

# Obesogenic Food Environments in New Jersey

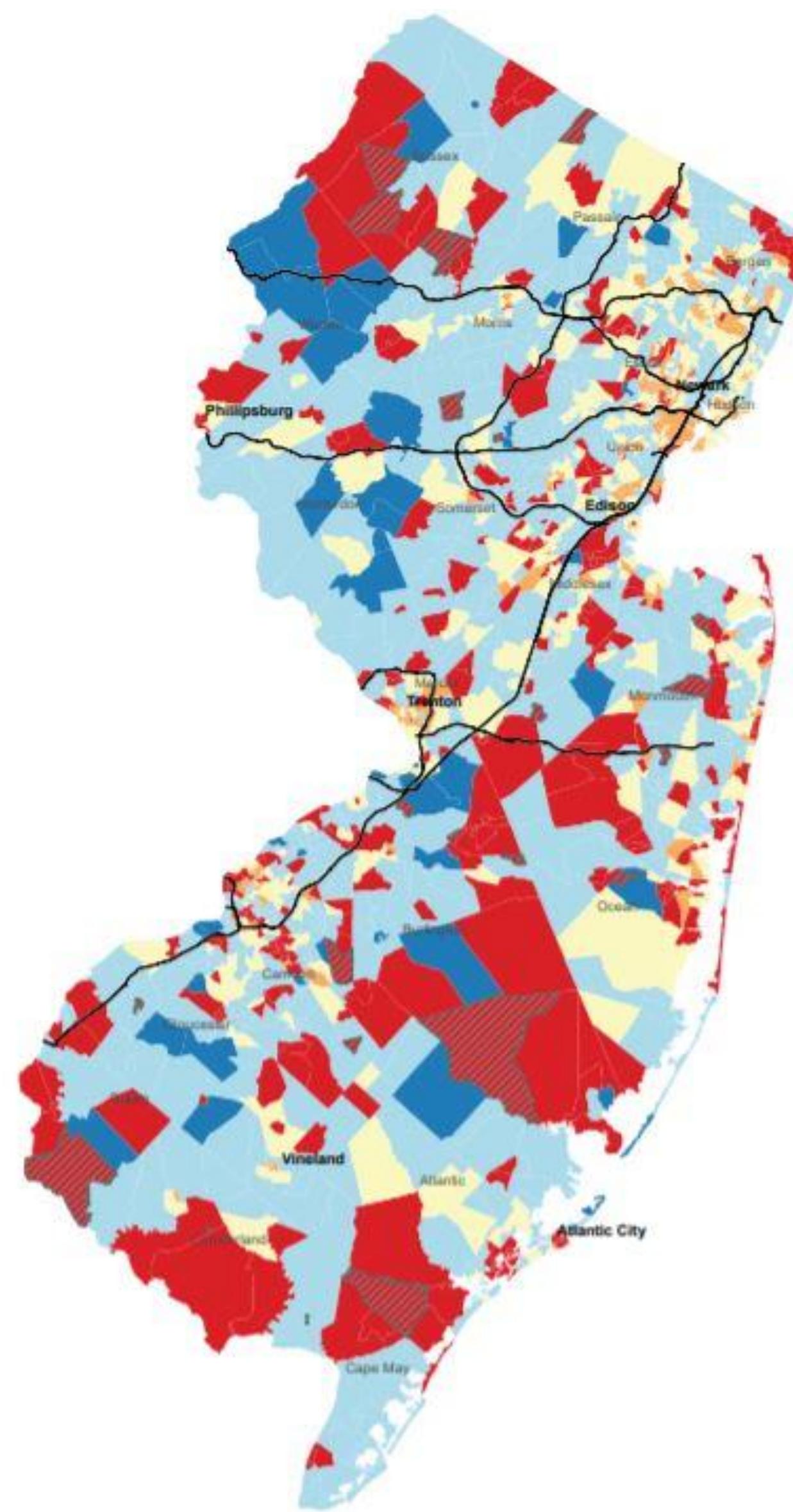
