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Structural racism in the built environment: Segregation and the overconcentration of alcohol outlets

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Abstract

Structural racism, evidenced in practices like residential racial segregation, has been linked to health inequities. We examined the relationship between an adverse environmental factor (alcohol outlet overconcentration), segregated neighborhoods, and county alcohol policy in Louisiana and Alabama to investigate this link. Multilevel analysis revealed high outlet density associated with segregated counties and predominantly black census tracts in counties with restrictive alcohol policy. This inverse association between policies designed to limit alcohol availability and overconcentration of outlets in black neighborhoods warrants consideration by policymakers given links between outlet density and health inequities. Consideration of these findings in historical context suggests these policies may function as a contemporary actualization the historical use of alcohol policy to subjugate black people in the South, now over-concentrating instead of prohibiting access.

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Keywords

systemic racism; segregation; built environment; alcohol outlets; South; disparities

Health inequity research often focuses on inequalities and disparities – differences in health arising from intentional or unintentional discrimination that reinforces social disadvantage and vulnerability (Braveman et al., 2011; US Department of Health and Human Services, 2014; Williams and Collins, 2001). In other words, discrimination and marginalization result in social inequities that lead to differences in health outcomes (Krieger, 2001; Krieger et al., 2003). The link between racial inequities in health outcomes and the neighborhood environment has been well-established. This link can, in part, be explained as the effects of structural racism, the fostering of racial discrimination through mutually reinforcing systems like housing and healthcare (Bailey et al., 2017).

Elements of the built environment, such as the overconcentration of institutions detrimental to health like off-sale alcohol outlets or absence of salubrious institutions like grocery stores, have also been associated with poor health outcomes (Berke et al., 2010; Franco et al., 2008). The over and under-concentrations of these institutions has been found to be associated with neighborhoods with high concentrations of minority residents (Block et al., 2004; LaVeist and Wallace, 2000). Income has also been found to be a determinant of alcohol environment (Jin et al., 2018), however, the interrelated neighborhood effects of race and poverty are difficult to disentangle. Further complicating this, differences in alcohol policy may affect the relationships between neighborhood racial composition, poverty and alcohol environment. We aim to add to our understanding of these interrelationships by exploring the geography of race and distribution of alcohol outlets in the policy environment of the South where alcohol distribution and consumption is explicitly regulated. Specifically, we investigate the relationship between residential racial segregation and concentrated alcohol outlet density taking into consideration the influence of poverty in two Southern states in effort to further our understanding of how systemic racism may be linked to health.

Health Inequities, Neighborhood Environment & Structural Racism

Inequities in health outcomes sometimes follow geographic patterns, meaning that some places or neighborhoods have better health outcomes than others, that align with patterns of racial/ethnic residences. Neighborhood characteristics, ranging from pollution to socioeconomic status to segregation, have been shown to be associated with a variety of health-related factors like physical activity (Mama et al., 2019; Timperio et al., 2015), and diseases including cardiovascular disease (CVD) (Xiao and Graham, 2019) and breast cancer (Saini et al., 2019). Perceptions of neighborhood disorganization also affect child health, or perceived child health (Cronin and Gran, 2018). While a relational perspective on the relationship of neighborhood – or more broadly place – to health considers place in network, rather than physical, terms (Cummins et al., 2007), frameworks are available for explaining their interrelationship as constituted by both material (i.e. physical) and sociocultural (i.e., cultural, relational) features. One such framework for understanding how neighborhood – or place – affects health grounded in universal human needs organizes

distinct, yet not mutually exclusive, pathways characterized by five types of features (Macintyre et al., 2002). Those features include three material types: physical features, availability of healthy environments, and access to services; alongside two collective social functioning types: sociocultural features and reputation. The first two material features, to which this paper turns, while material are socially constructed and patterned and both directly and indirectly affecting health outcomes (Macintyre et al., 2002).

The connection between these material features and health inequities can be further understood in two ways. One, as a progenitor of chronic stress. That chronic social stress, the physiological consequences of which are known as allostatic load, activates mechanisms that lead to metabolic dysfunction, predisposing individuals to obesity, diabetes, cardiovascular disease and cancer (Geronimus et al., 2006; McEwen, 1998; McEwen and Stellar, 1993; Schulz et al., 2012; Seeman et al., 2010). Two, as features that constrain or facilitate determinants of health, which we further investigate herein. How land is used shapes behaviors related to diet, physical activity, and substance use, as well as dictates access to resources like food or healthcare. Consequently, these limitations on or overexposure to resources that affect health or behavior changes lead to obesity, metabolic dysfunction and the chronic diseases (e.g. cardiovascular disease, diabetes, and cancer) which account for the health inequities borne by poor and minority populations (Franco et al., 2008; King, 2013; Larson et al., 2009).

Material features include land use practices like residential racial segregation that have been shown to be strongly linked to health inequities (Ahmed et al., 2007; Chang-Martinez et al., 2017; Gaskin et al., 2014; Towne et al., 2017; Williams and Collins, 2001). Residential segregation is a built environment manifestation of sociocultural patterns of institutional or structural racism. Jones (2001, 2000) described institutional racism as the differential access to resources and exposure to adverse material conditions by race as it is codified in institutions of custom, practice, or law. Bailey, Krieger and colleagues (2017) adopt the term ‘structural racism’ to refer to essentially the same concept, the “totality of ways in which societies foster racial discrimination through mutually reinforcing systems,” explicitly, housing, employment, health care, etc.(p.1453). While the term systemic racism encompasses a more comprehensive theory of oppression grounded in the social reproduction of inequities based in a white dominant framework of racial hierarchy (Feagin, 2006; Feagin and Bennefield, 2014; Feagin and Elias, 2013), we purposefully employ structural racism to engage with the concept as articulated in connection to health outcomes in the public health literature.

Understanding processes of residential segregation as structural racism improves analysis of the root causes of health inequities. Residential segregation is the “degree to which two or more groups live separately from one another, in different parts of the urban environment” (Massey and Denton, 1988, p. 282). Segregation is multidimensional, understandable and measurable according to five distinct aspects of spatial variation: centralization, clustering, concentration, evenness, and exposure (Massey and Denton, 1988). According to Williams (1999), residential segregation is the “single most important [land use] policy” that “continues to have pervasive adverse effects on the socioeconomic circumstances and the health of African Americans.” Indices of exposure reflecting degree of potential contact or

interaction between minority and majority group members, like isolation, are appropriate to approximate the experience of the average resident (Massey and Denton, 1988) and are often employed in studies of segregation and health (Kershaw and Albrecht, 2015; Kershaw and Pender, 2016). A growing body of literature connects the neighborhood environment to systemic racism and its effects (Diez Roux and Mair, 2010; Williams and Collins, 2001).

Our multilevel conceptual model of the relationship between structural racism and individual health is shown in Figure 1 below. Poverty and segregation (isolation) at both county and neighborhood levels contribute to built environment features (e.g. alcohol outlet density). County alcohol policy both directly influences the built environment and modifies the county and neighborhood level effects of poverty and isolation. Downstream factors not directly investigated by this study, shown in grey, illustrate how these factors link to health outcomes.

