LOCATION ANALYSIS OF ALCOHOL BILLBOARDS

IN BEXAR COUNTY, TEXAS

THESIS

Presented to the Graduate Council of
Texas State University-San Marcos
in Partial Fulfillment
of the Requirements

for the Degree

Master of SCIENCE

by

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San Marcos, Texas
May 2013

LOCATION ANALYSIS OF ALCOHOL BILLBOARDS

IN BEXAR COUNTY, TEXAS

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DEDICATION

Dedicated to my family and friends: my dad, Rick Jimenez, mom, Lisa Jimenez, and

brothers Ricky and Austin Jimenez, for their continued love, support, and guidance both

in life and throughout my education.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Outdoor advertisements are one of the less expensive ways to advertise to large numbers of people. Outdoor advertising is found in almost every city across the world (East 2003). Typically, the advertisement is intended for passers-by along highways because it allows people to be exposed to the message repetitively.

In the United States, the Federal Trade Commission (FTC) regulates the consumer protection commerce practices including outdoor advertising by the tobacco and alcohol industries. The alcohol industry is allowed to self-regulate alcohol advertisements. The latest alcohol marketing and self-regulation report was published in 2008 (FTC 2008). Some cities and states have requirements for placement and size of outdoor advertising. One of the laws enacted after the 1998 Master Settlement Agreement (MSA) eliminated outdoor tobacco advertising (Niemeyer 2004). Several studies have examined the placement of harmful product advertisements (Hackbarth, Silvestri, and Cosper 1995; Schooler et al. 1996; Stoddard et al. 1997; Stoddard et al. 1998; Luke, Esmundo, and Bloom 2000; Kwate and Lee 2006). Most studies focus on small areas of cities or counties but rarely encompass an entire county. When the area of the study is very small, such as one neighborhood within a city, researchers fail to include the context within a larger area, such as a city or county. This scale problem can lead to biased results.

History and Use of Outdoor Advertisements

Ancient civilizations, like the Egyptians, used outdoor advertising. The Egyptians used stone obelisk to publicize laws and treaties. In 1796, illustrated posters began being used and the lithographic process was perfected. Outdoor advertising reached the United States in the 1830s with Jared Bell's circus posters that were more than 50 square feet in size. During this period, most roadside advertisements were only local. They were typically painted signs or glued posters on walls or fences to notify pedestrians of the goods that nearby stores provided (Outdoor Advertising Association of America 2012).

Over the past 20 years, the tobacco and alcohol industries have used outdoor advertisements, or billboards, to cheaply advertise their products around the world (Jernigan 1999). In 2008, the alcohol industry in the U.S. spent $3.13 billion on advertising with $1.78 million expended on outdoor advertisements (FTC 2008). Many in the advertising industry call outdoor advertising out-of-home advertising (OOH) because consumers can be targeted outside of their homes (Maverick Outdoor Media 2011). This method of advertising is used because the billboards are static and reach a large number of people that travel by them on their way to work, school, shopping, entertainment, etc. Billboard advertising has what the industry calls a high "impression rate" as the same people repetitively view the billboard, thereby increasing its effectiveness (Luke, Esmundo, and Bloom 2000).

Billboard Bans and Restrictions

In 1965, the federal government established the Highway Beautification Act to try to create more scenic thoroughfares. This legislation restricted signs to zoned commercial or industrial areas that local authorities designated (Taylor and Taylor 1994). Some states expanded this legislation even further and banned billboard advertisements altogether. Vermont, Maine, Alaska, Hawaii, and Rhode Island banned the construction of new billboards (Gatty 1991). Throughout the late 1990s, many campaigns tried to restrict or ban outdoor tobacco advertisements within urban communities and eventually within the entire nation (Hackbarth, Silvestri, and Cosper 1995; Garner 1996). These campaigns formed in response to views that billboards polluted communities and attempted to target vulnerable populations, such as minorities and schoolchildren (Hackbarth, Silvestri, and Cosper 1995; Stoddard et al. 1997; Luke, Esmundo, and Bloom 2000; Hackbarth et al. 2001; Mastro and Atkins 2002; Kwate and Meyer 2009; Pasch 2009; Stoddard et al. 2010).

In November 1998, the attorneys general of 46 states and tobacco companies signed the Master Settlement Agreement (MSA). The MSA banned all tobacco outdoor advertising that included billboards, signs, and placards in arenas, stadiums, shopping malls, transit advertising, windows facing outdoors, and video arcades (Luke, Esmundo, and Bloom 2000). Over the years, the location of billboards has continued to be a heated argument, underscoring such questions as whether the poor or minority groups are targeted by exposing them to high concentrations of harmful products (Abernathy and

Teel 1986; Tye, Warner, and Glantz 1987; Cohen 1989; Pollay 1989; King et al. 1991;

Pollay 1992).

Purpose Statement

The purpose of this research is to identify the socio-environmental landscape

where outdoor alcohol advertisements occur within Bexar County, Texas. For this

research, I will use the definition of socio-environmental landscape as the demographic

as well as the physical composition of the landscape. Using locations in Bexar County

exposed to outdoor alcohol advertisements, this research aims to identify specific

communities where outdoor alcohol advertisements and billboards are clustered to

understand the characteristics of these communities. Using alcohol retailers as proxies for

alcohol consumption, the study will also attempt to discover if places with more alcohol

consumption have more outdoor alcohol advertisements.

CHAPTER II

LITERATURE REVIEW

Site Selection and Location Analysis

Advertisers, retailers, and realtors use location analysis techniques to influence decisions regarding site selection (Lilien and Kotler 1983; Morrison and Abrahamse 1996; Alaniz 1998; Jones and Pearce 1999; Mendes and Themido 2004; Miller and Associates 2006; and Berke et al. 2010). According to Miller and Associates (2006), retail is governed simply by location, location, location. However, they also emphasize that two key criteria undergird location analysis: demographics and lifestyle. Hernandez and Bennison (2000) found that retailers employ ten techniques to make location decisions: experience, checklist, analogue models, ratios, multiple regression, discriminate analysis, cluster analysis, gravity models, expert systems, and neutral networks. One company does not use all of these site analysis methods but typically just one or two, with the exception of experience that is always drawn upon. Generally, the fewer locations a company owns, the fewer techniques they use for site selection. The demographic data of a market being assessed generally includes age, sex, number of households, median household income, educational attainment, ethnicity, and other specific variables of interest (Miller and Associates 2006).

Demographic data alone does not determine consumer behavior. Lifestyle Profile (LSP) research is also valuable (Miller and Associates 2006). Market segmentation is one of the most common ways to divide the lifestyle differences between groups within a population. Market segmentation strategies are essential because customers exhibit heterogeneous needs and purchasing patterns and thus respond differently to varying marketing stimuli (Segal and Giacobbe 1994). The LSP strategy uses data about a population and matches them with the audience being targeted. This targeted group is known as the market segment (Segal and Giacobbe 1994). The process of matching products to consumers is a market segmentation strategy. Large companies use third-party firms to collect and maintain information for multiple databases at different geographic scales and clustering algorithms to create the market scenarios (Jones and Pearce 1999).

Placement and Analysis of Billboards and Content

Scholars have conducted a number of studies that examine billboard placement and content, most particularly vice content, in cities including Chicago, San Diego, Los Angeles, St. Louis, New York, and San Francisco (Hackbarth, Silvestri, and Cosper 1995; Schooler et al. 1996; Stoddard et al. 1997; Stoddard et al. 1998; Luke, Esmundo, and Bloom 2000; Kwate and Lee 2006). Vice content includes both alcohol and cigarette advertisements (Altman and Schooler 1991; Hackbarth, Silvestri, and Cosper 1995; Stoddard et al. 1998; Luke, Esmundo, and Bloom 2000; Hackbarth et al. 2001;). Most of these studies that examined billboard advertisements were pre-Master Settle Agreement in November 1998 and investigated the locations of cigarette billboard advertisements.

A study in St. Louis revealed 19.5 percent of the 1,309 billboards in the city and county advertised tobacco products, with the next closest product being food at 10.6 percent. Investigators also found tobacco billboards were disproportionately located in poor African-American neighborhoods rather than white neighborhoods (Luke, Esmundo, and Bloom 2000). A Los Angeles study showed that billboard density was higher in minority neighborhoods than in white neighborhoods. The density of tobacco advertisements was significantly higher in African-American neighborhoods than in Hispanic and Asian neighborhoods. This research also revealed the concentration of billboards was 4.6 times higher in the city as opposed to the suburbs (Stoddard, Johnson, Boley-Cruz, Sussman 1997). Similarly, a study in Chicago found African-American neighborhoods had an average of 150 alcohol and tobacco billboards, while white majority neighborhoods averaged only 50 billboard advertisements (Hackbarth et al. 2001).

Primack, Bost, Land, and Fine (2007) conducted a systematic review of data from six articles relating to tobacco billboards, aggregated the results, and found there were 2.6 times as many tobacco advertisements per person in African-American neighborhoods compared to that of white neighborhoods. Their study also corroborated the density of the number of tobacco billboards increased in African-American markets.

With the body of research on billboards advertisements being relatively small, it is important to note almost all the studies focused on the difference between African-Americans and whites, thereby, overlooking Hispanics and their neighborhoods. With the exception of a few, these studies also neglect to examine an entire city or an entire county, a method which overlooks the context of the neighborhoods examined.

San Antonio Metropolitan Demographics and Selected Health Indicators

The core of San Antonio's population consists primarily of first-, second-, and third-generation Mexican Americans. People of Mexican descent account for 80 percent of the Latino population in San Antonio, and people of Hispanic/Latino origin account for 63 percent of the entire San Antonio population. In comparison to the United States, only 14 percent of the population is of Hispanic/Latino descent (U.S. Census Bureau 2010).

Figure 1 displays in red the 10 zip codes of 72, or 25% of 2010 population, Metro Health identified as high risk areas in San Antonio for ongoing public health problems and higher demand for social/city services due to high rates of maternal child issues. Because of the high concentration of poverty in these zip codes and health problems resulting from high numbers of births to both single and school-age mothers, children in these areas are more likely to experience problems that may serve as barriers to success (Health Profiles 2010).

The acculturation and acculturation processes of Mexican Americans happens differentially depending on the generation. The first and second generations tend to keep their native language and beliefs with which they came to the United States, while the younger generations assimilate much faster. The assimilation of those born in the U.S. occurs very quickly as they begin to take on the language and culture of those around
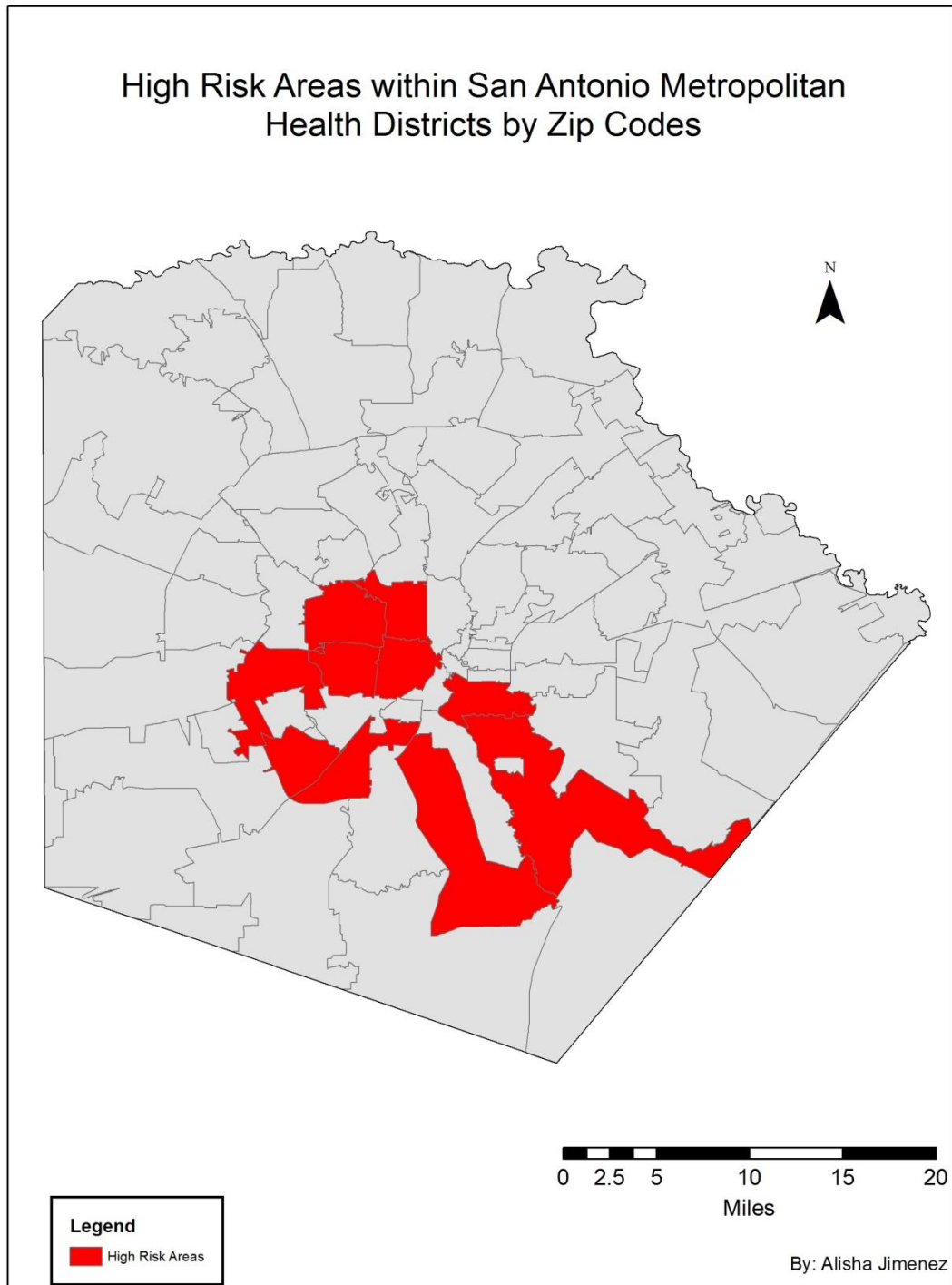
Figure 1. High Risk Areas within San Antonio Metropolitan Health Districts by Zip Codes. Source: Health Profiles, 2010.

them (Circles of San Antonio Community Coalition 2011). Although the generations of

Latinos assimilate at different levels and speeds, they keep certain cultural aspects.