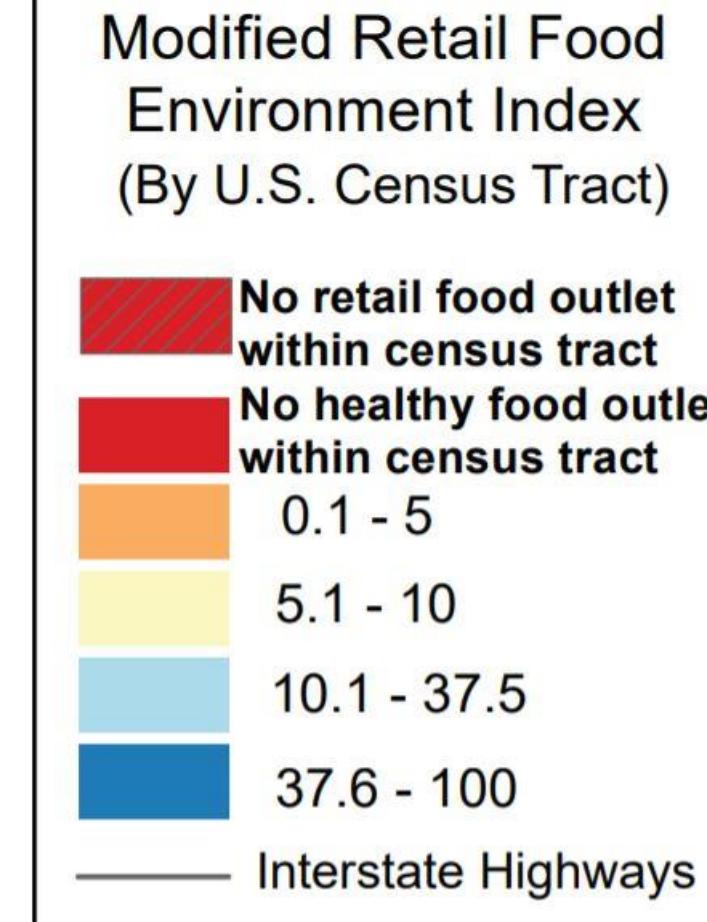
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## INTRODUCTION

