol use, and (3) maternal alcohol use and maternal monitoring behavior. Effects of interaction variables were not statistically significant and not included in final models. Multivariable logistic regression analyses were used to test predictors of mothers' recent alcohol use and sons' lifetime alcohol use. Sons' lifetime use was chosen as the outcome variable (rather than use during the previous 30 days) due to the infrequency of sons' reports of recent alcohol use. Variables were entered in three blocks: individual variables, family variables, and environmental variables.

3. Results

Descriptive statistics are shown in Table 1. On average, there were 3.6 outlets (*SD*=2.96) per 400-m radius surrounding dyad addresses. On average, 38% of the surrounding population was had not graduated high school, 73% were black, and 37% of the households were living below the poverty level. The average score on the parental monitoring scale was 31.9 (*SD*=5.11), indicating a high level of strictness in the sample. Fig. 1 displays the location of alcohol outlets within the city of Philadelphia. The figure also displays housing site locations with graduated symbols representing density of alcohol outlets in a 400 m radius.

Table 2 is a correlation matrix of the geographic variables. Alcohol outlet density was not correlated with any environmental demographic variables. All environmental demographic variables were positively correlated with each other. Black residents and percent of population who had no high school diploma were most strongly correlated with each other at.64 ($p<0.001$).

Table 3 displays the results of univariable logistic regressions of mothers' recent alcohol use and sons' lifetime alcohol use. Mothers' recent use and sons' lifetime use were not significantly related. Older sons were 1.7 times ($p<0.001$) more likely to have ever used alcohol. Alcohol outlet density increase the odds of sons lifetime alcohol use (*OR*=1.08; $p<0.05$). The odds of mothers' recent use of alcohol slightly increased as alcohol outlet density (*OR*=1.15, $p<0.001$), percentage of Black residents (*OR* = 1.02, $p<0.001$), percentage of population with no high school diploma *OR*=1.06, $p<0.001$) and percentage households living below poverty threshold (*OR*=1.04, $p<0.001$) increased. An interaction variable for alcohol outlet density and maternal monitoring behavior was created and was statistically significant at the individual level with mothers' recent alcohol use (*OR* = 1.00, $p<0.001$) and sons' lifetime use (*OR* = 1.00, $p < 0.01$). However, the final model does not include the interaction variable because it was statistically nonsignificant at the intra-familial level and in the full multivariate model.

Table 4 presents multivariate logistic regression results of mothers' recent alcohol use. With each step in the model process, the 2log likelihood statistic decreased from 447.71 to 353.76, indicating an increase in the goodness of the model fit. The Cox and Snell R^2 value also increased, confirming improvement in model fit. With the addition of environmental variables the model the R^2 value drastically increased accounting for 19% of the variance in the sample. In the second step of the model, odds of recent drinking slightly decreased with mothers' age (*OR*=0.96, $p<0.05$). The final model indicated that with every additional alcohol outlet within a 400-m radius of a mother's residence, there was a 16% increase in the odds ($p<0.001$) of recent alcohol use. Living in a neighborhood with more Black residents (*OR*=1.02; $p<0.01$) and fewer high school graduates (*OR*=1.05; $p<0.05$) increased the odds of recent alcohol use among mothers.

Results for sons' lifetime alcohol use are presented in Table 5. With each step in the model process, the 2log likelihood statistic decreased from 376.28 to 319.19, indicating an improvement in the final model fit. In the final model, Cox and Snell's R^2 indicated that this model accounted for approximately 21% of the variance in the sample. Sons' age was the

strongest predictor of lifetime alcohol use ($p<0.001$) in all three models; in the final model, for each 1-year increase in age, the likelihood of reporting ever using alcohol by sons increased by 1.8. Alcohol outlet density also increased the odds of sons lifetime use by 10% ($p<0.05$). No family variable (man living in the home, parental monitoring, or recent maternal alcohol use) or demographic environmental variables were associated with sons' reported alcohol use.