Family obligation is one of the traits that seem to stay with those at all levels, along with

traditional values and customs (Lara et al. 2005). One of the negative effects of reaching

higher levels of acculturation among Latinos is that they are more likely to adopt

substance abuse and binge drinking behavior in addition to experiencing other public

health concerns (Lara et al. 2005; Circles of San Antonio Community Coalition 2011).

Figure 2 suggests that Hispanics born outside the United States do not experience the

issues with substance abuse and binge drinking as much as Hispanic generations born in

the United States. The Behavioral Risk Factor Surveillance System (BRFSS) data for the

San Antonio Metropolitan Statistical Area (MSA) shows that in 2010 the binge drinking

rates for adults 18 and older were higher than both state and national rates.
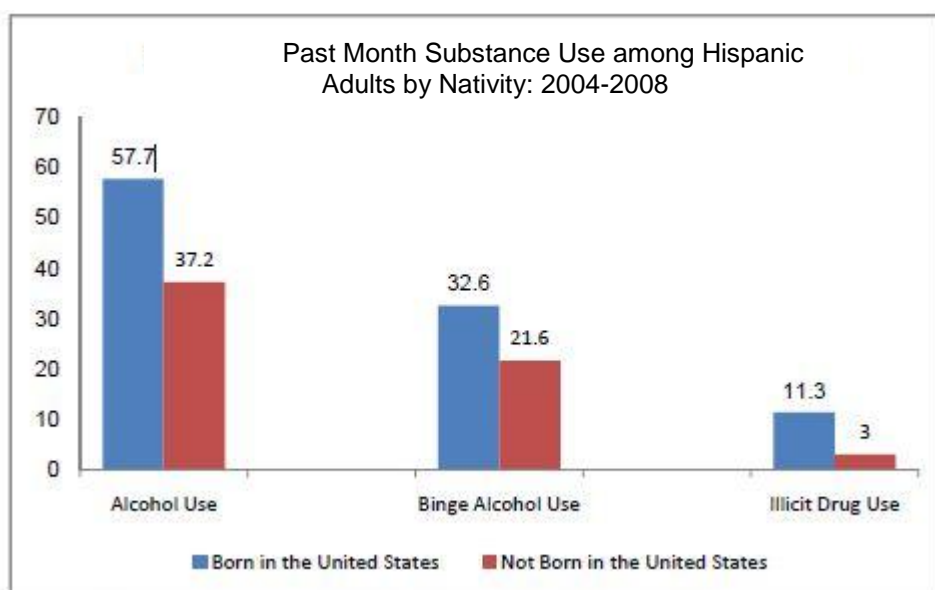
Figure 2. Past Month Substance Use among Hispanic Adults by Nativity: 2004-2008.
Source: The National Survey on Drug Use and Health (NSDSU).

Figure 3 displays rates for binge drinking among white, Hispanics, and African

Americans in the San Antonio MSA reported by the 2010 Health Profile.
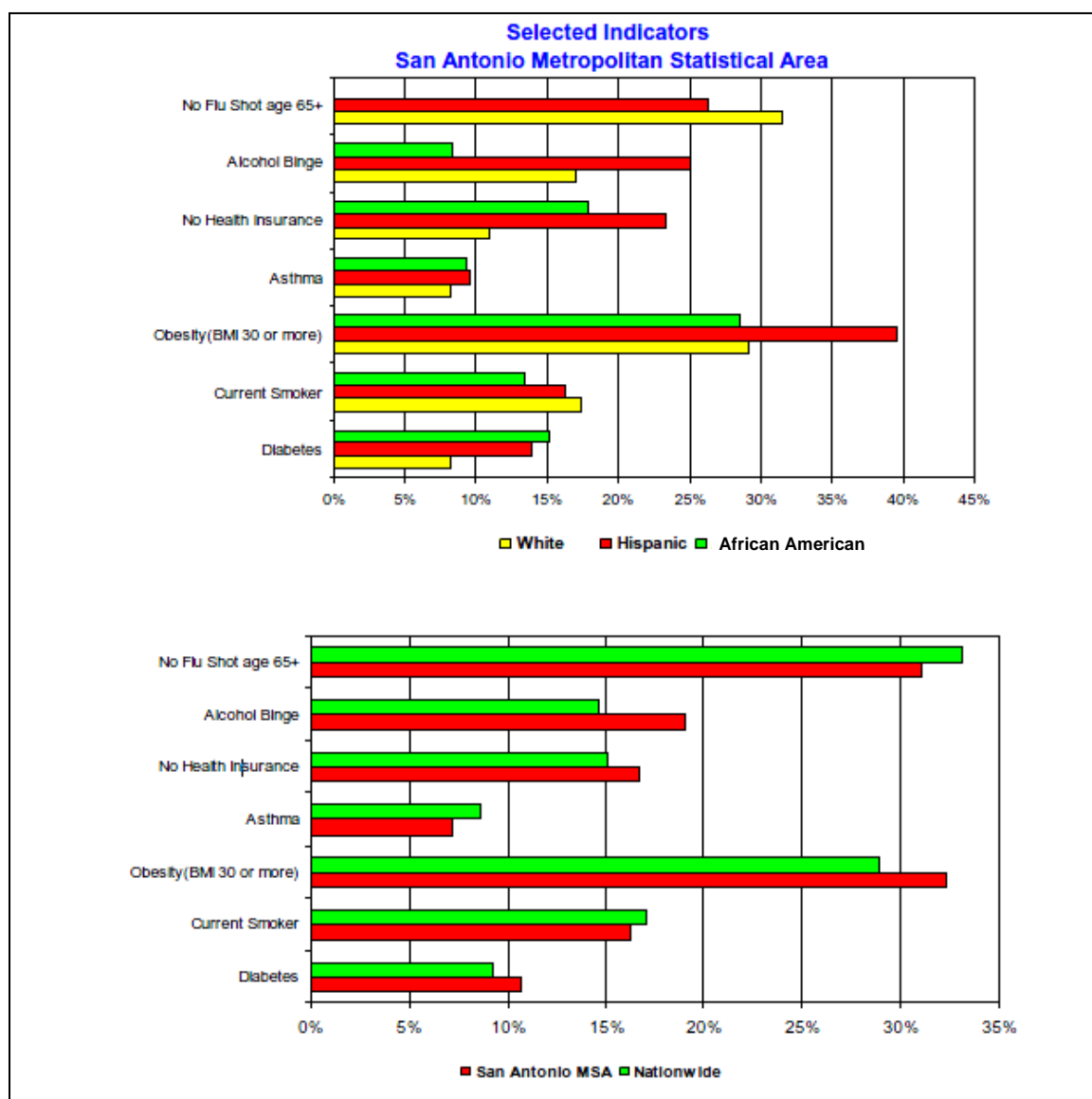
Figure 3. Selected Indicators of San Antonio Metropolitan Statistical Area.
Source: Health Profile, 2010.

Within the San Antonio MSA, Hispanics binge drink at a rate of 25%, while whites and

African Americans follow at 16% and 8% respectively. While the national binge drinking

rate is almost 15%, the San Antonio MSA surpasses the national rate with a binge

drinking rate of 18%. Like binge drinking, heavy drinking also remains higher than the

state and national rates. In 2009, the San Antonio heavy drinking rate was 5.8%, while

the state was 4.9% and the national rate was 5.2%. In 2009, 61.5% of adults 21 and older,

in Bexar and surrounding counties, reported having consumed alcohol within the past

thirty days (Circles of San Antonio Community Coalition 2011).

Theoretical Framework

Mere Exposure Theory, conceptualized by Robert B. Zajonc (1968), states the

more interaction people have to a stimulus, the more positive their feelings will be toward

the stimulus. Zajonc and Rajecki (1969), early investigators of mere exposure theory,

studied how people reacted to meaningless words, symbols, and photographs of unknown

persons when exposed at different frequencies in both natural and experimental

conditions. The increase in exposure to the stimulus caused greater liking of the stimulus.

When "ad-like" pieces were placed in a student newspaper, similar effects were observed

(East 2003).

The majority of ad exposure occurs under incidental conditions, where the

audiences' attention is focused on something else. This "low-involvement" means they

were not taught something but just came across it. Repetitive advertising in this state

results in enhanced liking for the neutral stimulus (Fang, Singh, and Ahluwalia 2007).

Batra and Ray (1981) found that the subjects' attitude toward a product was not directly

affected by exposure to repetitive advertisements but their awareness of the product was

amplified causing them to make decisions using the information given to them in the advertisement. Hicks and King (2011) performed an experiment using undergraduates who needed to participate as part of an introductory to psychology course. These students were shown ovals and circles, with a Chinese ideograph in between each shape, for five milliseconds. The students said they did not see the ideograph and were not suspicious of the study. The researcher determined that repeated exposure to the Chinese ideographs increased the likeability rating for those stimuli and for similar pictures of new ideographs. This experiment showed that, although the students were not aware they saw the images, their subconscious was aware.

My research draws from mere exposure theory to provide evidence that people who are repetitively exposed to stand-alone, outdoor alcohol advertisements are at greater risk of consuming more alcohol. Hispanic neighborhoods are the population of interest in my research in San Antonio, Texas.

Research Questions

Two fundamental research questions guide this study:

(1) What are the demographics of the landscape of alcohol billboard advertisements in San Antonio, Texas?

(2) What is the propinquity of alcohol billboard advertisements and commercial alcohol sales outlets in San Antonio, Texas?

CHAPTER III

METHODS

Working Hypotheses and Conceptual Structure

Four working hypotheses address this study's purpose statement by comparing data for selected demographic variables of neighborhoods with outdoor alcohol advertisements and the mean values of the variables for Bexar County:

1. Alcohol billboard advertisements are not located in neighborhoods with less median household income than the county mean.

2. Alcohol billboard advertisements are not located in neighborhoods with less educational attainment than the county mean.

3. Alcohol billboard advertisements are not located in neighborhoods with a greater Hispanic population percentage than the county mean.

4. Alcohol billboard advertisements are not located in neighborhoods with greater accessibility to alcohol sales outlets as compared to the county mean.