Obesity, defined as  $BMI \geq 30$ , is on the rise in the United States, with a current prevalence of over 30%<sup>1</sup>. In the state of New Jersey, the prevalence is slightly better than the national average at 25.7%<sup>2</sup>. The most scrutinized causes are an overall decrease in physical activity and a corresponding rise in the availability of high-calorie food options. Our research focuses on the food environment and its relationship to the population BMI at the census tract level within the entire state of New Jersey. We also examine the interplay of BMI and unhealthy behaviors in 1695 census tracts within the state of New Jersey. The state is densely populated, racially and economically diverse, and has a wide distribution of rural to urban locales. We hope that a broader perspective will shed light on general trends in the relationship between food environment and public health.

## HYPOTHESIS

1. Obesity rates are inversely proportional to the quality of food environment.
2. Unhealthy behavior is positively correlated with obesity.



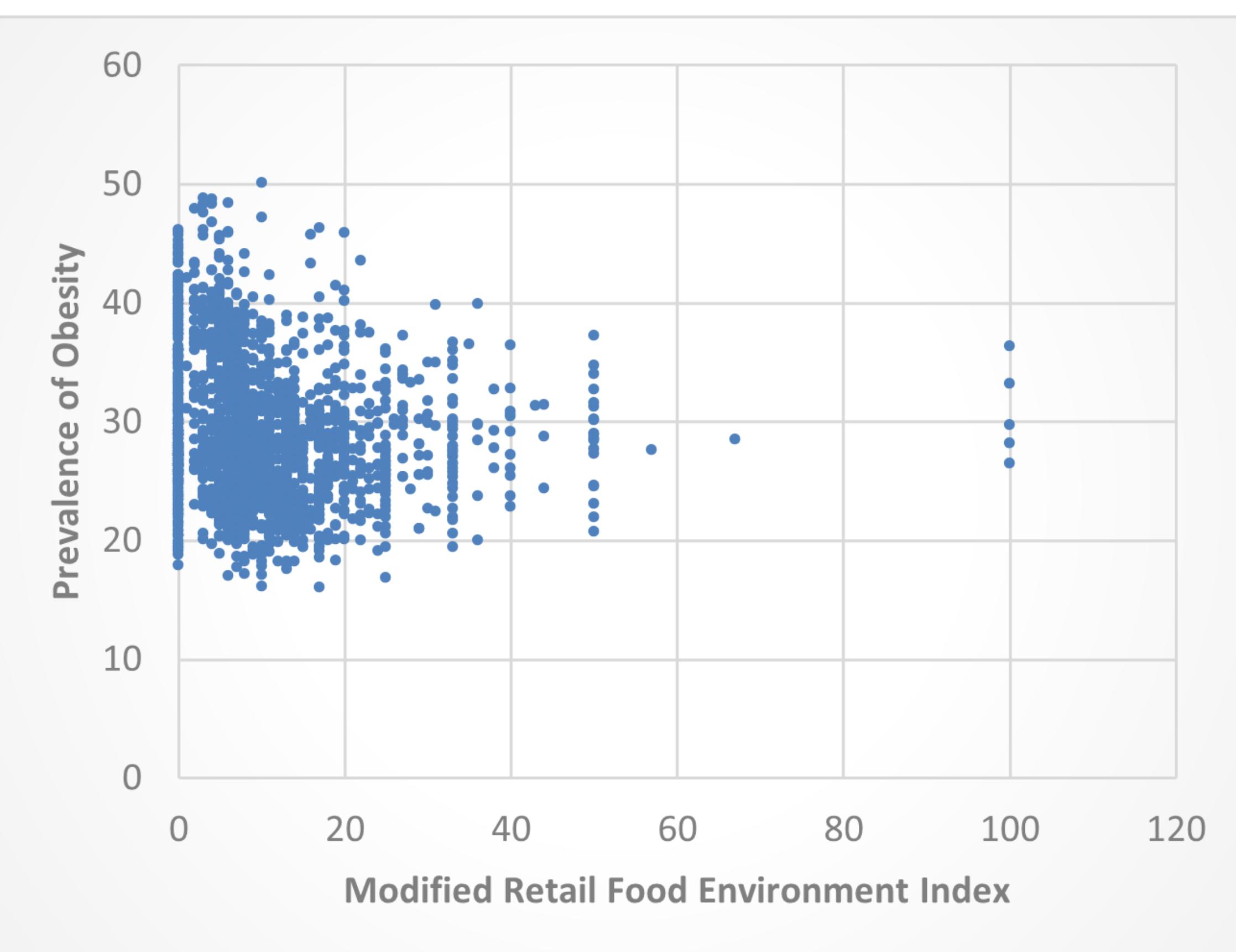
**Figure 1:** A map of NJ showing census tracts illustrating food swamps and food deserts<sup>3</sup>.

## METHODS

- Food environment quality is quantified by the Modified Retail Food Environment Index (mRFEI)<sup>3</sup>.

$$mRFEI = 100 \times \frac{\# \text{ Healthy Food Retailers}}{\# \text{ Healthy Food Retailers} + \# \text{ Less Healthy Food Retailers}}$$

- A higher value corresponds to a higher quality food environment.
- Behavior and demographics data are from the CDC PLACES project (Behavioral Risk Factor Surveillance System 2018 data, Census Bureau 2010 population estimates, and American Community Survey 2013-2018 estimates)
- Pearson correlation coefficients illustrate the strength of association.



**Figure 2:** A negative correlation between food environment quality (mRFEI) and obesity rates in 1695 NJ census tracts.

## RESULTS

We find a weak ( $r = -0.13$ ) but significant ( $p < 0.005$ ) negative correlation between mRFEI and obesity rate.

Obesity correlates positively with the following unhealthy behaviors:

Health Behavior	Pearson's r	p-value
Current Smoking	0.839	<0.0005
Lack of physical activity	0.767	<0.0005
Sleep <7 hrs/night	0.819	<0.0005