Alcohol Environment and Health

One aspect of the neighborhood environment that has been linked to health outcomes that disproportionately affect poor and minority populations is the alcohol environment (LaVeist and Wallace, 2000; Scribner et al., 1999). However, as Mair and colleagues (2019) note in their comprehensive review of alcohol use research, while the importance of place to alcohol related outcomes is well illustrated, the mechanisms whereby place influences use are often not well articulated. While they suggest studies that further link behavior to context to improve understanding of alcohol use, the association between alcohol environment and risk for adverse health outcomes is not limited to the direct impact of consumption. Numerous studies have demonstrated geographic associations between alcohol outlet density, both on-sale (i.e., restaurants and bars) and off-sale (i.e., beer, wine and liquor retail outlets, not intended for onsite consumption), and health outcomes ranging from assaultive violence to homicide, domestic violence, sexually transmitted diseases and injuries, both intentional and unintentional (Cunradi, 2010; Freisthler et al., 2005; Gruenewald et al., 1993; Livingston et al., 2007; Morrison et al., 2016b; Scribner et al., 1994, 1995, 1999).

Several mechanisms have been proposed to explain how the alcohol environment contributes to adverse health outcomes. While perhaps the most straightforward of these is via increased consumption due to greater alcohol availability, ironically, this mechanism has been the most difficult to document (Scribner, 2013). This is due in part to the complication presented by what has been called the alcohol harm paradox – the fact that the social gradient in harm is inverse to that seen with other adverse behaviors, i.e., for lower socioeconomic groups alcohol-related harm is higher despite the fact that reported consumption is lower or the same (Shortt et al., 2018). Among studies that have considered the connection between off-sale outlets and consumption, one documented a marginal connection between off-sale outlet density and alcohol use disorder at the neighborhood level (Ahern et al., 2015). Another study found a relationship between young Australian adults' consumption and outlet density and convenience, not size (Foster et al., 2018). Focusing specifically on different consumption behaviors, Shortt and colleagues (2018) found that high income groups were more likely to report all categories of problem drinking, yet while the probability of all drinking outcomes remained static for higher income groups across outlet density, for lower

income groups density mattered and was associated with higher likelihood of drinking outcomes. Their findings that lower income groups are disproportionately affected by off-sale outlet density suggest that structural/policy interventions, rather than behavioral interventions, would have better potential to effect change in consumption patterns (Shortt et al., 2018).

While these aforementioned studies begin to articulate the downstream mechanisms – the relationship between outlet density and consumption that affect health – fewer studies contend with the upstream mechanisms related to the construction of the high risk, i.e. high off-sale outlet density, environment and its relationship to health not focused on consumption behaviors. In one, and perhaps the first, systematic review of alcohol outlets to focus on off-sale sites and health outcomes, Gordon and colleagues (2015) found that most (70%, 25) of the 36 studies they reviewed that met design-based selection criteria had observed statistically significant associations between off-site outlet density and negative health outcomes/alcohol related harms ranging from assault to gonorrhea to alcohol-related mortality. Other recent studies have examined this relationship in terms of violent crime, finding evidence that off-sale outlets were associated with higher neighborhood violent crime (Subica et al., 2018; Trangenstein et al., 2018). Investigations of this relationship between alcohol outlets in the neighborhood and health through this lens approach their placement as a land use problem, as a structure associated with social disorganization that affects routine activities (Cohen and Felson, 1979; Sampson et al., 1997) leading to diminished community social cohesion/capital (Sampson et al., 1997). Social capital, the “aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition--or in other words, to membership in a group” describes how sociocultural features can be linked to the material to affect health (Bourdieu, 1986, p. 250; Portes, 1998). Societal structures like residential racial segregation that affect both individual and community acquisition of social capital and have been shown to be strongly linked to health inequities (Ahmed et al., 2007; Chang-Martinez et al., 2017; Gaskin et al., 2014; Towne et al., 2017; Williams and Collins, 2001), both shape and are shaped by policy.

Overconcentration of off-sale alcohol outlets in minority neighborhoods has been implicated in health inequities affecting minority populations in general, and black populations in particular (LaVeist and Wallace, 2000; Livingston, 2012). LaVeist and Wallace (2000) have demonstrated that the overconcentration of off-sale alcohol outlets is associated with black neighborhoods, despite lower levels of alcohol consumption by black people. Their findings suggest that segregation of black and white neighborhoods with similar socioeconomic compositional characteristics (e.g., 40% households in poverty) may affect land use policy like that regulating alcohol outlet licensing (LaVeist and Wallace, 2000). Another recent study by Morrison and colleagues (2016a) also noted the contribution of population density and area income to the relationship between alcohol outlet density and race/ethnicity, yet found that neighborhoods with a greater share of Hispanics and those proximal to white communities faced significantly greater exposure to off-sale outlets. While they indicated that the higher social capital of high-income white areas may be a factor however, they did not examine differences in alcohol policy (Morrison et al., 2016a).

Though alcohol sale and consumption in the United States is regulated by federal, state and local government agencies, in most cases, local governments have sole jurisdiction in the actual location of alcohol outlets (Platt, 2014). As early as 1926, the U.S. Supreme Court confirmed that cities and counties possessed the necessary power to control and regulate private land for the “health, safety, welfare, and morals” of the public (*Village of Euclid v. Ambler Realty Co.*, 1926). Cities, towns, and counties have many land use control tools at their disposal (Barnett, 1974). Courts have confirmed that local governments may impose alcohol related land use restrictions, even in localities where the state has attempted to preempt local control over the sale of alcohol products, basing this determination on the relationship between alcohol availability and its effects on public health and safety. In other words, the courts have found that local power over land use is so strong that it can be used to regulate the operation of alcohol outlets, despite the state’s exclusive authority over alcohol sales (*City of Oakland v. Superior Court*, 1996). In a context like the South where alcohol policy has been historically used to regulate black communities (Herd, 1983), this local control of policy is particularly salient.

In this study, we respond to the call by Mennis and colleagues (2016), among others, to investigate the upstream factors related to “inequities in risky substance use environments” and their health outcome related implications. We examine whether social inequities in the neighborhood environment, in this case off-sale alcohol outlet density measured as number of outlets per capita, are linked to residential segregation, and how this is influenced by the alcohol policy context. We chose to focus on off-sale outlets both because of the relative paucity of studies specifically addressing such outlets and prior evidence of a relationship between their density and neighborhood racial/ethnic composition. In a multilevel framework, we examined the relationship between outlet density and residential segregation in Louisiana (LA) and Alabama (AL), two states with high percentages of black residents and explicit alcohol policy regulations at the county/parish level, focusing on neighborhoods embedded in counties/parishes. We hypothesized that segregated neighborhoods with high concentrations of black residents would be associated with higher concentrations of alcohol outlets, and that this would be modified by county alcohol policy.

Methods

Data

We obtained alcohol outlet data for 2014, including address and type of license, from the Alabama Alcoholic Beverage Control Board (n.d.) and the Louisiana Office of Alcohol and Tobacco Control (n.d.). Louisiana and Alabama are two southern states each with a large black resident population that both distinguish between on-sale and off-sale outlet permits and have joint local and state licensing for spirits and either joint (LA) or state licensing with concurrent local zoning for beer and wine (AL) (Mosher and Treffers, 2013). Alcohol permit types vary by state. As shown in Table 1, liquor, beer, and wine sales each require separate permits in Alabama, which lead to individual outlets often holding more than one permit. As our objective was to examine the relationship between racial segregation and off-sale outlet density we included only off-sale (vs. on-sale) outlets.