Study Area and Timeframe

Bexar County, located in south-central Texas (Figure 4), is the fourth most populous county in Texas. Bexar County consists of San Antonio and 26 unincorporated cities and municipalities. The 2010 population of San Antonio was 1,327,407 and is the

largest metropolitan area in Bexar County (Table 1) (U.S. Census Bureau 2010).
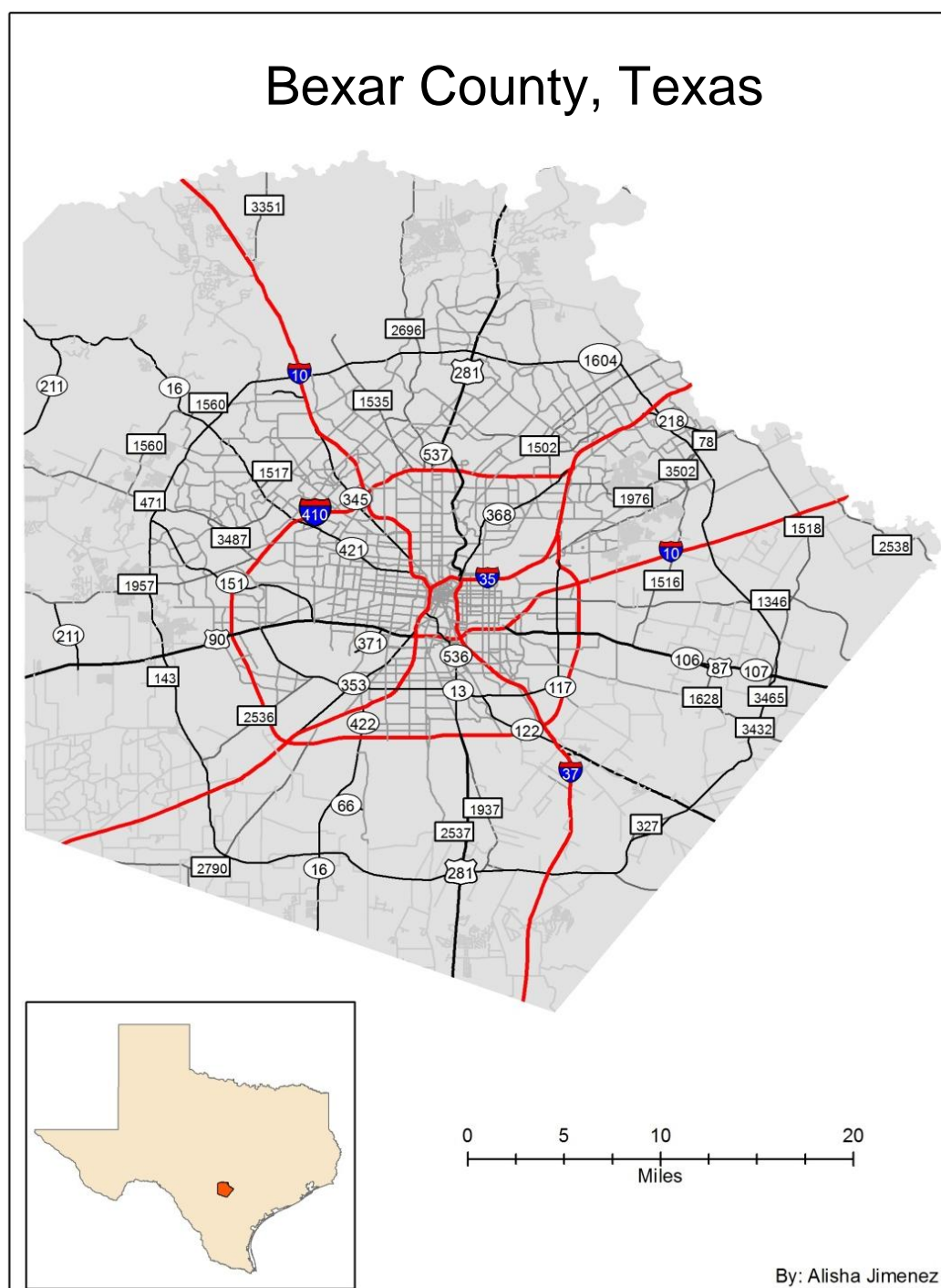
Figure 4. Map of Bexar County, Texas.

The San Antonio MSA centered on Bexar County serves as an area of social and economic integration for its adjacent counties—Kendall, Bandera, Medina, Atascosa, Wilson, Guadalupe, and Comal (Circles of San Antonio Community Coalition 2011). Many people in adjacent counties work in Bexar County and commute into the county for leisure.

Table 1. Demographic Characteristics, 2008-2010.

	Texas	Bexar County	San Antonio
Population	24,789,312	1,687,039	1,311,959
Median Age	33.5	32.8	32.6
Median Household Income	$49,585	$46,809	$42,656
Percentages			
Hispanic/Latino	37.2	59.5	62.9
Not Hispanic/Latino	62.8	40.5	37.1
African American	11.5	6.9	6.4
White Alone	45.8	30.6	27.0
Speaks language other than English at home	34.5	43.1	46.4
Percent high school graduate or higher	80.3	81.3	79.4
Percent bachelor's degree or higher	25.8	25.2	23.6

Source: American Community Survey, U.S. Census, 2010.

Definitions of Operational Terms

Some terms used in this study have alternative meanings, so clarification of what they mean is important. Stand-alone outdoor advertising in this study refers to billboard

locations. One billboard location can contain up to three billboard faces that are the advertisements themselves. This study uses alcohol sales outlets as a proxy for alcohol consumption in the region. Alcohol sales outlets are businesses that sell alcoholic beverages, but for this study I will simply focus on locations that sell beer, wine, and liquor, which may not be consumed at the point of purchase. These retailers have one or more of the following Texas licenses:

BF – Retail Dealer's Off-Premise License

This license authorizes the holder to sell beer in a lawful container direct to the consumer but not for resale and not to be opened or consumed on or near the premises.

BQ – Wine and Beer Retailer's Off-Premise Permit

This permit authorizes the holder to sell for off-premise consumption only, but not for resale, wine, beer, and malt liquors containing alcohol in excess of one-half of one percent (1/2 of 1%) by volume and not more than 14% or 17% of alcohol by volume (depending on type of local option election).

P – Package store Permit

This permit authorizes the holder to sell liquor, malt and various liquors on or from licensed premises at retail to consumers for off-premise consumption. (Texas Alcoholic Beverage Commission 2012)

Data Collection and Analysis

For this research, I used several different datasets. Geospatial datasets include street layers, census tracts, billboard locations, and off-premise alcohol outlets. Using

data collected from each outdoor advertisement company and comparing them to permit

records from the Texas Department of Transportation (TxDOT), I was be able to identify

the number of billboards in Bexar County and the location of each advertisement. There

are approximately 681 billboard locations with registered permits from the Texas

Department of Transportation (TxDOT) in Bexar County, and, as of March 2012, 46

different companies own their locations. In this study, I examined billboards owned by

the top three advertising companies that own 85 percent of the billboard locations in

Bexar County: Clear Channel Outdoors, Lamar, and CBS (CBS 2011, Clear Channel

2011, and Lamar 2011).

Table 2. Billboard Ownership in Bexar County, Texas 2012.

Company	Number of Billboards Owned
Clear Channel Outdoor	508
Lamar Advantage Outdoor	45
CBS Outdoor	33
Gulf Advertising	22
Fuller III	10
Fairway Outdoor Advertising	6
Keller	4
Poole Outdoor Advertising	4
Wetz	3
KEM Texas	3
Other	43

Source: Texas Department of Transportation, 2012.

Using geographic information systems (GIS), I plotted all the addresses of the

billboard locations for the three largest outdoor advertising companies provided by

company representatives. These addresses are displayed on a GIS street layer from the

Bexar 9-1-1 Network. These plots show the general location of each billboard.

Employing the relative location to find each billboard, I then documented them using a

digital camera to record their advertisements. I also employed a GPS device to verify the absolute location of each billboard location in the county. Along with the location of billboard advertisements, I also identified alcohol outlets. The Texas Alcoholic Beverage Commission had the data needed for this study. The three types of permits are located in these databases: Retail Dealer's Off-Premise License, Wine and Beer Retailer's Off-Premise License, and a Package Store Permit.

I used alcohol retail outlets as a proxy in this study for alcohol consumption, and the GIS mapped these locations. A geospatial buffer was then used to determine the fourth hypothesis: alcohol billboard advertisements are not located in neighborhoods with greater accessibility to alcohol sales outlets as compared to the county mean.
The 2010 U.S. Census Summary and 2010 American Community Survey (ACS) files provided demographic data for the analysis, specifically, median household income, educational attainment, and race/ethnicity. This research is aimed at examining billboards in neighborhoods rather than on highways that target commuters. Billboard visibility is measured in daily effectiveness circulation (DEC). The purpose of DEC is to indicate how many people 18 years or older have the opportunity to see the billboard on a daily basis. The higher the DEC, the more people being advertised to daily. Billboard locations along highways typically have a DEC greater than 100,000, and those along city roads have a DEC less than 20,000 (Lamar 2011). For this reason, billboards along state loops, state roads, U.S., and interstate highways were not examined. Figure 5 displays the research method in a conceptual model.

Table 3. Conceptual Framework.

Conceptual Variables	Operational Variables
Median Household Income	<$30,000
	$30,000-49,999
	$50,000-79,999
	$80,000+
Education	Percent high school graduate or higher
	Percent bachelor's degree or higher
Race/Ethnicity	Hispanic or Latino
	Not Hispanic or Latino
	African American
	White alone
Alcohol Consumption	Retail Dealer's Off-Premise Permit
	Wine and Beer Off-Premise Retailer's Permit
	Package Store Permit
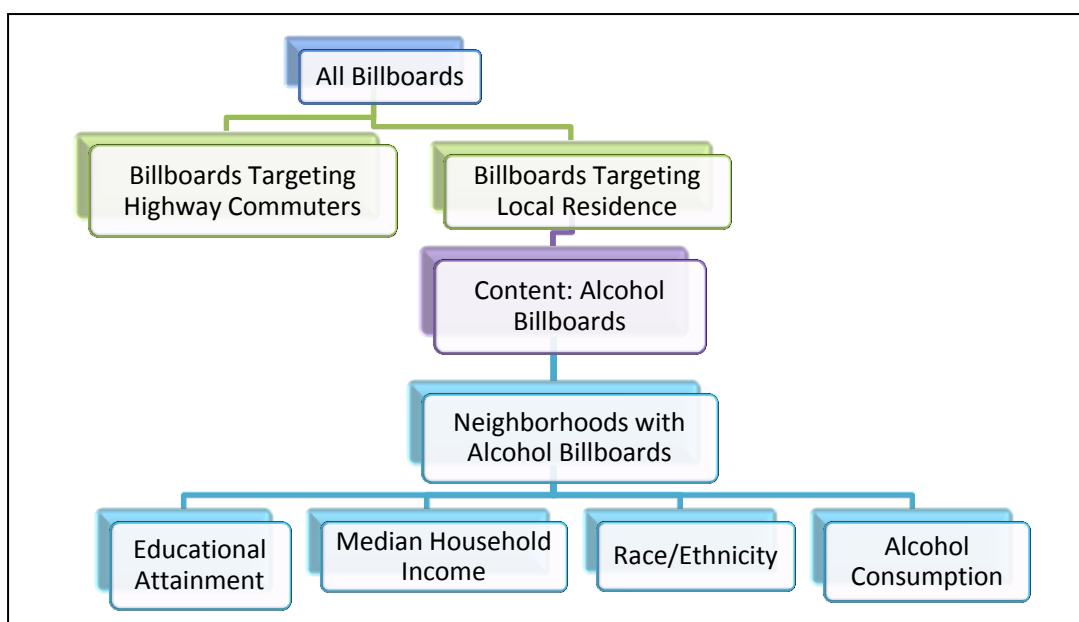
Figure 5. Conceptual Model.

I used ArcMap to identify billboards that are not located along highways. This work was accomplished by selecting all billboards that are within 500 feet of the foregoing road types and creating a new GIS layer with only the billboards that are not located along these roads (Figure 6).

Using photographs of the advertisements in the study area, I analyzed the content of each and put them into one of six main categories and then into subcategories (Table 4). The product categories and their frequencies and percentages shown in Table 4 were then used to identify the percentage of advertisements that are alcohol related and determine the social-environmental differences of the locations of the alcohol advertisements.