## DISCUSSION

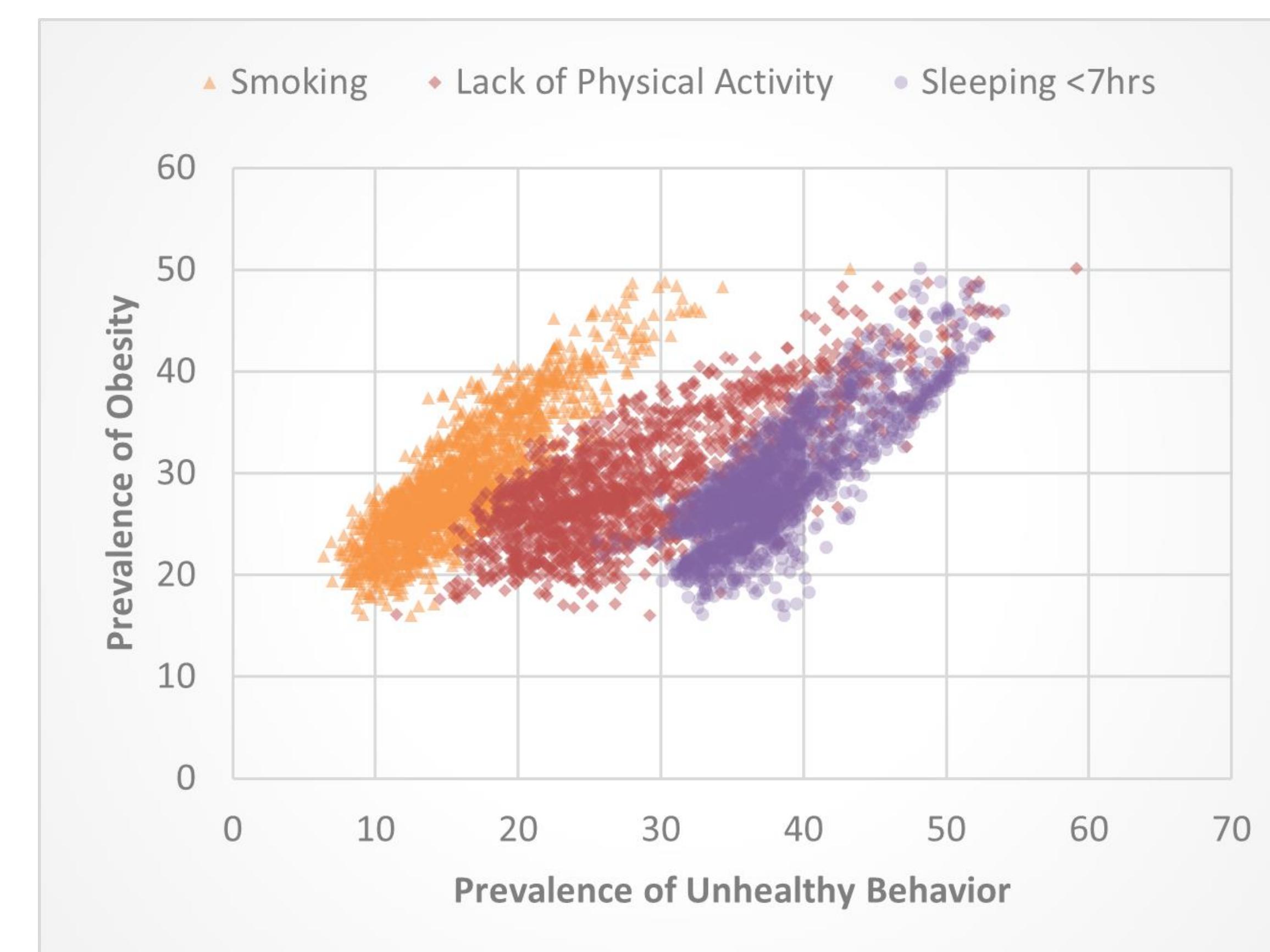
Our findings support both of our hypotheses.

- The quality of the food environment is negatively correlated with population BMI.
- There is significant positive correlation between obesity and prevalence of unhealthy behavior.
- It follows that the same negative correlation exists between food environment and unhealthy behavior.

Together, these findings suggest a role for zoning policies to control the type of food retailers that can open in an area.

Further exploration is warranted into the effect of food environment on rates of overweight status. Data from other states or on a national scale should be examined for similar trends. Comparisons could be made between matched geographic regions with and without zoning policies to see if they have a significant effect on population BMI.

A limitation of the research is that the data was pulled from five years of surveys. There is some variability in the number of food retailers, population size, and prevalence of obesity across that time period.



**Figure 3:** Three different health behaviors correlate positively with obesity prevalence.

1. National Center for Health Statistics. Percentage of obesity for adults aged 18 and over, United States, 2019. National Health Interview Survey. Generated interactively: Mar 19, 2021 from [https://www.cdc.gov/NHISDataQueryTool/SHS\\_2019\\_ADULT3/index.html](https://www.cdc.gov/NHISDataQueryTool/SHS_2019_ADULT3/index.html)

2. Behavioral Risk Factor Survey, Center for Health Statistics, New Jersey Department of Health, <http://www.state.nj.us/health/chs/njbrfs/>

3. Centers for Disease Control and Prevention. Census Tract Level State Maps of the Modified Retail Food Environment Index (mRFEI), 2011. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention