Neighborhood Disadvantage and the Sales of Unhealthy Products: Alcohol, Tobacco, and Unhealthy Snack Food

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Research Objective

- People under stress tend to use unhealthy coping mechanisms such as consumption of alcohol, tobacco and unhealthy snacks.
- The purpose of this study is to study how neighborhood disadvantage, which may be a proxy for neighborhood stress, is associated with the sales of unhealthy products (alcohol, tobacco, and unhealthy snacks) at a discount variety store chain.
- Specifically, we consider the following measures of neighborhood socioeconomic status: Area Deprivation Index (ADI), population racial composition, and walkability score.

Study Design

- Mixed effects linear regressions with random effects were used to examine the relationship between the weekly unit sales (per 1000 population) of three outcome variables (tobacco, alcohol, unhealthy snacks) and neighborhood socioeconomic factors: ADI, racial composition (as indicated by the percentage of African-American households), percent of the population under 18 years old, and the walkability of the neighborhood.
- The Environmental Affordances model was used as our guiding framework.

Figure 1: The Environmental Affordances Model

Reference: Muzek B, Abdou CM, Hudson D, Kershaw KN, Rafferty JA, Lee H, Jacson JS. (203) "White Box" Epidemiology and the Social Neuroscience of Health Behaviors: The Environmental Affordances Model. *Soc. Ment Health*. 3(2): . doi:10.1177/2156869313480892.

Population Studied and Data Sources

Population studied:
- Alcohol, tobacco, and unhealthy snack sales were collected over a 20-month period in 2017 and 2018 in 16 discount variety stores. Census Block Group defines the community.

Data sources:
- DVS sales data over a period of 85 weeks, from August, 2016 through March, 2018 from 16 stores. The majority of these stores were in the Southeast portion of the United States.
- The majority of neighborhood socioeconomic variables were obtained from US Census American Community Survey (ACS) website based on 2015 estimates.

Outcome measures:
- Unhealthy snack foods were identified as: sugar sweetened beverages (excluding diet/sugar free), salty snacks, cookies & pastries, and candy.
- Tobacco, alcohol, and unhealthy snack food sales were obtained by dividing weekly unit sales in each category by block census population size.

Neighborhood socioeconomic status:
- Population size and percentage of African-American households were obtained at census block level from ACS.
- Walkability scores were obtained from walkscore.com. Walk Scores ranged from 0-100 with 100 being the most walkable.
- Area Deprivation Indices (ADI) that rank neighborhoods in terms of SES were obtained from the Department of Medicine, University of Wisconsin (https://www.neighborhoodatlas.medicine.wisc.edu/). ADI is measured as a percentile of Census Block Groups throughout the US, where the 99th percentile represents the highest level of neighborhood disadvantage.

Descriptive Statistics

Table 1: Neighborhood Socio-Demographic Characteristics of 16 Discount Variety Stores

Neighborhood Socio-Demographic Characteristics	Store Median [IQR], N=16 stores
Percentage of African-American households	74 [61,87]
Walk Score	48 [39,59]
Population	1068 [901,1889]
Percent population ages 0-17	25 [23,29]
ADI national rank percentile	87 [83,89]

Principal Findings

- The discount variety stores were located in neighborhoods where the median ADI percentile was 87 [interquartile range 83,89] (compared to median ADI percentile of 50 for the all US communities), indicating that the stores were located in disadvantaged neighborhoods.
- Per 1% increase in ADI, the weekly unit sales of unhealthy snack food increased by 43 [95% confidence interval 28-57] per store.
- In addition, per 1% increase in ADI, the weekly unit sales of tobacco products increased by 11.5 [95% confidence interval 5-18] per store.
- Of the 16 discount variety stores examined, only 8 sold alcohol products. No significant relationship between neighborhood disadvantage and the weekly unit sales of alcohol products was identified.

Table 2: Relationship between Area Deprivation Index and Neighborhood Characteristics and the Number of Unhealthy Snack Food Units Sold on Average by Store per Week

Neighborhood Socio-Demographic Characteristics	Coefficient	P-value	95% Confidence Interval	
Percentage of African-American households	-5.52	0.19	-12.64	1.60
Walk Score	-7.35	0.22	-17.61	2.92
ADI percentile	42.57	0.00	26.67	58.45
Percent population ages 0-17	62.73	0.02	23.28	102.18
Conditional R-squared = 0.64				

Table 3: Relationship between Area Deprivation Index and Neighborhood Characteristics and the Number of Tobacco Units Sold on Average by Store per Week

Neighborhood Socio-Demographic Characteristics	Coefficient	P-value	95% Confidence Interval	
Percentage of African-American households	-6.16	0.01	-9.35	-2.98
Walk Score	-6.18	0.03	-10.78	-1.59
ADI percentile	11.48	0.02	4.37	18.52
Percent population ages 0-17	22.00	0.05	4.35	39.64
Conditional R-squared = 0.85				

Conclusions

- The positive relationship between neighborhood disadvantage and the sales of unhealthy projects (tobacco and snack foods) may help explain the pathway between neighborhood disadvantage and these poor health outcomes. Further research to understand how neighborhood disadvantage influences resident health-related behaviors is warranted.