4. Discussion

This study was the first to our knowledge to use individual, intrafamilial, and environmental data from mother–son dyads to explore the influence of multiple systems on the alcohol use of mothers and sons in public housing communities. Although previous studies have merged individual and environmental data to explore alcohol use (Austin et al., 2005; Picone et al., 2010; Pollack et al., 2005; Theall et al., 2011; Truong and Sturm, 2007), only one identified study included any family factors and none included dyadic data (West et al., 2010). These findings suggest that, despite their modest effect relative to other risk factors, using individual-level data collected from Black mothers and sons can increase our understanding of the influence of multiple systems on alcohol use.

In this study, the only individual-level variable associated with either mothers' or sons' alcohol use was age. Although younger mothers were slightly more likely to report drinking, alcohol use among sons was more common among older adolescents. These findings are in line with prior research that showed that as adults age, they are less likely to report drinking (Schiller et al., 2012) and that as adolescents age, they are more likely to report drinking (Center for Disease Control, 2013). Contrary to our hypothesis, none of the family variables (man living in the home, parental monitoring, mothers' recent alcohol use) was associated with adolescent sons' alcohol use. Several factors may have contributed to these nonsignificant findings. Although parental presence in the home has been found to be associated with more monitoring and less frequent substance use among adolescents (Borawski et al., 2003; Eaton et al., 2012), living in a home with an adult man was not associated with reduced or increased substance use among adolescent boys. This finding in these data may be related in part to issues of statistical power (only one third of boys reported ever drinking and only one third of the sample reported a man living in the home). However, we were unable to determine the relationship of these male figures to each mother–son dyad and whether qualitative differences exist between having a biological father in the home compared to another man.

Our finding that parental monitoring was not associated with adolescent alcohol use is in contrast to other studies (Capaldi et al., 2009; Fosco et al., 2012; Resnick et al., 1997; Ryan et al., 2010). The lack of association between monitoring and behavior may be partially explained by the lack of variance in the sample or lack of power (reliability was acceptable but not high). It may also be reflective of prior research that has noted that high parental control is a strategy among Black mothers (Dodge et al., 1994; Tobler and Komro, 2010), with mothers of boys potentially more controlling than those of girls (Jackson, 1997). Finally, the lack of association between maternal and sons' alcohol use is also inconsistent with previous findings (Tamis-LeMonda et al., 2009). The temporal incongruence (recent

use by mothers and lifetime use by sons) may have contributed to this nonsignificant finding. Further, neighborhood factors may be inherently more predictive of these behaviors when adolescents are living in high-risk settings.

Poverty, educational attainment, and race have been associated with increased alcohol accessibility (Hurd et al., 2009). We found that environmental variables were associated with substance use by both mothers and sons; however, the factors that affected each member of a dyad were not the same. Despite inconsistent findings regarding the influence of alcohol accessibility on use (Picone et al., 2010; Pollack et al., 2005; Truong and Sturm, 2007), our findings supported results from previous work indicating that accessibility is significantly related to alcohol use (Scribner et al., 2000; Theall et al., 2011; Weitzman et al., 2003). While age was an important predictor of alcohol use for both mothers and sons and not intrafamilial factors influenced either, only mothers were influenced by neighborhood variables (percent of high school graduates and percent Black). However, both mothers and sons'alcohol use was influenced by density of outlets near housing communities. Similar to findings from previous studies (Pollack et al., 2005; Truong and Sturm, 2007), we found that alcohol outlet density was associated with alcohol use. The percentage of Black residents and residents who had not graduated high school in each census block group predicted alcohol use by mothers. Although it has been noted that perceived neighborhood disorder, including poverty level, is associated with alcohol use (Boardman et al., 2001; Ennett et al., 1997), this was not the case in our study. Given the high correlation between education and poverty in our data, it may be that living in these neighborhoods contributed to increased stress, which in turn contributed to alcohol use by mothers (Berke et al., 2010). Finally, although previous studies indicated that alcohol use is higher among adolescents and adults in affluent neighborhoods (Pollack et al., 2005; Truong and Sturm, 2007), the increased availability of alcohol in neighborhoods with a higher percentage of Black residents may influence the association found in the current study (Brenner et al., 2013; Romley et al., 2007; Tamis-LeMonda et al., 2009).

5. Limitations

Although these unique dyadic data allowed the exploration of alcohol use among mothers and sons on individual, intrafamilial, and environmental levels, there were several limitations to the current study. First, although we were able to capture data from multiple sources, we did not have any information on peer use of alcohol. Future studies should examine how peer networks and alcohol availability relate to adolescent alcohol use. Second, sampling affected the variation of neighborhood environments. Individuals living in the same housing site shared the same neighborhood characteristics. Future studies might explore the aggregate behaviors of individuals living in the same housing site to determine how housing, not just the home environment, is related to alcohol use behaviors. Further, although we did not have the power to do so, examining recent alcohol use among adolescent boys and how it is influenced by individual, intrafamilial, and environmental factors should be a feature of future research. Although these data were rich in measures, lower R^2 values for models indicated that there were missing factors that explained some of the variation in alcohol use for both mothers and sons. Further research should test other contributing variables and mediating and moderating variables. Last, there is the possibility

that answers provided by participants were influenced by the desire to provide socially desirable answers. To promote honesty, data collectors had mothers and sons complete the survey simultaneously, but separately, and provided reminders about data confidentiality.

6. Conclusion

Overall, study findings imply that assessment of neighborhood affluence or disadvantage can inform local governing entities regarding community planning and licensing policies related to alcohol outlets. For example, this study's findings highlight neighborhood influence, above family qualities, as a determinant of disadvantaged Black mothers' alcohol use. Indeed, the finding that mothers living in areas with higher alcohol availability were more likely to drink suggests that policies need to be place to address ease of access to these potentially risky environmental factors. There is a concern that increased alcohol use by mothers who are living in these high-risk environments can potentially affect parenting capacity and monitoring. As alcohol outlets are more likely to be located in lower income areas (Gorman and Speer, 1997), one primary prevention opportunity is influencing policy to reduce the number of alcohol outlets located in already vulnerable areas. Secondary and tertiary prevention strategies, such as installing alcohol use informational billboards or developing school-based programs intervention programs, can be implemented in existing high-alcohol-density and low-income housing communities (or communities with similar risk characteristics) to counter adverse community factors.

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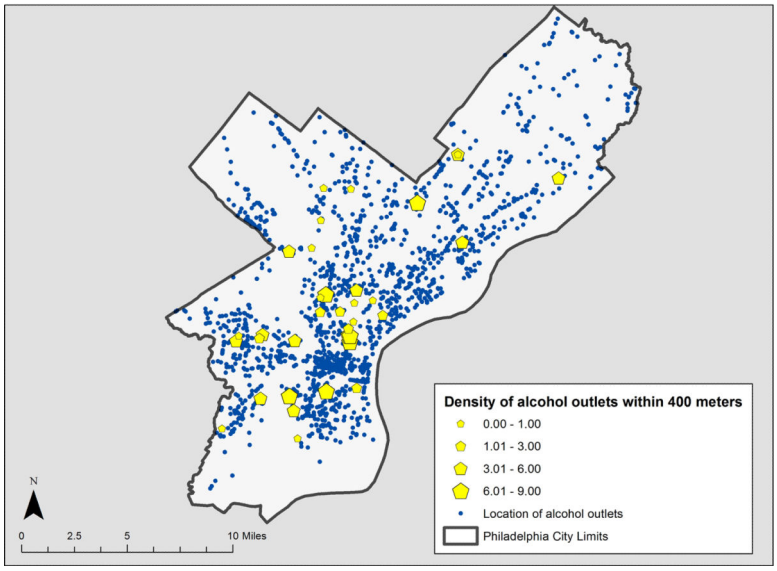

Fig. 1.
Housing Community Locations and Alcohol Outlet Density.

Table 1

Descriptive statistics.

	M (*SD*)	*n* (%)
Geographic		
Outlet count 400 m	3.62 (2.96)	
Percentage Black residents	73.26 (29.46)	
High school graduates	38.45 (7.72)	
Families below poverty	37.45 (11.70)	
Dyads		
Son age	13.96 (1.43)	
Mother age	38.41 (6.80)	
Monitoring score	31.90 (5.11)	
Mother drank in previous 30 days		199 (43.9)
Mother alcohol use during previous 30 days (3 or more days)		118 (33.2)
Son alcohol use during previous 30 days		68 (18.8)
Mother lifetime alcohol use		331 (88.7)
Son lifetime alcohol use		114 (32.9)
Mother currently employed		130 (34.1)
Mother less than high school education		106 (27.8)
Man currently lives in home		110 (30.1)

Table 2

Correlation matrix of geographic variables.

	1	2	3
1. Outlet count 400 m			
2. Percentage Black residents	0.05		
3. Less than high school	0.01	0.21***	
4. Families below poverty	0.06	0.51***	0.64***

Note. All census data measured by percentage of residents per census tract.

*$p < 0.01$.

***$p < 0.001$.

Table 3

Univariate logistic regressions for alcohol use for mothers and sons.

	Mother recent use	**Son lifetime use**
	OR	***OR***
Son lifetime use	1.10	
Mother recent use		1.10
Son age	0.99	1.70***
Mother age	0.97	1.01
Mother currently employed	0.75	1.46
Man currently lives in home	0.91	0.90
Monitoring	1.00	0.99
Outlet count 400 m	1.15***	1.08
Percentage Black residents	1.02***	0.99
Less than high school	1.06***	0.99
Families below poverty	1.05***	0.1

*** $p < 0.001$.

Table 4

Mother recent alcohol use (3+ days of use during previous month; $n = 302$).

	Model 1		Model 2		Model 3	
	OR	**95% CI**	***OR***	**95% CI**	***OR***	**95% CI**
Mother age	0.97	0.94, 1.00	0.96*	0.93, 0.99	0.97	0.93, 1.00
Mother currently employed	0.96	0.60, 1.54	1.03	0.63, 1.69	1.47	0.85, 2.50
Man currently lives in home			0.71	0.42, 1.21	0.75	0.43, 1.3
Monitoring			1.01	0.1, 1.062	1.01	0.97, 1.10
Outlet count 400 m					1.16***	1.07, 1.30
Percentage Black residents					1.02**	1.01, 1.00
Less than high school					1.05*	1.00, 1.10
Families below poverty					1.00	0.97, 1.00
Cox and Snell R^2	0.02		0.03		0.16	
2log likelihood	447.716		392.410		360.881	

* $p < 05$.

** $p < 001$.

Table 5

Son lifetime alcohol use (n = 277).

	Individual		Family		Environment	
	B	**95% CI**	**B**	**95% CI**	**B**	**95% CI**
Son age	1.73**	1.44, 2.09	1.76**	1.44, 2.15	1.819**	1.47, 2.23
Mother currently employed	1.37	0.83, 2.28	1.50	0.87, 2.57	1 56	0.88, 2.76
Mother recent alcohol use	1.21	0.72, 2.04	1.19	0.68, 2.09	1.05	0.57, 1.91
Man currently lives in home			1.08	0.60, 1.94	1.10	0.61, 2.01
Monitoring			0.99	0.94, 1.04	0.98	0.93, 1.04
Outlet count 400 m					1.10*	0.10, 1.20
Percentage Black residents					0.99	0.98, 1.01
Less than high school					0.98	0.94, 1.03
Families below poverty					1.03	0.99, 1.06
Cox and Snell R^2	0.16		0.18		0.21	
2log likelihood	376.281		326.303		320.201	

* $p < 0.05$.

** $p < 0.001$.