We defined the neighborhood unit of analysis at the census tract-level to align our methods with previous studies that investigated the relationship between alcohol outlet density, health outcomes, and race/ethnicity by examining census tracts (Franklin et al., 2010; Jennings et al., 2014; LaVeist and Wallace, 2000). Tract level analysis was also appropriate given evidence that it would render more conservative estimates (i.e., bias toward the null) were there spillover effects from adjoining neighborhoods contributing to exposure than an analysis at a lower unit like the block group (Spielman and Yoo, 2009; Vogel and South, 2016). Off-sale outlets were geocoded to census tracts by unique trade address using ArcGIS. The geocoding success rate reached 94.9% in Alabama and 99.4% in Louisiana. Geocoded alcohol outlet data was aggregated by 2010 census tracts and density was measured as number of off-sale outlets per 1,000 residents. Population estimates and socioeconomic indicators for 2010 census tracts were obtained from the United States (US) Census Bureau's American Community Survey (ACS) (US Census Bureau, n.d.). The study included all counties (parishes) in Alabama ($n = 64$) and Louisiana ($n = 67$).

Measures

Alcohol Policy—We constructed an alcohol policy indicator based on information provided by state alcohol control agencies (Alabama Alcoholic Beverage Control Board, n.d.; Louisiana Office of Alcohol and Tobacco Control, n.d.). Counties or parishes without laws that prohibit or restrict alcohol sales are considered 'wet' in comparison to 'dry' counties or parishes that prohibit alcohol sales outright. We use the term 'damp' to indicate counties whose laws allow alcohol sales in some areas (often cities or urban areas) but not others. Damp counties in Alabama ($n=24$) are typically counties that prohibit off-premises sale of alcohol in unincorporated areas, census-designated places with a name and concentrated population, housing, and commercial structures yet located outside the boundaries of an incorporated city or town (Ratcliffe, n.d.; United States Census Bureau, n.d.), but allow incorporated areas to pass local ordinances that permit off-premise sales. Damp parishes in Louisiana ($n = 16$) permit smaller jurisdictions such as wards or villages to prohibit the sale of alcohol through local ordinances.

Segregation—For this study, we examined residential segregation by using an index of isolation, a measure of exposure common in investigations of the relationship between neighborhood conditions and individual health (Kershaw and Albrecht, 2015). This construct represents the extent to which minority residents, in this case black residents, live near members of their same minority group. We examined multiple levels of influence of segregation by decomposing black isolation into county and tract level measures. County-level black isolation (I_j) was calculated as a weighted average of the proportion of black residents among all census tracts in the county, where B_j is the proportion of black residents in county j and B_{ij} is the proportion of black

$$\text{County Isolation: } I_j = \sum_{i=1}^{n_j} \left[\frac{B_{ij}}{B_j} \right] * B_{ij} \quad (1)$$

residents in census tract $i = 1, \dots, n_j$ in county j . Scores take a value between 0 and 1 and can be interpreted as the average share of black neighbors for black residents in a county.

Tract-level black isolation was the proportion of black residents in a tract centered on the county-level black isolation index score. As a measure of isolation, the proportion of black residents in a tract reflects the level of exposure of black residents for that the geographic unit. Thus, tract-level black isolation (I_{ij}) for census tract $i = 1, \dots, n_j$ in county j is given as equation (2), where I_j is black isolation for county j and B_{ij} is proportion of black residents in census tract $i = 1, \dots, n_j$ in county j .

$$\text{Tract Isolation: } I_{ij} = (B_{ij} - I_j) \quad (2)$$

Poverty—As issues of residential disadvantage are known to be associated with access to economic resources as well as race and ethnicity, we include a measure for neighborhood poverty. Similar to black isolation, poverty was decomposed into county and tract-level measures to account for multiple levels of influence. County poverty was calculated as the proportion of residents living below the federal poverty line and tract-level poverty was centered on the county rate.

Off-Sale Outlet Density—Off-sale outlet density, given as the number of outlets per 1,000 residents, was derived for all census tracts in Alabama and Louisiana with a non-zero population. Census tracts with less than 1,000 residents were excluded from the analysis.

Analysis

Geographic variation can occur due to effects of both place and space. While questions of space are best addressed with spatial methods, questions regarding the influence of place, especially when defined as administrative units like census tracts, are most often approached with hierarchical or multilevel models (Diez Roux and Mair, 2010). Thus, to investigate the explicit effects of county alcohol policy and segregation on off-alcohol outlet distribution, we employed multilevel models with census tracts nested within counties (parishes). Chi square and Wilcoxon two sample non-parametric tests were used to compare state distribution, black isolation, poverty, and off-sale outlet density by county policy. A mixed effects negative binomial model, which accounts for over-dispersion in count data (Agresti, 2012) and has been employed in studies examining the correlation between outlet density and crime (Franklin et al., 2010; Jennings et al., 2014), was used to model off-sale outlets. Census tract population was included as a model offset, as the natural log of the population (in thousands), to control for population size. A random intercept at the county level established the multilevel structure and accounted for the correlation due to shared context of tracts within a county. Models were fit using the Glimmix procedure in SAS version 9.4. Model fit was assessed using the Pearson Chi-square goodness of fit statistic and Chi-square goodness of fit tests.

All models included main effects for state to account for differences in alcohol licensing. Our initial model (Model 1) included fixed effects for black isolation and poverty at both the county and tract level. Next, in model 2, we assessed if these effects were modified by county policy by including both an indicator of policy as a fixed effect and all two-way interactions. The initial model was then stratified by county policy and the full model run

separately on wet and damp counties. The full model equation for the overall and stratified models is shown by equation (3) below,

$$E(Y_{ij}) = \exp(\beta_0 + \beta_1 \text{state} + \beta_2 I_j + \beta_3 I_{ij} + \beta_4 P_j + \beta_5 P_{ij} + \log(\text{pop}_{ij}) + c_j) \quad (3)$$

where Y_{ij} is the outlet density rate on census tract i for county j ; β_0 is an overall intercept; state is a fixed effect for the state effects of Alabama, with Louisiana being the reference; I_j is the fixed effect of county black isolation in county j ; I_{ij} is the fixed effect of tract black isolation of census tract i in county j ; P_j is the fixed effect of county poverty level in county j ; P_{ij} is the fixed effect of tract poverty in census tract i in county j ; $\log(\text{pop}_{ij})$ is a model offset, natural log of population in thousandths for census tract i in county j , and c_j is a random effect of county j .

Results

Multilevel county and tract characteristics are reported in Table 2. The analysis included 131 counties in Alabama and Louisiana. Overall, 30.5% of counties had policy that restricted the sale of alcohol (“damp”). Median (min, max) county level black isolation was significantly lower in damp counties [0.46 (0.04, 0.86) for wet and 0.29 (0.01, 0.63) for damp, $p < 0.0001$], while median tract level black isolation was significantly greater in damp counties [−0.16 (−0.78, 0.49) for wet and −0.06 (−0.60, 0.67) for damp, $p < 0.0001$]. There were no significant differences in median poverty rate at county or tract-level by policy. Off-sale outlet density was significantly lower in damp counties, as expected [1.03 (0, 8.4) for wet and 0.48 (0, 4.3) for damp, $p < 0.0001$].

Model parameter estimates from multilevel negative binomial regression models of off-sale outlet density are provided as Table 3. County level black isolation ($p = 0.0002$) and tract level poverty ($p < 0.0001$) were significantly associated with increased outlet density in an overall model not controlling for alcohol policy. In the model that included fixed effects for county policy and all its two-way interactions, there were significant interactions between county policy, black isolation and poverty at an alpha 0.10, prompting stratification of the initial model by county policy. When examining outlet density by county policy, we observed that in wet counties, county black isolation, county poverty and tract poverty were significantly associated with off-sale outlet density. In damp counties, however, the only significant factor associated with off-sale outlet density was tract-level black isolation.

Table 4 provides adjusted rate ratios for black isolation and poverty from the overall and stratified analyses. Results are reported as adjusted rate ratios (RR) with corresponding 95% confidence intervals (95% CI). In wet counties, a 10% increase in county poverty was associated with a 29% increase in outlet density (RR= 1.29; 95% CI: 1.18, 1.41), while a 10% increase in tract level poverty was associated with 19% increase in outlet density (RR = 1.19; 95% CI: 1.15, 1.23). Among wet counties, controlling for poverty, county black isolation was associated with a slight decrease in outlet density (RR = 0.97; 95% CI: 0.94, 0.99). In dry counties, the only significant factor was tract level black isolation, for which a 10% increase was associated with a 20% increase in outlet density (RR = 1.20; 95% CI: 1.09, 1.33).

Discussion

We found that across counties in Louisiana and Alabama off-sale alcohol outlet concentration was significantly associated with residential racial segregation and poverty. This is consistent with prior studies that found retail alcohol outlets concentrated in black and low-income communities, despite their known lower alcohol demand (Berke et al., 2010; LaVeist and Wallace, 2000; Romley et al., 2007). This study also found a significant interaction between the effects of segregation and poverty, and alcohol policy on outlet density, where greater neighborhood residential racial segregation (black isolation) was associated with increased outlet density, but only in counties that had policies limiting alcohol availability (i.e., damp counties). In other words, that county level alcohol policy modifies the relationship between the overconcentration of alcohol outlets and residential racial segregation. Recent analyses have illuminated nuances in the off-sale alcohol outlet concentration, finding higher concentrations in low-income areas near high-income white areas, that suggest that outlets maybe intentionally excluded from neighborhoods with more financial and social resources with higher demand (Jin et al., 2018; Morrison et al., 2016a), however they did not specifically examine differences in alcohol policy. By accounting for policy, we found that residential racial segregation was significantly associated with higher off-sale outlet density in damp counties, indicating that restrictive alcohol policy may enable overconcentration of alcohol institutions in black communities in the south.

In the United States, federal policy since prohibition leaves much of the regulation of alcohol sales to state and local control. States thus take different approaches to this regulation function: some fully pre-empt local control while others fully empower localities and still others, including Alabama and Louisiana, have mixed state-local control (Mosher and Treffers, 2013). State Alcoholic Beverage Control (ABC) boards issue licenses for alcohol outlets to operate. However, in the states with mixed state-local control the local jurisdictions (i.e., county and city governments) exert the most power over where alcohol outlets are located. A license owner must first demonstrate to local jurisdictions they are in compliance with local zoning codes and ordinances to obtain a use permit, then they present this permit to obtain a license from the state ABC board (Wittman, 2016). Our findings indicate that rather than prevent outlet establishment altogether, restrictive policies may instead facilitate overconcentration of outlets in segregated neighborhoods defined by high black isolation.

Our findings thus bring to light a potential mechanism perpetuating systemic racism at the county level – via alcohol policy. Cynical use of alcohol policy to target black communities in the South is not without precedent. In an analysis of the politics of prohibition in the post-Reconstruction South, Denise Herd (1983) showed that alcohol policy was used to restrict black people, albeit with opposite (prohibition) policy proscriptions. She traced the racist links between Prohibition era anti-liquor and black disenfranchisement campaigns and Jim Crow legislation, demonstrating how characterizations stereotyping black people as drunks and their vote as “hopelessly corrupted by liquor” were used to promote anti-liquor policies and disenfranchisement, despite the fact that black people had “long-supported” temperance and were noted for their relatively “infrequent drunkenness” and low level of alcohol related problems (Herd, 1983, p. 78). The associations between black residents and alcohol, as well

between alcohol and immoral behavior, painted by these early stereotypes were long lasting. While the history of prohibition policies enacted to reduce access to liquor for black people in the guise of preventing disorder would predict that contemporary black areas have lower outlet densities, as societal norms around alcohol and its use have changed so may have how policy regulating it is wielded.

Indeed, instead of keeping outlets out of black communities, contemporary alcohol prohibition policies appear to facilitate their overconcentration in segregated black communities in Alabama and Louisiana, demonstrated by the present study, and nationally (Romley et al., 2007). In doing so, given the connection between outlets and negative health outcomes (Cunradi 2010; Freisthler et al., 2005; Gruenewald et al., 1993; Livingston et al., 2007; Morrison et al., 2016b; Scribner et al., 1999, 1995, 1994), such policy may further exacerbate the systemic effects of economic and political marginalization experienced by black neighborhoods around the country. Our findings that policy matters align with other contemporary analyses that find overconcentration of off-sale alcohol outlets in block groups that had higher concentrations of black residents and economic disadvantage and a history of redlining, racially discriminatory mortgage lending policy (Trangenstein et al., 2020).

A number of limitations should be considered in the interpretation of the findings. Although the findings suggest an association between overconcentration of alcohol outlets in black neighborhoods and local alcohol policy, unobserved factors could account for the relationship, e.g. changes in neighborhood composition. Variations in specific county policies might follow other trends that, if discovered, would better explain this effect. Additionally, the cross sectional nature of this study means that we are unable to definitively determine causality, e.g., to establish whether changes in outlet density followed or preceded changes in racial composition. We cannot rule out that some of what we see is due to population change. However, a recent study of the distribution of alcohol outlets which assessed temporal trends of income and population in longitudinal analyses (Jin et al., 2018) found that their results were consistent with earlier cross-sectional studies (LaVeist and Wallace, 2000; Morrison et al., 2016a). As demonstrating discriminatory intent of human actors is challenging in policy research (Goetz et al., 2020), we describe discrimination via presentation of outcome differences and discuss their consistency with discriminatory patterns in land use and zoning. Further qualitative investigation of local policy implementation would help to identify and analyze themes across policies.

In addition, the multilevel model did not account for spatial correlation or potential spillover effects, which have been reported in studies conducted at the census block group level. However, if unaccounted for spillover from adjoining neighborhoods does contribute to exposure, e.g., if high isolation tracts are more likely to have neighbors that are high isolation, the net result of this systematic misclassification (if one exists) would be to underestimate exposure, biasing the estimated association with outlet density toward the null (Spielman and Yoo, 2009; Vogel and South, 2016). Random misclassification would also tend to bias evidence of association toward the null. In other words, not accounting for spillover effects would likely produce estimates that are more conservative rather than spuriously strong. While our results suggest that policy may be an important mechanism of outlet distribution at the tract level, future research aimed at a more localized understanding

of this relationship could investigate these questions using emerging multilevel spatial models with finer spatial units (Arcaya et al., 2012; Morrison et al., 2016a). Another consideration is the use of personal GPS tracking and other methods to account for an individual's activity space, wherein they may encounter exposures in multiple places during daily travels (e.g., Caryl et al., 2019; Chambers et al., 2018). Finally, future research could directly examine the mechanisms by which outlets produce specific health inequities. Nevertheless, while taking these into account, our illustration of the modifying effect of alcohol policy on the relationship between social contextual factors like residential racial segregation and built environment features, like alcohol outlets, known to impact health is important to understanding the relationship between built environment and health.

Conclusion and Implications

How policy shapes the connection between societal features like residential racial segregation, and built environment features, like overconcentration of alcohol outlets, illustrates a systemic mechanism by which racism may affect health. The overconcentration of off-sale alcohol outlets, a built environment feature known to be associated with negative health outcomes (Cunradi, 2010; Freisthler et al., 2005; Gruenewald et al., 1993; Livingston et al., 2007; Morrison et al., 2016b; Scribner et al., 1999, 1995, 1994), in black neighborhoods in counties with restrictive alcohol policies may be in part a continuation, albeit in mirror image, of the use of anti-liquor and policies of the prohibition era (Herd, 1983) to oppress black people. This parallels the contemporary differential impact of drug and alcohol policy on black people and other communities of color. Health researchers and planners would be well served to examine specific prohibition policies to assess their impact on health equity.

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References

- Agresti A, 2012 *Categorical Data Analysis*, Edición: 3. ed. Wiley, Hoboken, NJ.
- Ahern J, Balzer L, Galea S, 2015 The roles of outlet density and norms in alcohol use disorder. *Drug Alcohol Depend.* 151, 144–150. 10.1016/j.drugalcdep.2015.03.014 [PubMed: 25858787]
- Ahmed AT, Mohammed SA, Williams DR, 2007 Racial discrimination & health: Pathways & evidence. *Indian J. Med. Res.* 126, 318. [PubMed: 18032807]
- Alabama Alcoholic Beverage Control Board, n.d. Alabama Alcoholic Beverage Control Board [WWW Document]. Ala. Alcohol. Beverage Control Board. URL <http://alabcboard.gov/> (accessed 8.4.18).
- Arcaya M, Brewster M, Zigler CM, Subramanian SV, 2012 Area variations in health: A spatial multilevel modeling approach. *Health Place, Infectious Insecurities* 18, 824–831. 10.1016/j.healthplace.2012.03.010
- Bailey ZD, Krieger N, Agenor M, Graves J, Linos N, Basset MT, 2017 Structural racism and health inequities in the USA: evidence and interventions. *The Lancet* 389, 1453–1463. 10.1016/S0140-6736(17)30569-X
- Barnett J, 1974 *Urban design as public policy; practical methods for improving cities*. Architectural Record Books [1974], New York, NY.

- Berke EM, Tanski SE, Demidenko E, Alford-Teaster J, Shi X, Sargent JD, 2010 Alcohol Retail Density and Demographic Predictors of Health Disparities: A Geographic Analysis. *Am. J. Public Health* 100, 1967–1971. 10.2105/AJPH.2009.170464 [PubMed: 20724696]
- Block JP, Scribner RA, DeSalvo KB, 2004 Fast food, race/ethnicity, and income: A geographic analysis. *Am. J. Prev. Med.* 27, 211–217. 10.1016/j.amepre.2004.06.007 [PubMed: 15450633]
- Bourdieu P, 1986 The Forms of Capital, in: Richardson JG (Ed.), *Handbook of Theory and Research for the Sociology of Education*. Greenwood Press, New York, pp. 241–58. 10.1002/9780470755679.ch15
- Braveman PA, Kumanyika S, Fielding J, LaVeist T, Borrell LN, Manderscheid R, Troutman A, 2011 Health Disparities and Health Equity: The Issue Is Justice. *Am. J. Public Health* 101, S149–S155. 10.2105/AJPH.2010.300062 [PubMed: 21551385]
- Caryl F, Shortt NK, Pearce J, Reid G, Mitchell R, 2019 Socioeconomic inequalities in children's exposure to tobacco retailing based on individual-level GPS data in Scotland. *Tob. Control.* 10.1136/tobaccocontrol-2018-054891
- Chambers T, Stanley J, Signal L, Pearson AL, Smith M, Barr M, Ni Mhurchu C, 2018 Quantifying the Nature and Extent of Children's Real-time Exposure to Alcohol Marketing in Their Everyday Lives Using Wearable Cameras: Children's Exposure via a Range of Media in a Range of Key Places. *Alcohol Alcohol* 53, 626–633. 10.1093/alcalc/agy053 [PubMed: 30052769]
- Chang-Martinez C, Ahmed NU, Natale RA, 2017 Residential Segregation, Neighborhood Social and Physical Context in Obesity Disparities in Hispanic Preschoolers: A Conceptual Model. *J. Health Disparities Res. Pract* 10, 24.
- City of Oakland v Superior Court, 1996, Cal App 4th.
- Cohen LE, Felson M, 1979 Social Change and Crime Rate Trends: A Routine Activity Approach. *Am. Sociol. Rev* 44, 588–608.
- Cronin CE, Gran BK, 2018 The importance of environment: Neighborhood characteristics and parent perceptions of child health. *J. Child Health Care* 22, 658–669. 10.1177/1367493518768453 [PubMed: 29618238]
- Cummins S, Curtis S, Diez-Roux AV, Macintyre S, 2007 Understanding and representing 'place' in health research: A relational approach. *Soc. Sci. Med.* 65, 1825–1838. 10.1016/j.socscimed.2007.05.036 [PubMed: 17706331]
- Cunradi CB, 2010 Neighborhoods, Alcohol Outlets and Intimate Partner Violence: Addressing Research Gaps in Explanatory Mechanisms. *Int. J. Environ. Res. Public Health* Vol 7 Iss 3 Pp 799–813 2010 799. 10.3390/ijerph7030799 [PubMed: 20617004]
- Diez Roux AV, Mair C, 2010 Neighborhoods and health. *Ann. N. Y. Acad. Sci.* 1186, 125–145. 10.1111/j.1749-6632.2009.05333.x [PubMed: 20201871]
- Feagin J, 2006 *Systemic racism: a theory of oppression*. Routledge, New York.
- Feagin J, Bennefield Z, 2014 Systemic racism and U.S. health care. *Soc. Sci. Med., Structural Stigma and Population Health* 103, 7–14. 10.1016/j.socscimed.2013.09.006
- Feagin J, Elias S, 2013 Rethinking racial formation theory: a systemic racism critique. *Ethn. Racial Stud.* 36, 931–960. 10.1080/01419870.2012.669839
- Foster S, Hooper P, Knuiman M, Lester L, Trapp G, 2018 Associations between proposed local government liquor store size classifications and alcohol consumption in young adults. *Health Place* 52, 170–173. 10.1016/j.healthplace.2018.06.001 [PubMed: 29913358]
- Franco M, Diez Roux AV, Glass TA, Caballero B, Brancati FL, 2008 Neighborhood Characteristics and Availability of Healthy Foods in Baltimore. *Am. J. Prev. Med.* 35, 561–567. 10.1016/j.amepre.2008.07.003 [PubMed: 18842389]
- Franklin FA, LaVeist TA, Webster DW, Pan WK, 2010 Alcohol Outlets and Violent Crime in Washington D.C. *West. J. Emerg. Med.* 11, 283–290. [PubMed: 20882151]
- Freisthler B, Needell B, Gruenewald PJ, 2005 Is the physical availability of alcohol and illicit drugs related to neighborhood rates of child maltreatment? *Child Abuse Negl.* 29, 1049–1060. 10.1016/j.chiabu.2004.12.014 [PubMed: 16168479]
- Gaskin DJ, Thorpe RJ, McGinty EE, Bower K, Rohde C, Young JH, LaVeist TA, Dubay L, 2014 Disparities in Diabetes: The Nexus of Race, Poverty, and Place. *Am. J. Public Health* 104, 2147–2155. 10.2105/AJPH.2013.301420 [PubMed: 24228660]

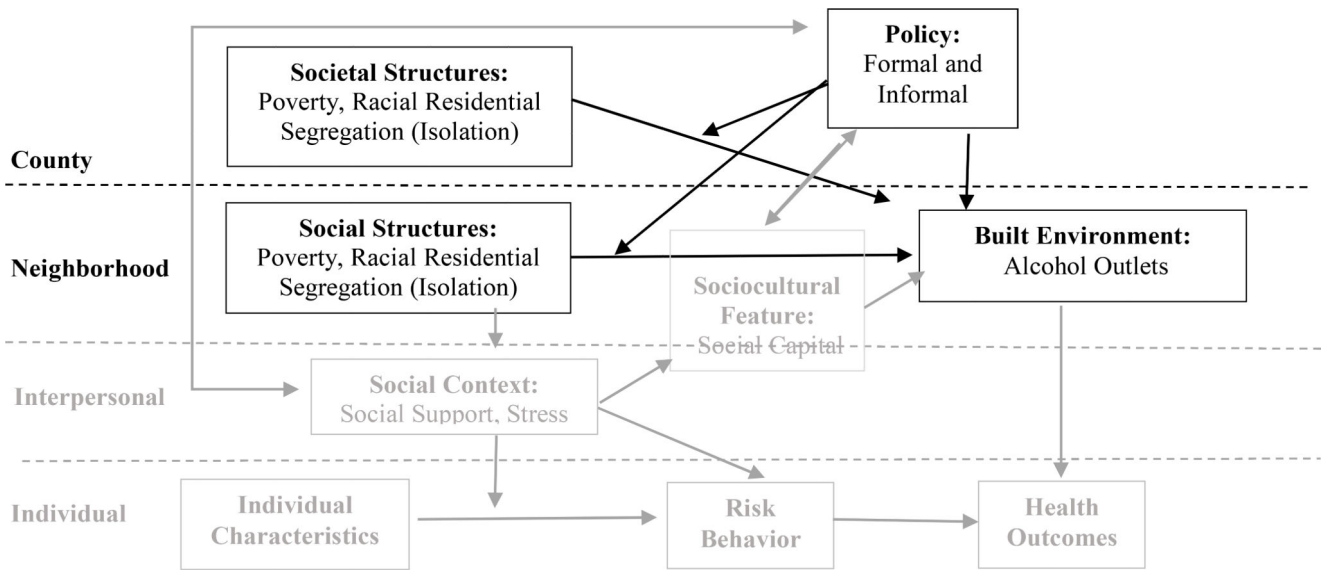
- Geronimus AT, Hicken M, Keene D, Bound J, 2006 “Weathering” and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States. *Am. J. Public Health* 96, 826–833. [PubMed: 16380565]
- Goetz EG, Williams RA, Damiano A, 2020 Whiteness and Urban Planning. *J. Am. Plann. Assoc* 86, 142–156. 10.1080/01944363.2019.1693907
- Gordon E, Hobday M, Gilmore W, Lensvelt E, Chikritzhs T, 2015 A systematic literature review of off-site outlet density and alcohol-related harm. *Drug Alcohol Rev.* 34, 29–30.
- Gruenewald PJ, Ponicki WR, Holder HD, 1993 The Relationship of Outlet Densities to Alcohol Consumption: A Time Series Cross-Sectional Analysis. *Alcohol. Clin. Exp. Res.* 17, 38–47. 10.1111/j.1530-0277.1993.tb00723.x [PubMed: 8452207]
- Herd DA, 1983 Prohibition, racism and class politics in the post-Reconstruction South. *J. Drug Issues* 13, 77–94.
- Jennings JM, Milam AJ, Greiner A, Furr-Holden CDM, Curriero FC, Thornton RJ, 2014 Neighborhood Alcohol Outlets and the Association with Violent Crime in One Mid-Atlantic City: The Implications for Zoning Policy. *J. Urban Health Bull. N. Y. Acad. Med.* 91, 62–71. 10.1007/s11524-013-9821-z
- Jin Z, Chang HH, Ponicki WR, Gaidus A, Waller LA, Morrison C, Gruenewald PJ, 2018 Longitudinal Impacts of Two Causal Drivers of Alcohol Demand on Outlet Concentrations within Community Settings: Population Size and Income Effects. *Spat. Spatio-Temporal Epidemiol.* 27, 21–28. 10.1016/j.sste.2018.07.003
- Jones CP, 2001 Invited Commentary: “Race,” Racism, and the Practice of Epidemiology. *Am. J. Epidemiol.* 154, 299–304. 10.1093/aje/154.4.299 [PubMed: 11495851]
- Jones CP, 2000 Levels of racism: a theoretic framework and a gardener’s tale. *Am. J. Public Health* 90, 1212. [PubMed: 10936998]
- Kershaw KN, Albrecht SS, 2015 Racial/ethnic residential segregation and cardiovascular disease risk. *Curr. Cardiovasc. Risk Rep* 9 10.1007/s12170-015-0436-7
- Kershaw KN, Pender AE, 2016 Racial/Ethnic Residential Segregation, Obesity, and Diabetes Mellitus. *Curr. Diab. Rep.* 16, 108 10.1007/s11892-016-0800-0 [PubMed: 27664041]
- King K, 2013 Neighborhood Walkable Urban Form and C-Reactive Protein. *Prev. Med.* 57, 850–854. 10.1016/j.ypmed.2013.09.019 [PubMed: 24096140]
- Krieger N, 2001 Theories for social epidemiology in the 21st century: an ecosocial perspective. *Int. J. Epidemiol.* 30, 668–677. 10.1093/ije/30.4.668 [PubMed: 11511581]
- Krieger N, Chen JT, Waterman PD, Rehkopf DH, Subramanian SV, 2003 Race/Ethnicity, Gender, and Monitoring Socioeconomic Gradients in Health: A Comparison of Area-Based Socioeconomic Measures—The Public Health Disparities Geocoding Project. *Am. J. Public Health* 93, 1655–1671. 10.2105/AJPH.93.10.1655 [PubMed: 14534218]
- Larson NI, Story MT, Nelson MC, 2009 Neighborhood Environments: Disparities in Access to Healthy Foods in the U.S. *Am. J. Prev. Med.* 36, 74–81.e10. 10.1016/j.amepre.2008.09.025 [PubMed: 18977112]
- LaVeist T, Wallace JM, 2000 Health risk and inequitable distribution of liquor stores. *Soc. Sci. Med.* 51, 613–617. [PubMed: 10868674]
- Livingston M, 2012 The social gradient of alcohol availability in Victoria, Australia. *Aust. N. Z. J. Public Health* 36, 41–47. 10.1111/j.1753-6405.2011.00776.x [PubMed: 22313705]
- Livingston M, Chikritzhs T, Room R, 2007 Changing the density of alcohol outlets to reduce alcohol-related problems. *Drug Alcohol Rev.* 26, 557–566. [PubMed: 17701520]
- Louisiana Office of Alcohol and Tobacco Control, n.d. The Louisiana Office of Alcohol and Tobacco Control [WWW Document]. La. Off. Alcohol Tob. Control. URL <http://www.atc.rev.state.la.us/> (accessed 8.4.18).
- Macintyre S, Ellaway A, Cummins S, 2002 Place effects on health: how can we conceptualise, operationalise and measure them? *Soc. Sci. Med.* 55, 125–139. 10.1016/S0277-9536(01)00214-3 [PubMed: 12137182]
- Mair C, Frankeberger J, Gruenewald PJ, Morrison CN, Freisthler B, 2019 Space and Place in Alcohol Research. *Curr. Epidemiol. Rep.* 6, 412.

- Mama S, Bhuiyan N, Lengerich E, 2019 Impact of the Built Environment on Physical Activity in Rural Cancer Survivors. *Cancer Epidemiol. Biomarkers Prev.* 28, 623–624.
- Massey DS, Denton NA, 1988 The Dimensions of Residential Segregation. *Soc. Forces* 67, 281–307. 10.2307/2579183
- McEwen BS, 1998 Stress, adaptation, and disease. Allostasis and allostatic load. *Ann. N. Y. Acad. Sci.* 840, 33–44. [PubMed: 9629234]
- McEwen BS, Stellar E, 1993 Stress and the individual. Mechanisms leading to disease. *Arch. Intern. Med.* 153, 2093–2101. [PubMed: 8379800]
- Mennis J, Stahler GJ, Mason MJ, 2016 Risky Substance Use Environments and Addiction: A New Frontier for Environmental Justice Research. *Int. J. Environ. Res. Public Health* 13 10.3390/ijerph13060607
- Morrison C, Gruenewald PJ, Ponicki WR, 2016a Race, Ethnicity, and Exposure to Alcohol Outlets. *J. Stud. Alcohol Drugs* 77, 68–76. [PubMed: 26751356]
- Morrison C, Smith K, Gruenewald PJ, Ponicki WR, Lee JP, Cameron P, 2016b Relating off-premises alcohol outlet density to intentional and unintentional injuries. *Addiction* 111, 56–64. 10.1111/add.13098 [PubMed: 26283189]
- Mosher JF, Treffers RD, 2013 State Pre-emption, Local Control, and Alcohol Retail Outlet Density Regulation. *Am. J. Prev. Med.* 44, 399–405. 10.1016/j.amepre.2012.11.029 [PubMed: 23498107]
- Platt RH, 2014 *Land Use and Society: Geography, Law, and Public Policy*. Island Press, Washington, DC 10.5822/978-1-61091-455-0_1
- Portes A, 1998 Social Capital: Its Origins and Applications in Modern Sociology 24, 1–24.
- Ratcliffe M, n.d. Understanding “Place” in Census Bureau Data Products.
- Romley JA, Cohen D, Ringel J, Sturm R, 2007 Alcohol and environmental justice: the density of liquor stores and bars in urban neighborhoods in the United States. *J. Stud. Alcohol Drugs* 68, 48–55. [PubMed: 17149517]
- Saini G, Ogden A, McCullough LE, Torres M, Rida P, Aneja R, 2019 Disadvantaged neighborhoods and racial disparity in breast cancer outcomes: the biological link. *Cancer Causes Control* 30, 677–686. 10.1007/s10552-019-01180-4 [PubMed: 31111277]
- Sampson RJ, Raudenbush SW, Earls F, 1997 Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy. *Science* 277, 918–924. [PubMed: 9252316]
- Schulz AJ, Mentz G, Lachance L, Johnson J, Gaines C, Israel BA, 2012 Associations Between Socioeconomic Status and Allostatic Load: Effects of Neighborhood Poverty and Tests of Mediating Pathways. *Am. J. Public Health* 102, 1706–1714. 10.2105/AJPH.2011.300412 [PubMed: 22873478]
- Scribner R, 2013 Commentary on Halonen et al. (2013): Exposure to alcohol outlets and alcohol consumption—back to square one? *Addiction* 108, 329–330. 10.1111/add.12038 [PubMed: 23331882]
- Scribner R, Cohen D, Kaplan S, Allen SH, 1999 Alcohol availability and homicide in New Orleans: conceptual considerations for small area analysis of the effect of alcohol outlet density. *J. Stud. Alcohol* 60, 310–316. [PubMed: 10371257]
- Scribner R, MacKinnon DP, Dwyer JH, 1995 The risk of assaultive violence and alcohol availability in Los Angeles County. *Am. J. Public Health* 85, 335–340. [PubMed: 7892915]
- Scribner R, MacKinnon DP, Dwyer JH, 1994 Alcohol outlet density and motor vehicle crashes in Los Angeles County cities. *J. Stud. Alcohol* 55, 447–453. [PubMed: 7934052]
- Seeman T, Epel E, Gruenewald T, Karlamangla A, McEwen BS, 2010 Socio-economic differentials in peripheral biology: Cumulative allostatic load. *Ann. N. Y. Acad. Sci.* 1186, 223–239. 10.1111/j.1749-6632.2009.05341.x [PubMed: 20201875]
- Shortt NK, Rind E, Pearce J, Mitchell R, Curtis S, 2018 Alcohol Risk Environments, Vulnerability, and Social Inequalities in Alcohol Consumption. *Ann. Am. Assoc. Geogr.* 108, 1210–1227. 10.1080/24694452.2018.1431105 [PubMed: 32154488]
- Spielman SE, Yoo E, 2009 The spatial dimensions of neighborhood effects. *Soc. Sci. Med.* 68, 1098–1105. 10.1016/j.socscimed.2008.12.048 [PubMed: 19167802]

- Subica AM, Douglas JA, Kepple NJ, Villanueva S, Grills CT, 2018 The geography of crime and violence surrounding tobacco shops, medical marijuana dispensaries, and off-sale alcohol outlets in a large, urban low-income community of color. *Prev. Med.* 108, 8–16. 10.1016/j.ypmed.2017.12.020 [PubMed: 29277409]
- Timperio A, Veitch J, Carver A, 2015 Safety in numbers: Does perceived safety mediate associations between the neighborhood social environment and physical activity among women living in disadvantaged neighborhoods? *Prev. Med.* 74, 49–54. 10.1016/j.ypmed.2015.02.012 [PubMed: 25735603]
- Towne SD, Probst JC, Hardin JW, Bell BA, Glover S, 2017 Health & access to care among working-age lower income adults in the Great Recession: Disparities across race and ethnicity and geospatial factors. *Soc. Sci. Med.* 182, 30–44. 10.1016/j.socscimed.2017.04.005 [PubMed: 28411525]
- Trangenstein PJ, Curriero FC, Webster DW, Jennings JM, Latkin C, Eck R, Jernigan DH, 2018 Outlet Type, Access to Alcohol, and Violent Crime. *Alcohol. Clin. Exp. Res.* 42, 2234–2245. 10.1111/acer.13880 [PubMed: 30256427]
- Trangenstein PJ, Gray C, Rossheim ME, Sadler R, Jernigan DH, 2020 Alcohol Outlet Clusters and Population Disparities. *J. Urban Health* 97, 123–136. 10.1007/s11524-019-00372-2 [PubMed: 31264024]
- United States Census Bureau, n.d. Places, in: United States Census Bureau Geography. United States Census Bureau, Washington, D.C.
- US Census Bureau, n.d. American Community Survey (ACS) [WWW Document]. URL <https://www.census.gov/programs-surveys/acs> (accessed 8.4.18).
- US Department of Health and Human Services, 2014 Healthy People 2020 Framework. US Department of Health and Human Services, Washington, D.C.
- Village of Euclid v Amber Realty Co., 1926, US.
- Vogel M, South SJ, 2016 Spatial Dimensions of the Effect of Neighborhood Disadvantage on Delinquency*. *Criminology* 54, 434–458. 10.1111/1745-9125.12110
- Williams DR, 1999 Race, Socioeconomic Status, and Health The Added Effects of Racism and Discrimination. *Ann. N. Y. Acad. Sci.* 896, 173–188. 10.1111/j.1749-6632.1999.tb08114.x [PubMed: 10681897]
- Williams DR, Collins C, 2001 Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Rep.* 116, 404–416. [PubMed: 12042604]
- Wittman FD, 2016 Halfway there – The evolution of local alcohol control in California. Part I: The system as it has developed. *Int. J. Alcohol Drug Res.* 5, 101 10.7895/ijadr.v5i3.228
- Xiao Y-Y, Graham G, 2019 Where we live: The impact of neighborhoods and community factors on cardiovascular health in the United States. *Clin. Cardiol.* 42, 184–189. 10.1002/clc.23107 [PubMed: 30393880]

Highlights

- Higher concentration of alcohol outlets in predominantly black neighborhoods of segregated counties
- Controlling for poverty, relationship persists only within “damp” counties
- Evidence of contemporary actualization of historical use of alcohol policy in the South



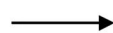

 Indicate pathways directly examined in this analysis.
 Indicate pathways not directly examined in this analysis.

Figure 1.
Conceptual model.

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Table 1.

Types of Alcohol License Credentials listed by State.

Item	Credential
Alabama	
On-sale	Club Liquor – Class I
	Club Liquor – Class II
	Lounge Retail Liquor – Class I
	Restaurant Retail Liquor
Off-sale	Retail Beer (On or Off Premises)
	Retail Table Wine (On or Off Premises)
	Lounge Retail Liquor – Class II (Package)
	Retail Beer (Off Premises Only)
	Retail Table Wine (Off Premises Only)
Louisiana	
On-sale	Class A Beer
	Class A Beer and Liquor
Off-sale	Class B Beer
	Class B Beer and Liquor
	Class B Liquor

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Table 2.

County and tract characteristics, overall and by county alcohol policy.

Item	Overall	County alcohol policy ¹		p-value
		Wet	Damp	
Counties, N	131	91	40	
State				0.179
Alabama, % (N)	51.15 (67)	47.25 (43)	60.00 (24)	
Louisiana, % (N)	48.85 (64)	52.75 (48)	40.00 (16)	
Black Isolation, median (range)	0.43 (0.01, 0.86)	0.46 (0.04, 0.86)	0.29 (0.01, 0.63)	<.0001
Poverty, median (range)	0.20 (0.08, 0.40)	0.19 (0.08, 0.40)	0.20 (0.13, 0.29)	0.483
Tracts, N	2,263	1,877	386	
Black Isolation, median (range)	-0.14 (-0.78, 0.67)	-0.16 (-0.78, 0.49)	-0.06 (-0.60, 0.67)	<.0001
Poverty, median (range)	0 (-0.24, 0.59)	0 (-0.24, 0.59)	0 (-0.18, 0.35)	0.815
Off-sale Outlet Density, median (range)	0.97 (0, 8.4)	1.03 (0, 8.4)	0.48 (0, 4.3)	<.0001

¹Wet counties have no laws that prohibit or restrict alcohol sales while damp counties prohibit the sale of alcohol in all or some parts of the county.

Model parameter estimates and standard error (SE) from multilevel generalized linear models of off-sale outlets per 1,000 residents, overall and stratified by county alcohol policy.

Table 3.

Item	Overall			County alcohol policy ¹		
	Estimate (SE)	p-value		Wet	Damp	
Intercept	-0.40 (0.11)	0.0005	-0.25 (0.08)	0.002	-0.17 (0.45)	0.710
State	0.08 (0.06)	0.181	0.13 (0.04)	0.003	-0.15 (0.20)	0.471
Black Isolation						
County	0.69 (0.18)	0.0002	-0.34 (0.14)	0.017	0.70 (0.53)	0.191
Tract	0.13 (0.09)	0.145	0.002 (0.08)	0.981	1.85 (0.51)	0.0003
Poverty						
County	0.55 (0.60)	0.359	2.53 (0.46)	<0.0001	-0.57 (1.86)	0.761
Tract	1.66 (0.18)	<0.0001	1.74 (0.17)	<0.0001	0.40 (0.89)	0.654

¹Wet counties have no laws that prohibit or restrict alcohol sales while damp counties prohibit the sale of alcohol in all or some parts of the county.

Adjusted rate ratios (RR) and 95% confidence intervals (95% CI) from multilevel generalized linear models of off-sale outlets per 1,000 residents, overall and stratified by county alcohol policy.

Table 4.

	Overall	County alcohol policy ¹	
		Wet	Damp
		----- RR ² (95% CI) -----	
County Isolation	1.07 (1.04, 1.11)	0.97 (0.94, 0.99)	1.07 (0.97, 1.19)
Tract Isolation	1.01 (1.00, 1.03)	1.00 (0.98, 1.02)	1.20 (1.09, 1.33)
County Poverty	1.06 (0.94, 1.19)	1.29 (1.18, 1.41)	0.94 (0.65, 1.36)
Tract Poverty	1.18 (1.14, 1.22)	1.19 (1.15, 1.23)	1.04 (0.87, 1.24)

¹Wet counties have no laws that prohibit or restrict alcohol sales while damp counties prohibit the sale of alcohol in all or some parts of the county.

²Rate ratios are for a 10 percentage point increase. Bolded rate ratios are significantly different from 1 (see Table 3 for p-value).