With the location and the category of each sign face assigned, I then created a spatial join of the locations and the census tracts, producing a count of alcohol billboards faces for each tract. Using these counts, I then compared census tracts that contain at least one outdoor alcohol advertisements to the demographic data of census tracts: median household income, educational attainment, ethnicity/race and alcohol retail outlets within 500 feet. Because a majority of alcohol retailers are located on the borders of two or more census tracts and are accessible to populations in multiple tracts, I used a 500-feet buffer from each of these border locations to count the number of alcohol retailers. The size of the buffer was determined by using several distance thresholds in combination with Pearson correlation.
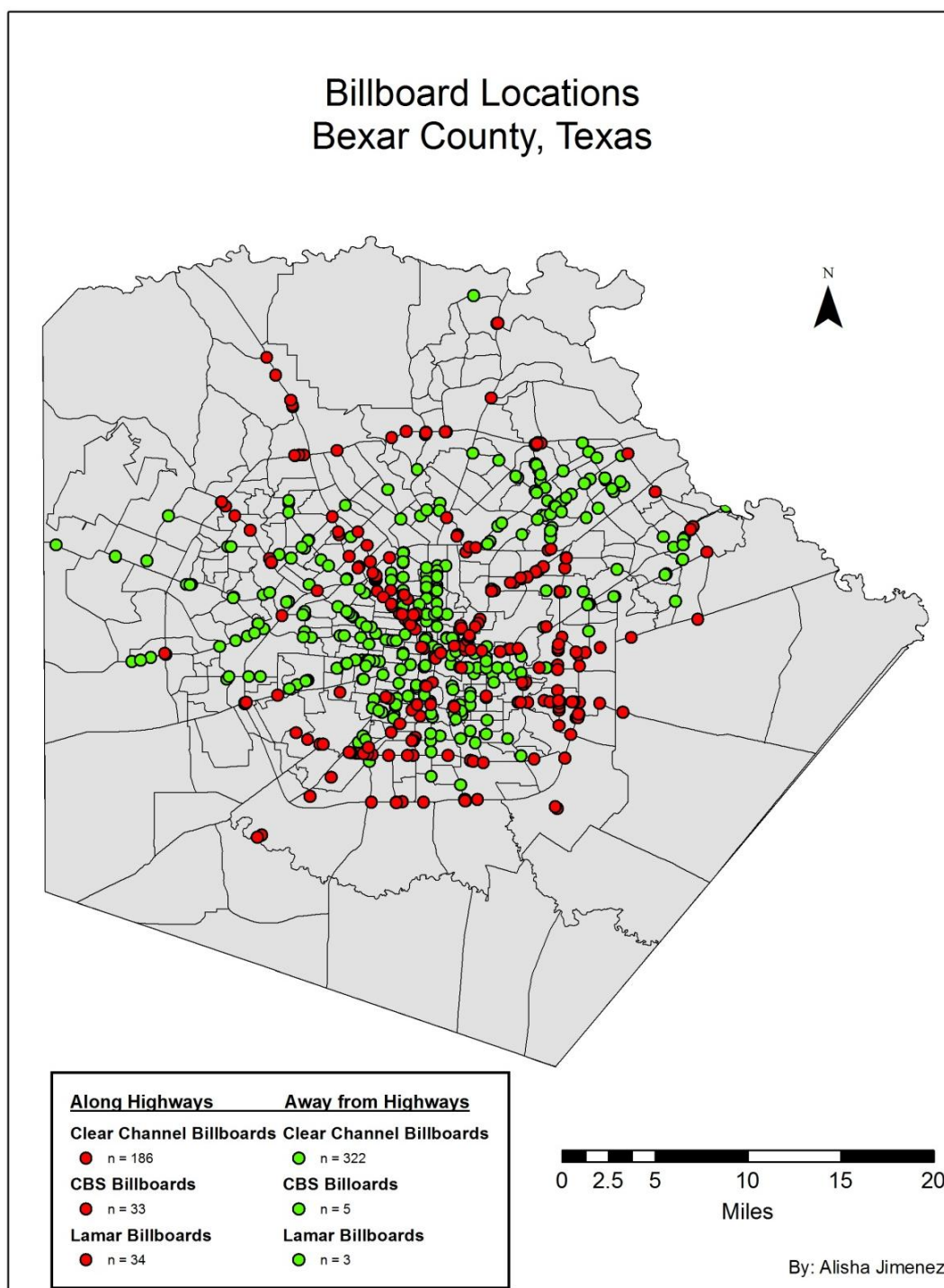
Figure 6. Billboard Locations in Bexar County, Texas.
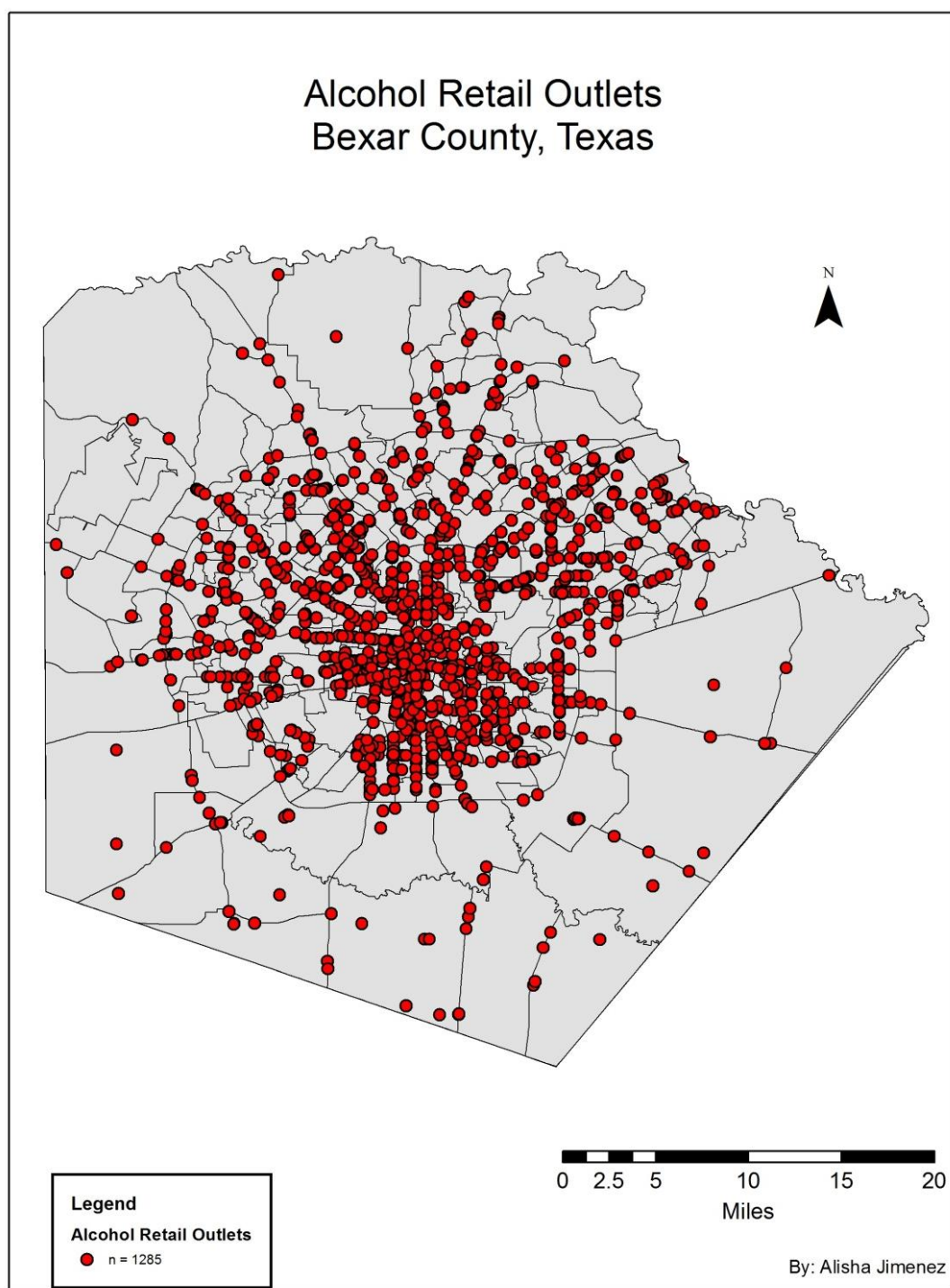
Figure 7. Alcohol Retail Outlets in Bexar County, Texas.
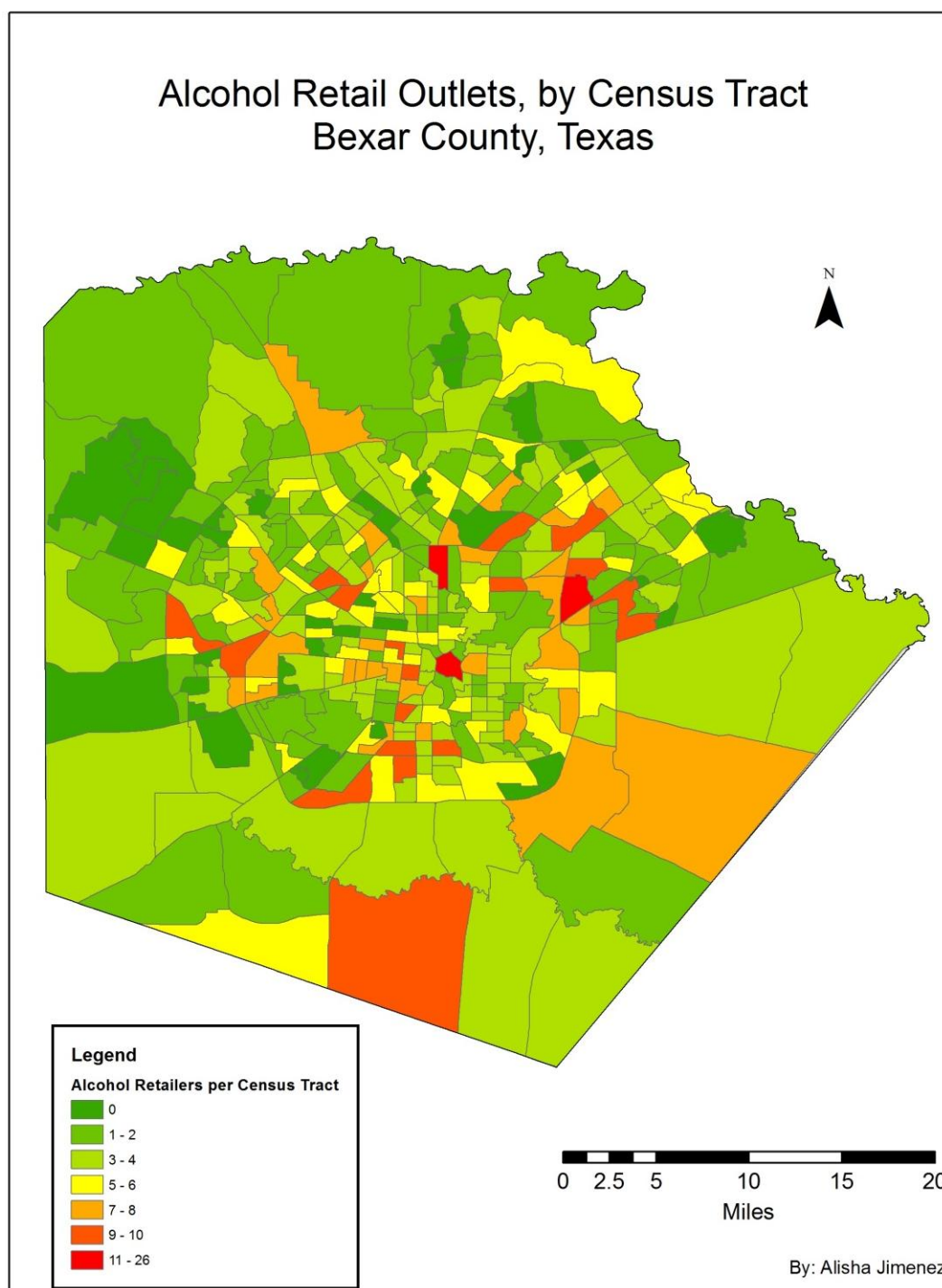
Figure 8. Alcohol Retail Outlets by Census Tract.
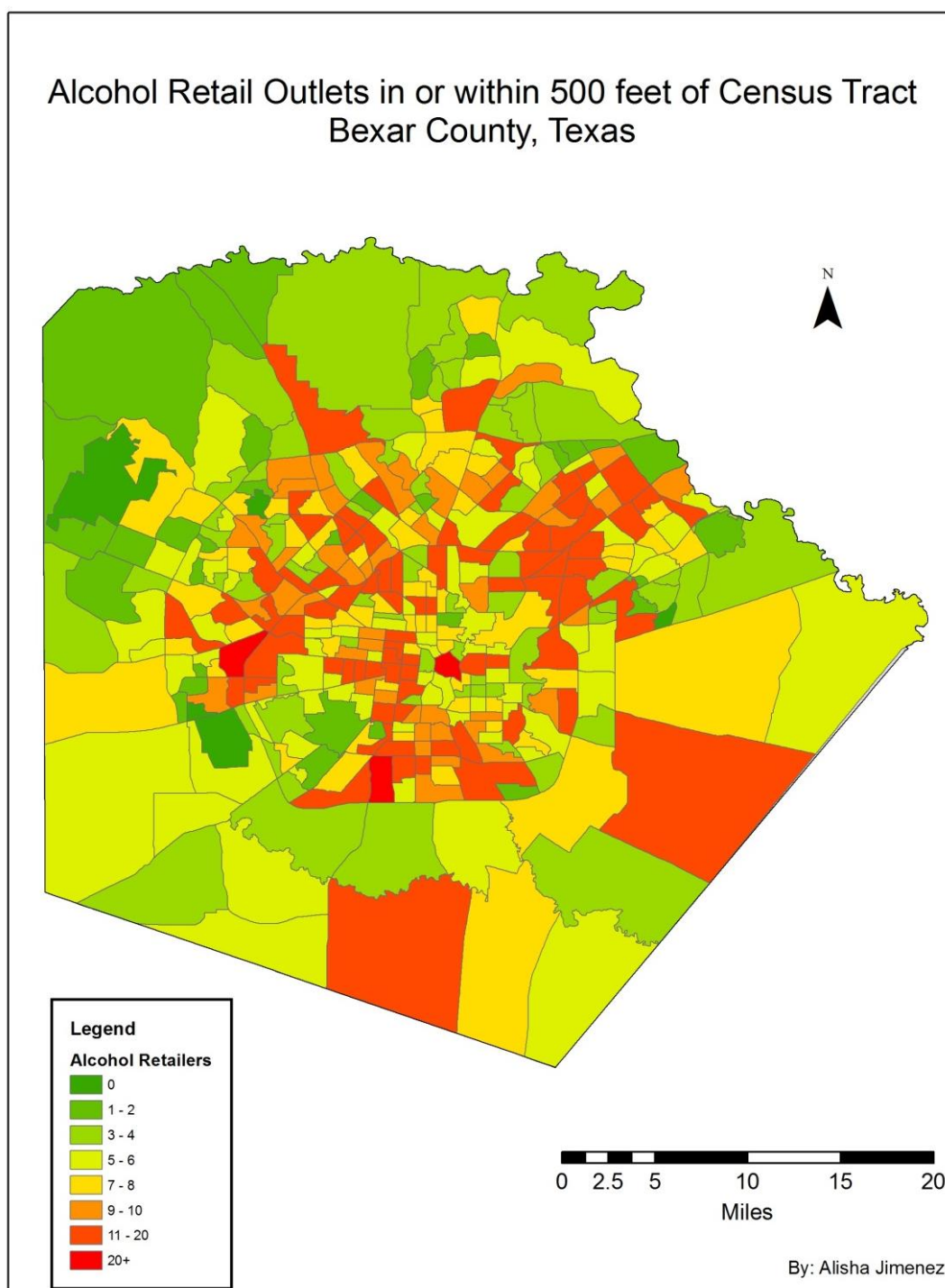
Figure 9. Alcohol Retail Outlets in or within 500 feet of Census Tract.

Table 4. Product Category Frequency.

26

Product Category	Frequency	Percentage
Retail Travel Related:	X	X
Restaurant	X	X
Hotels	X	X
Gasoline Stations	X	X
Tourism	X	X
Entertainment	X	X
Retail Non-Travel Related:	X	X
Entertainment Supplies	X	X
Auto Dealers and Other Transportation Retailer	X	X
Department Stores	X	X
Specialty Retailer	X	X
Supermarket	X	X
Manufactured Goods	X	X
Alcohol Beverages	X	X
Transportation Equipment	X	X
Health and Beauty Aids	X	X
Electronic/Appliances	X	X
Food and Nonalcoholic Beverages	X	X
Apparel and Accessories	X	X
Household Items	X	X
Services	X	X
Insurance	X	X
Health Care	X	X
Real Estate	X	X
Banks	X	X
Telecommunication	X	X
Media	X	X
Publications	X	X
Public Interest	X	X
Political	X	X
Public Service	X	X
Other	X	X
Other Products	X	X
Other Retailers	X	X
Total:	X	X

Source: Taylor and Taylor, 1994.

These buffers ranged from 50 to 5,000 feet and were compared to one another to find which threshold had the highest correlation between variables within the buffer zone. Similar studies have used geospatial buffers with a distance of 500, 800, 1,000, and 2,000 feet to determine accessibility to locations (Luke, Esmundo, and Bloom 2000 and Stoddard, Johnson, Boley-Cruz, and Sussman 1997). The buffer with the highest correlation indicated that the variables within the buffer was similar and variables outside was different. A two-sample t-test determined the statistical significance of the four working hypotheses. Dummy variables were used to determine which tracts had alcohol billboard advertisements and which did not have any.

K-Mean cluster analysis was used only on the census tracts that have alcohol billboard advertisements. I selected K-Means clustering because it clusters the nearest mean and will extract tracts that are different than those surrounding them. This technique determined if these tracts experience a higher number of advertisements than other tracts in relation to median household income, educational attainment, and race/ethnicity. These clusters allowed a better focus on communities that may be more exposed to alcohol advertisements. K-Mean cluster analysis thus determined clusters of alcohol advertisements within the county using each of the three operational variables (Table 3). This analysis was done using five to ten clusters to find k which explained the most variation without repetitive clusters. I then compared these clusters in terms of alcohol outlets to see if each cluster has a number of retail outlets above or below the county mean. I used the demographic data to decipher the differences of each cluster from the rest of the county.

I employed Pearson's correlation in SPSS to determine the correlation between alcohol billboards per census tract and the demographic variables of the census tract. The r^2 demonstrated the significance of the relationships between alcohol billboards and the demographic variables.

CHAPTER IV

ANALYSIS AND FINDINGS

Data Collection

Data collection for this study began with using the addresses provided by the billboard companies who owned outdoor signs in Bexar County. This included a number of companies such as: Clear Channel, Lamar, and CBS. Some of the companies had latitude and longitude locations of their billboard sites, while others simply gave the distance from the nearest cross street. Clear Channel reported having 523 billboard locations, CBS 33, and Lamar 37. Using the data from these three companies in ArcMap, I was able to create a comprehensive map containing all the locations they provided. I cross referenced these billboard locations with data provided by the Texas Department of Transportation (TxDOT), which is charged with regulating the Highway Beautification Act and the Rural Roads Act within Texas. According to TxDOT's list of permitted signs on record, Table 2 shows a list of billboard ownership in Bexar County for 2012.

I used all the billboard locations from Clear Channel, CBS, and Lamar and TxDOT to create a comprehensive billboard map for this study. Some of the cross streets given, however, could not be found or did not exist, so those locations were not included in this new map.   Figure 10 shows the billboard locations of the top three billboard

29

owners with the number each company owns in Bexar County: 508 Clear Channel, 38

CBS, and 37 Lamar. By using the map of all the known 583 locations from Clear

Channel, Lamar, and CBS, I was then able to select 330 locations in my study area that

are greater than 500 feet from highways, interstates, and state roads (Figure 11). During

two weeks in October 2012 and with 826 miles of travel, I captured a digital photograph

of each billboard face and used a GPS device to collect the latitude and longitude of each

face within +/- 50 feet. All billboards in the study area were photographed, even if they

were not on the companies' or TxDOT lists. Using the GPS their locations, I constructed

a map of these photographed billboard locations within the study area (Figure 12). This

map revealed 825 billboard faces, approximately 415 billboard locations, with some

locations having only one face while others had two or three faces. Out of the billboard

faces I photographed, 41 (82 billboard faces) were not within 500 feet of a highway.

Within the study's parameters were then 784 billboard faces (Figure 13). Using the

photographs, I divided the billboard faces into different categories according to the type

of advertisement as shown in Table 5.
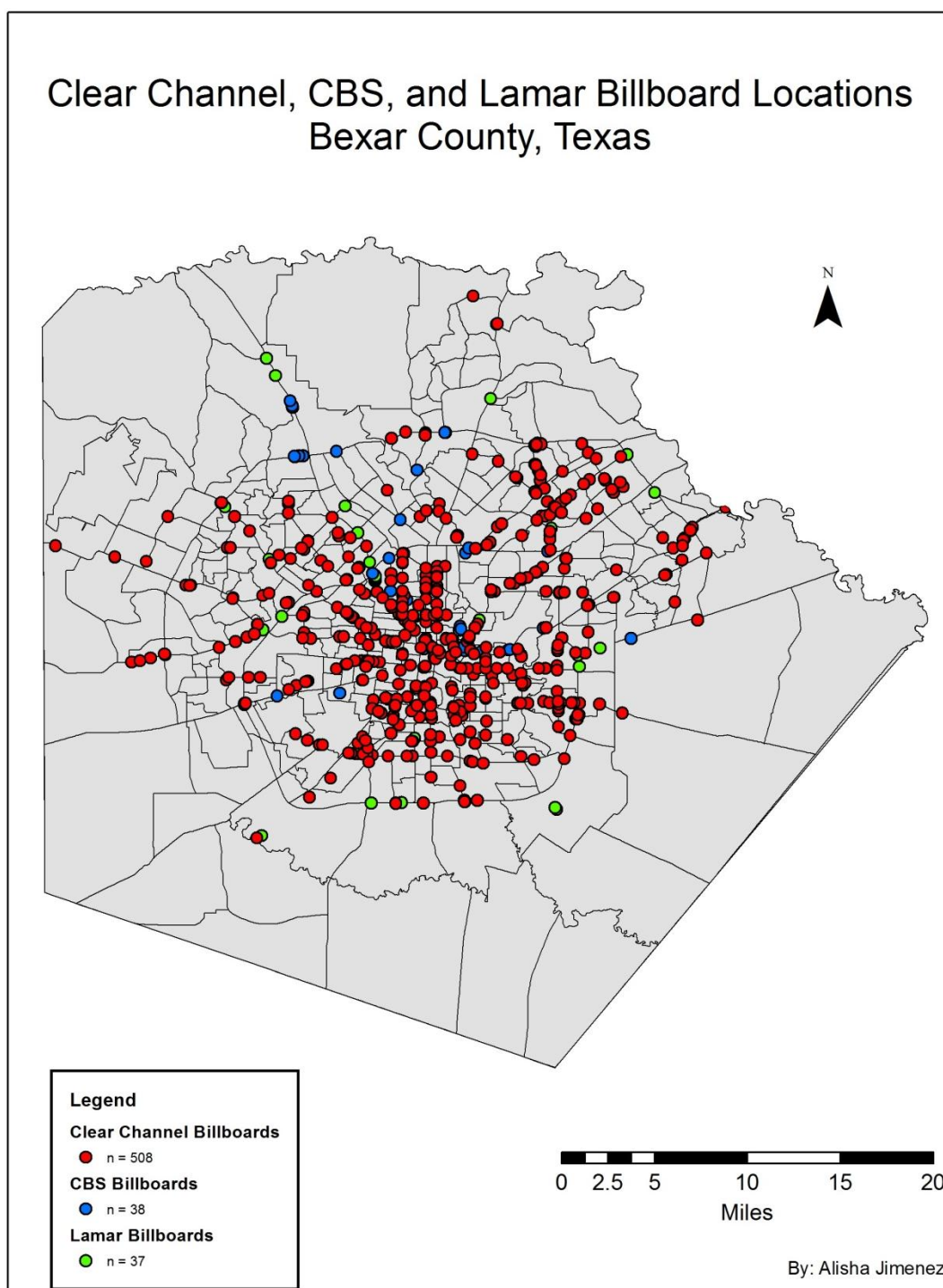
Figure 10. Clear Channel, CBS, and Lamar Billboards in Bexar County, Texas.
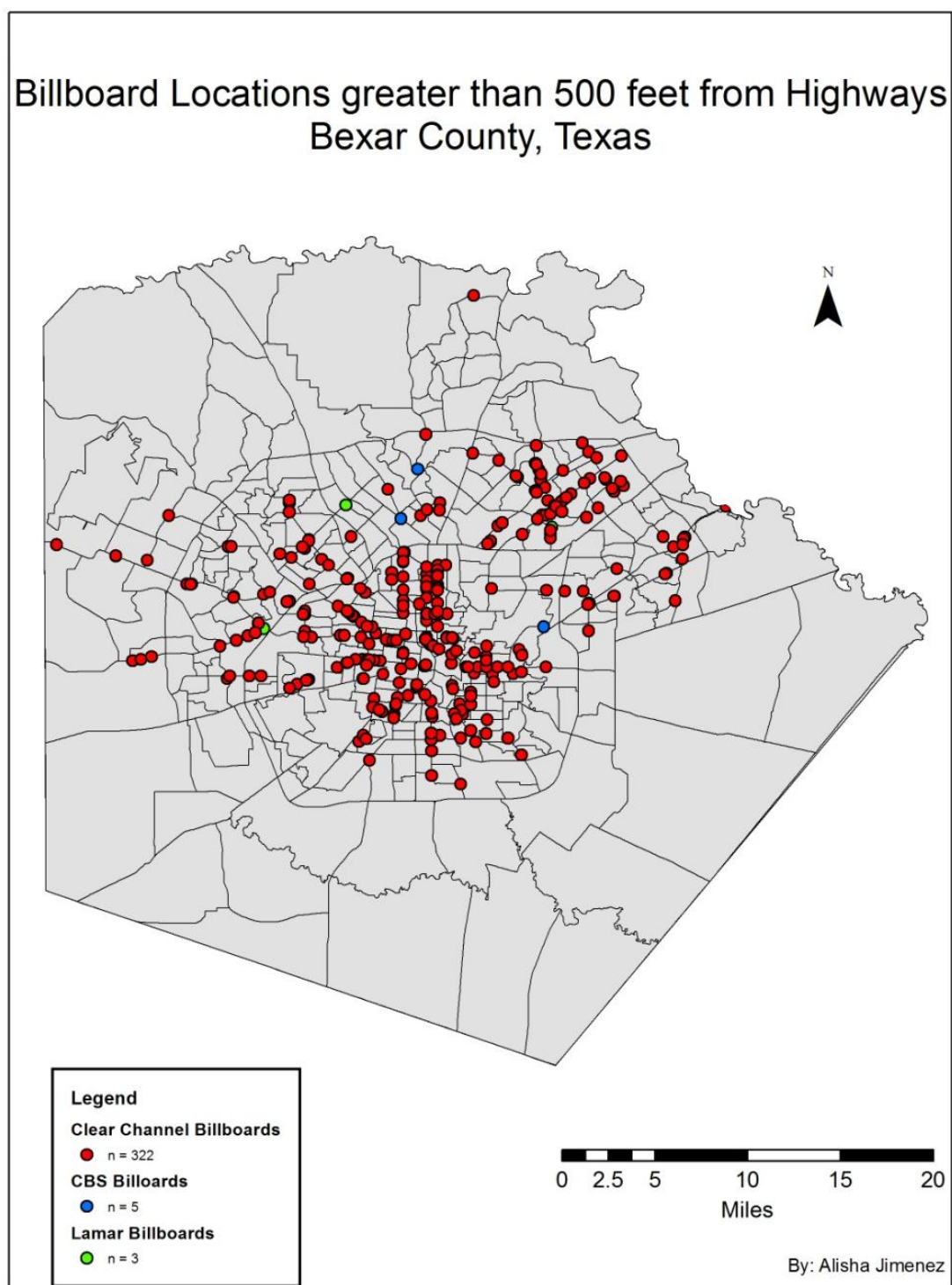
Figure 11. Billboard Locations greater than 500 feet from Highways.
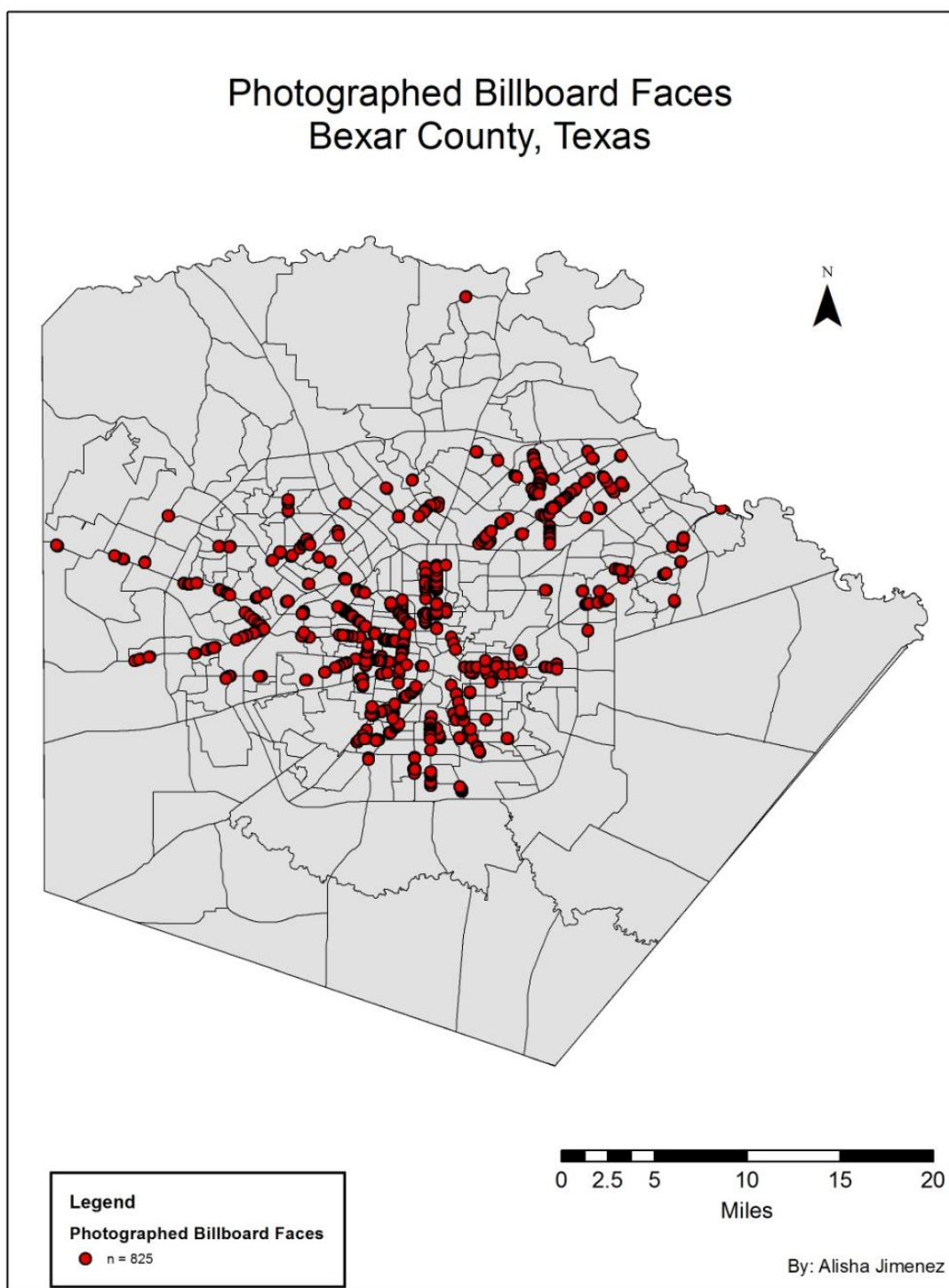
Figure 12. Photographed Billboard Faces.
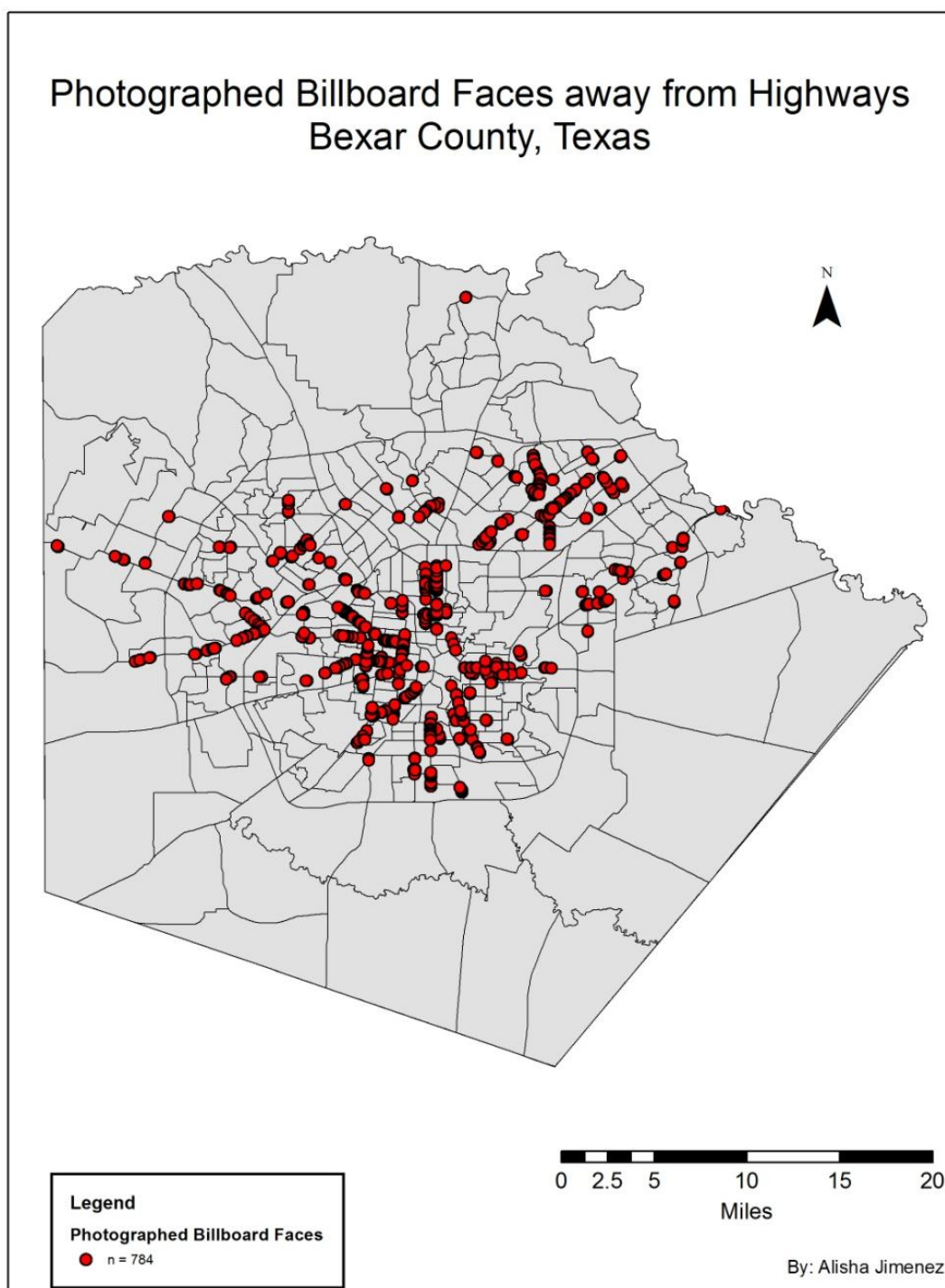
Figure 13. Photographed Billboard Faces away from Highways.

Table 5. Types of Advertisements Photographed.

Category		Subcategory	Total	Percent of Total
1	Retail Travel Related		128	16
	1	Restaurants	89	11
	2	Hotels	0	0
	3	Gasoline	1	0
	4	Tourism	0	0
	5	Entertainment	38	5
2	Retailer Non-Travel Related		38	5
	1	Entertainment Supplies	7	1
	2	Auto Dealer and Other Transportation Retailer	10	1
	3	Department Stores	2	0
	4	Specialty Retailer	11	1
	5	Supermarket	5	1
3	Manufactured		75	10
	1	Alcohol Beverages	45	6
	2	Transportation Equipment	0	0
	3	Health and Beauty Aids	0	0
	4	Electronics/ Appliances	3	0
	5	Food and Nonalcoholic Beverages	25	3
	6	Apparel and Accessories	2	0
	7	Household Items	0	0
4	Services		416	53
	1	Insurance	20	3
	2	Health Care	56	7
	3	Real Estate	54	7
	4	Banks	22	3
	5	Telecommunication	32	4
	6	Media	4	1
	7	Publication	1	0
	8	Law	193	25
	9	Other	34	4
5	Public Interest		122	16
	1	Political	45	6
	2	Public Service	63	8
	3	Education	11	1
	4	Religion	3	0
6	Other		5	1
	1	Other Products	5	1
	2	Other Retailer	0	0
		Total	784	

Billboard faces that advertised alcoholic beverages were the sixth most common subcategory of advertisements with 45 faces located in the study area (Figure 14). Beer was the only type of alcohol advertisements found within the study area. Of these 45 faces, only a handful of companies were advertised: Budweiser, Miller, Coors, Keystone, Dos Equis, and Tecate. Table 6 displays the six beer companies and their brands. APPENDIX A shows the GPS locations (latitude and longitude) of alcohol advertisements within the study area.

Table 6. Type of Alcohol Advertisements in Study Area.

Company	Brand	Number of Advertisements
Keystone		16
	Keystone Light	16
Budweiser		13
	Budweiser	7
	Bud Light	6
Miller		5
	Miller Lite	5
Coors		3
	Coors Light	3
Dos Equis		2
Tecate		6
	Tecate Light	6

Within Bexar County, there are 1,285 alcohol retail outlets. These stores sell packaged alcohol that cannot be consumed on the premises. Of the 1,285 alcohol retail outlets, 243 (19%) are located within the census tracts that are within 500 feet of alcohol billboard locations (Figure 15).
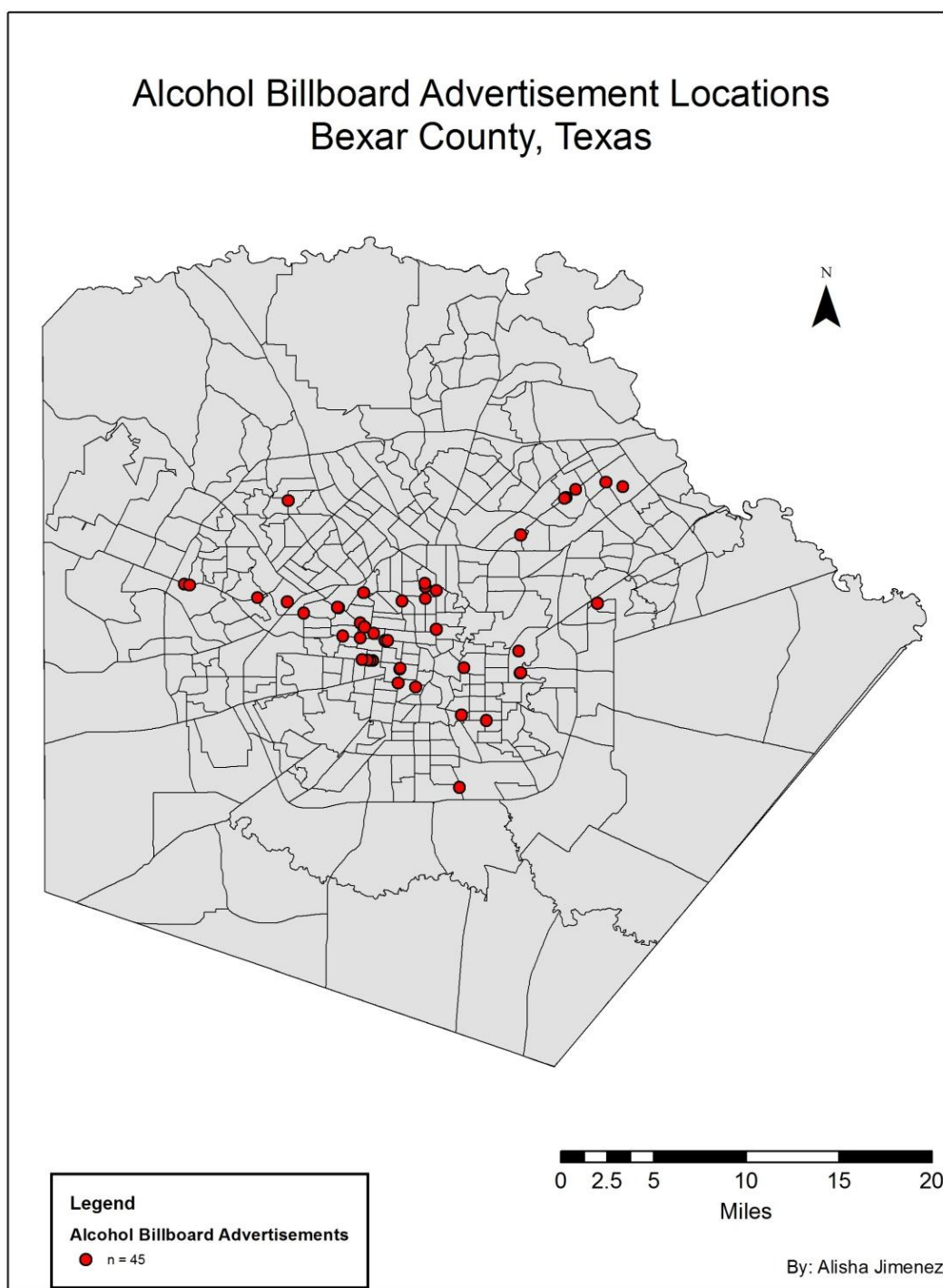
Figure 14.Alcohol Billboard Advertisement Locations.
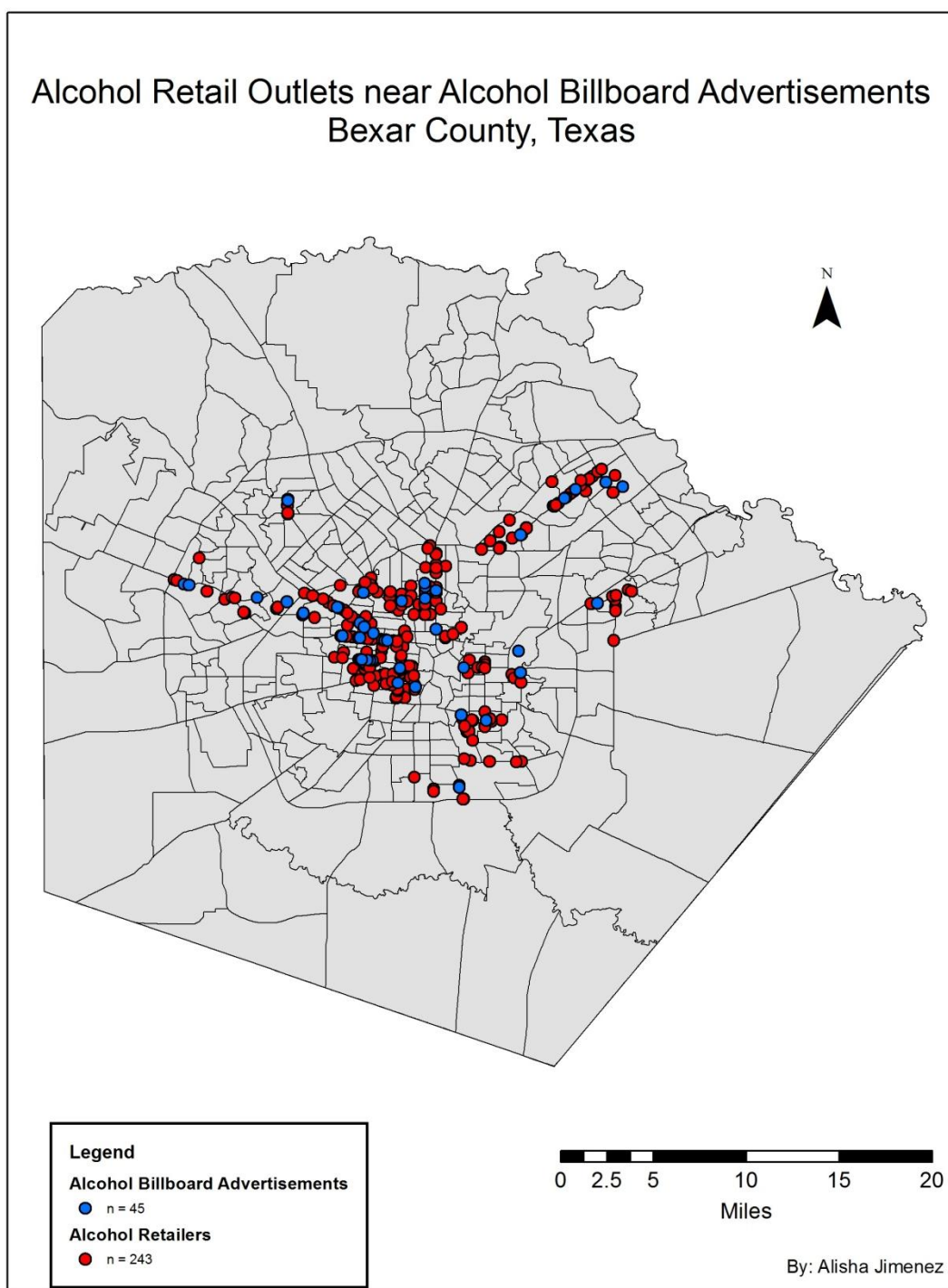
Figure 15. Alcohol Retail Outlets near Alcohol Billboard Advertisements in Bexar County, Texas.

Results

The alcohol billboard advertisements were given a 500-foot buffer zone to determine which census tracts the advertisements resided in and those that were located in adjacent census tracts. With many billboards located on roads dividing census tract, the 500-foot buffer allowed the populations within the adjoining tracts to also be included in the analysis. The 500-foot buffer captured 55 census tracts shown in a red color pallet in Figure 16.

These 55 census tracts were used in a two-sample t-test, Pearson correlation, and K-Means cluster analysis. For the t-test and Pearson correlation, the tracts in red represented group 1 (tracts with alcohol billboards in or within 500 feet), while the tracts in gray were group 0 (tracts without any alcohol billboards). These 55 census tracts were the only tracts used in the K-Means cluster analysis.

<u>Two-Sample T-Test</u>

A two-sample t-test compared the dependent variables—median household income (dollars), educational attainment (percent high school education or higher; bachelor's degree or higher), ethnicity (percent of white alone, black/African American, and Hispanic or Latino), and alcohol retailers within 500 feet of census tract boundaries—with the independent variable of alcohol billboard advertisements in or within 500 feet of census tract boundaries. This t-test included all 366 census tracts within Bexar County. The independent variable was encoded into two groups using a dummy variable: tracts within 500 feet of alcohol billboards (group 1; 55 tracts) and tracts outside 500 feet (group 0; 311 tracts).
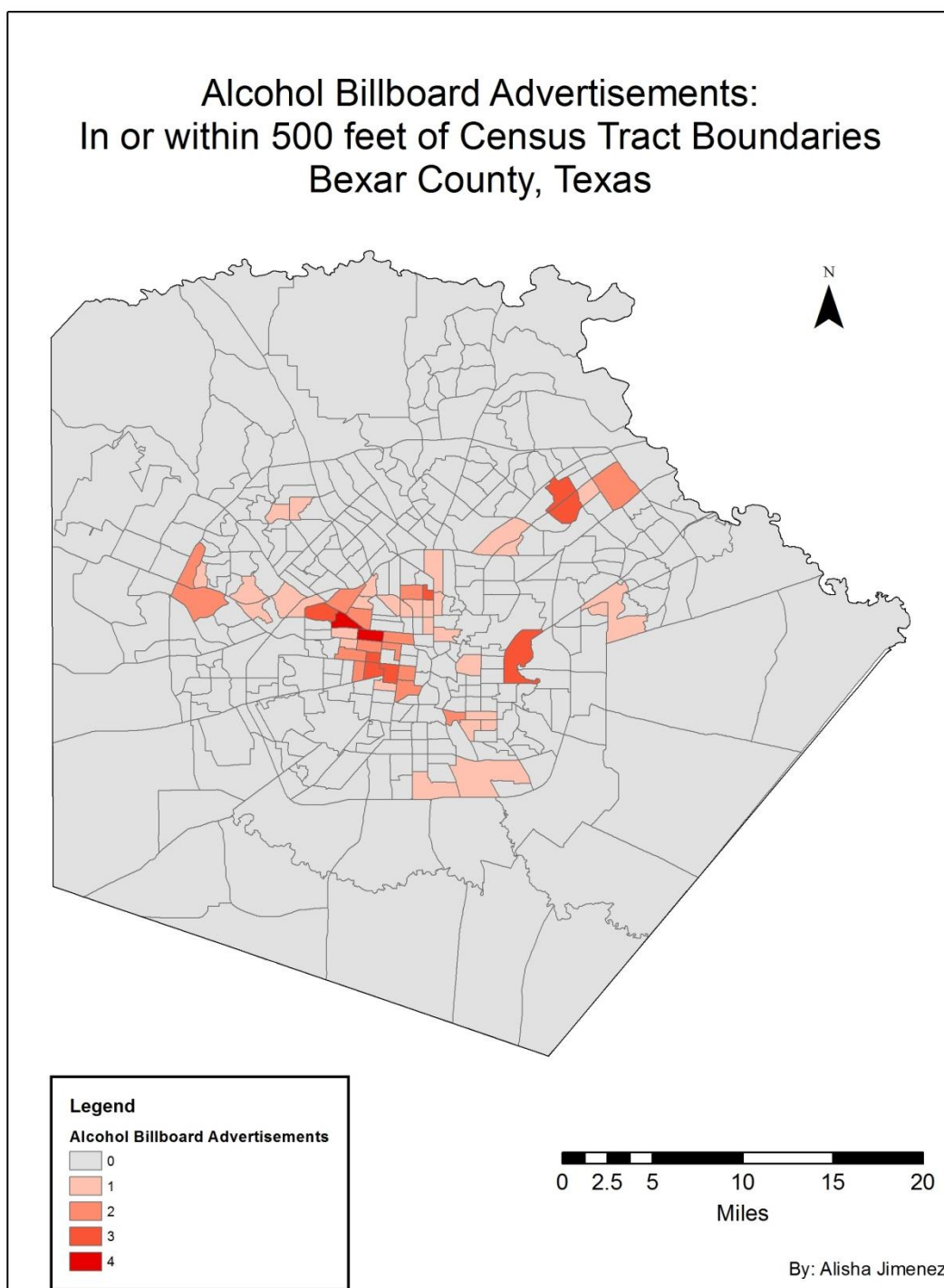
Figure 16. Alcohol Billboard Advertisements: In or within 500 feet of Census Tract Boundaries.

The results of the two-sample t-test showed that median household income, high school or higher, bachelor's degree or higher, white alone, Hispanic or Latino, not Hispanic or Latino, and number of alcohol retailers within 500 feet were all significant (p< .001). With the exception of tracts with a majority of blacks, the results of this test indicate that a significant difference exists between the census tracts within 500 feet of alcohol billboard advertisements and census tracts outside the buffer zone (Table 7; APPENDIX B presents all of the SPSS output).

Table 7. Two-Sample T-Tests Analysis.

Dummy Variables for Alcohol Billboards in or within 500 feet of Census Tracts		N	Mean	t	Sig. (2-tailed)
Median Annual Household Income	Group 0	311	53332.65	6.667	.000
	Group 1	55	36520.82		
High school or higher	Group 0	311	80.519936	3.359	.001
	Group 1	55	71.678182		
Bachelors or higher	Group 0	311	26.021543	5.845	.000
	Group 1	55	14.596364		
White alone	Group 0	311	.324469	6.976	.000
	Group 1	55	.169636		
Black	Group 0	311	.075113	1.264	.207
	Group 1	55	.059273		
Hispanic or Latino	Group 0	311	.560547	-6.745	.000
	Group 1	55	.754727		
Not Hispanic or Latino	Group 0	311	.436100	6.625	.000
	Group 1	55	.245446		
No. of Alcohol Retailers within 500ft	Group 0	311	6.99	-4.079	.000
	Group 1	55	9.47		

Pearson Correlation

With the results from the two-sample t-test, a Pearson correlation analysis was then performed to find the degree of correlation of each significant variable. Again, this analysis used all 366 census tracts in Bexar County. The independent variables once again included the median household income (dollars), educational attainment (percent high school education or higher; bachelor's degree or higher percent), ethnicity (percent white alone, Hispanic or Latino, not Hispanic or Latino), and number of alcohol retailers within 500 feet to determine their relationships with the dependent variable, the number of alcohol billboard advertisements within 500 feet of census tracts.

The results of the Pearson correlation revealed a negative correlation, or inverse relationship, between the number of alcohol billboards within 500 feet of census tracts and median household income, all levels of educational attainment, white alone, and not Hispanic or Latino (Table 8; APPENDIX C displays entire SPSS output). A positive

Table 8. Pearson Correlation Analysis.

Variables	Mean	Standard Deviation	Pearson Correlation	Sig. (2-tailed)
Median Annual Household Income	50,806.28	27,906.312	-.209	.000
High school or higher	79.191257	18.2456069	-.194	.000
Bachelor's or higher	24.304645	19.6556174	-.198	.000
White alone	.301202	.2155266	-.257	.000
Hispanic or Latino	.589727	.2430839	.279	.000
Not Hispanic or Latino	.407450	.2419756	-.276	.000
Number of Alcohol Retailers within 500ft	7.37	4.243	.206	.000

correlation exists between Hispanic/Latino and number of alcohol retailers within 500 feet. These relationships indicate that as the number of alcohol billboard advertisements increases, the median household income, educational attainment, percent of white alone, and percent of not Hispanic or Latino population decrease. While the percent of Hispanic/Latino population and the number alcohol retailers increases, the number of alcohol billboard advertisements also increase.

To further understand the degree of correlation, I calculated the coefficient of determination (r^2) using the same dependent and dependent variables.

Table 9. Coefficient of Determination Results.

	Correlation coefficient (r)	Coefficient of determination (r^2)
Median annual household income	-.209	.044
High school or higher	-.194	.038
Bachelor's degree or higher	-.198	.039
White alone	-.257	.066
Hispanic or Latino	.279	.078
Not Hispanic or Latino	-.276	.076
Number of alcohol retailers within 500ft	.206	.042

Employing Cohen's (1988) guidelines for correlation values in behavioral science (Table 10), I found that all of the significant independent variables have small associations with alcohol billboard advertisements. Both levels of educational attainment have the weakest correlations, and the Hispanic or not Hispanic variables have the highest associations with alcohol billboard advertisements.

Table 10. Cohen's Guidelines for Association Strength.

Size of Effect	Absolute value of r	r^2
Small	$0.1 \leq r < 0.30$	$0.01 \leq r^2 < 0.09$
Medium	$0.30 \leq r < 0.50$	$0.09 \leq r^2 < 0.25$
Large	$r \geq 0.50$	$r^2 \geq 0.25$

The strength of the association is small among all the variables. One cause for this could be the small group that actually had alcohol advertisements present is being dominated by the census tracts that lacked alcohol advertisements. Pearson correlation was performed on just the 55 census tracts with alcohol billboard advertisements, but this test yielded no significant variables. This finding indicates that within the 55 census tracts major differences exist in the demographic variables.

After completing the t-test and Pearson correlation analyses, the results led me to reject all four of the hypothesis. I conclude that alcohol billboard advertisements are located in neighborhoods with less median income than the county mean, less educational attainment than the county mean, greater percent of Hispanic population than county mean, and greater accessibility to alcohol sales outlets than the county mean.

K-Means Cluster Analysis

The K-Means cluster analysis was used to analyze data geospatially because the Pearson correlation determined that distinctive differences existed between the demographic (dependent variables). The factors included in this cluster analysis were median household income, educational attainment (percent high school or higher; bachelor's degree or higher), ethnicity (percent white alone, Hispanic or Latino, and not Hispanic or Latino). I divided these six variables into cluster segments that ranged from five to ten clusters. After analyzing the results for the five different cluster analyses,

seven cluster segments provided the optimum grouping of the variables without having

repetitive classes or classes with large ranges.   Figure 17 displays the distributions of the

seven clusters in Bexar County, and Table 11 lists the factors within each of the seven

clusters.

Table 11. K-Means Cluster Analysis.

Final Cluster Centers							
	Cluster						
	1	2	3	4	5	6	7
Variables	n = 14	n = 1	n = 8	n = 8	n = 15	n = 3	n = 6
Median Annual Household Income	$33,226	$75,677	$41,306	$60,735	$26,199	$49,324	$18,420
High school or higher	69.61%	95.80%	81.55%	89.36%	63.45%	83.53%	50.36%
Bachelor's or higher	14.04%	46.80%	17.12%	23.22%	8.56%	20.60%	7.73%
White Alone	16.21%	46.00%	23.75%	29.25%	8.53%	29.00%	3.50%
Hispanic or Latino	79.93%	44.00%	68.13%	53.63%	83.73%	64.33%	94.17%
Not Hispanic or Latino	20.03%	55.75%	32.06%	46.43%	16.29%	35.57%	5.82%

The K-Means cluster analysis that yielded seven distinct clusters in San Antonio

that I characterize as: low income (less than $30,000), lower middle income ($30,000 -

$50,000), and upper middle income ($50,000 - $80,000). Clusters 1 has 14 census tracts

and is lower middle income, predominately Hispanic with lower education. Cluster 2

possesses 1 census tract that has upper-middle income, mixed ethnicity, and a high

educational attainment. Cluster 3 encompasses 8 census tracts and is middle income,

closely resembling the overall county mean. Cluster 4 contains 8 census tracts and is

upper-middle income, has an above average educational attainment and a mixed ethnicity
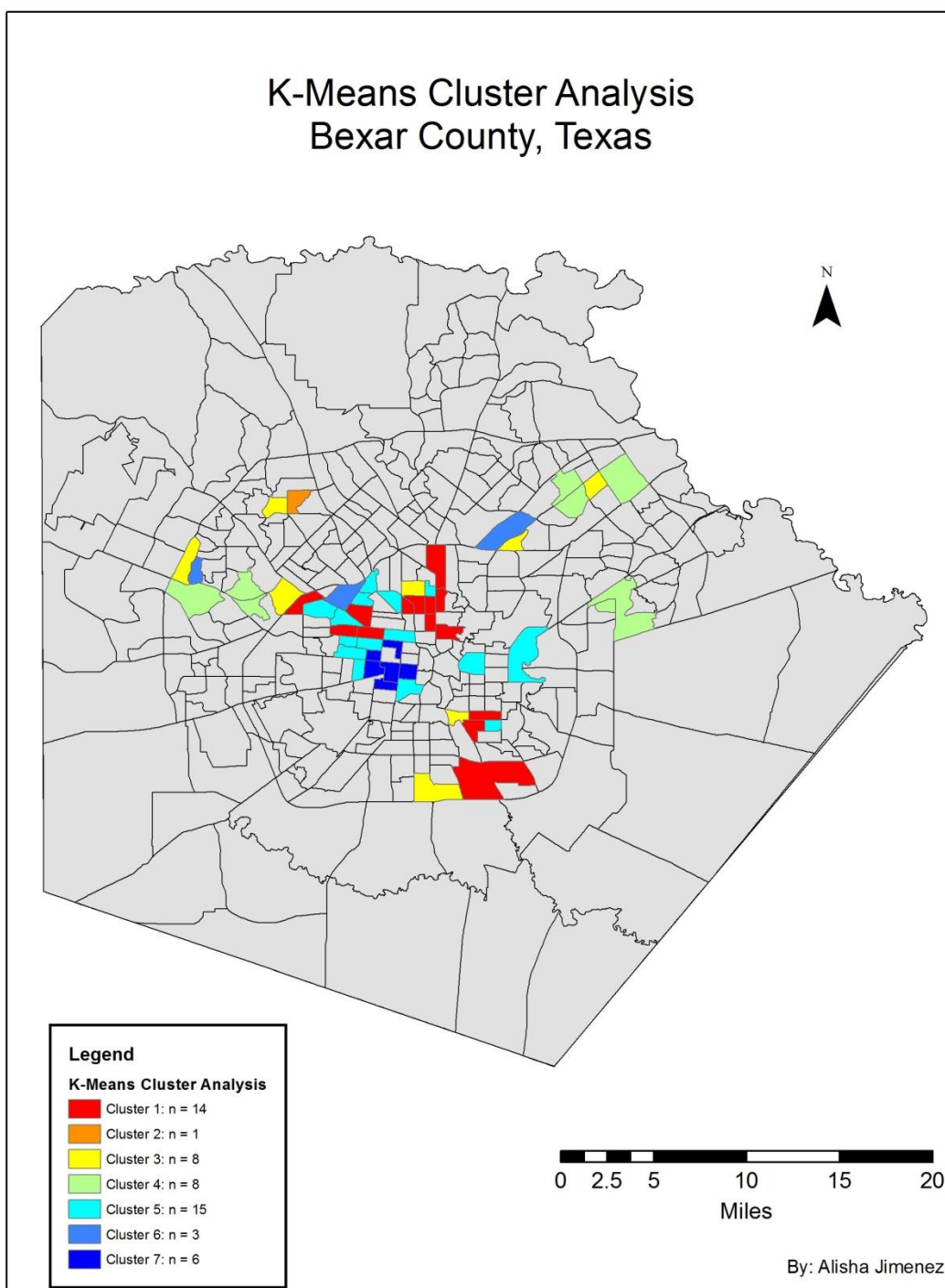
Figure 17. Map of K-Mean Cluster Analysis, Bexar County, Texas.

with Hispanics dominating. Cluster 5 has 15 census tracts and is low income, primarily

Hispanic with lower than mean educational attainment than the county. Cluster 6

encompasses 3 census tracts and is middle income, slightly more educated than the

county, and largely Hispanic. Cluster 7 has 6 census tracts and is low income and almost

completely Hispanic with only half the population graduating from high school.

Clusters 5 and 7 have very similar characteristics with low educational attainment,

low annual household income, and a very high percentage of Hispanic population.

Cluster 3 and 6 are also similar to one another. These clusters are close to the county

mean for all variables, just slightly above average for percent Hispanic middle income.

Cluster 2 and 4 both have upper-middle income populations with higher than average

educational attainment and greater mixing of races and ethnicities.

The county mean for alcohol retail outlets in Bexar County is 3.49 per census

tract. The 55 census tracts within 500 feet of alcohol billboard advertisements have a

mean of 4.41 alcohol retail outlets. When a 500-foot buffer was applied to alcohol retail

locations in the 366 census tracts in the study area, the mean for Bexar County increased

to 6.99. This same 500-foot buffer zone increased the number of alcohol retailers in the

55 focal census tracts within 500 feet of alcohol billboard advertisements to a mean of

9.47 that is substantially larger than the county mean.

CHAPTER V

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

Outdoor billboard advertisements are cost effective and can reach a large audience easily. Alcohol billboard advertisements not only target commuters but those who live near them and pass them daily.

This research was driven by two major questions: (1) What are the demographics of the landscape of alcohol billboard advertisements in San Antonio, Texas? (2) What is the propinquity of alcohol billboard advertisements and commercial alcohol sales outlets in San Antonio, Texas?

My research was conducted using four working hypotheses, all of which the statistical analyses rejected.

1. Alcohol billboard advertisements are not located in neighborhoods with less median household income than the county mean.

2. Alcohol billboard advertisements are not located in neighborhoods with less educational attainment than the county mean.

 3. Alcohol billboard advertisements are not located in neighborhoods with a greater Hispanic population percentage than the county mean.

4. Alcohol billboard advertisements are not located in neighborhoods with greater accessibility to alcohol sales outlets as compared to the county mean.

After analyzing the results of the t-test and Pearson correlation, I determined the relationship between alcohol billboard advertisements and the independent variables: median annual household income, educational attainment (high school or higher; bachelor's degree or higher), ethnicity (white alone, Hispanic /Latino, not Hispanic or Latino), and number of alcohol retail outlets within 500 feet of census tracts with alcohol billboards. A negative relationship exists between alcohol billboard advertisements and median annual household incomes, high school or higher, bachelor's or higher, white alone, and not Hispanic or Latino. These outcomes mean as the values of the independent variables increase in a census tract, the number of alcohol billboard advertisements decreases in that tract. There is a positive relationship between Hispanic or Latino and the number of alcohol retailers within 500 feet of census tracts, that is, as the Hispanic population increases, the number of alcohol billboard advertisements also increase as well as the number of alcohol retailers within 500 feet of the census tract. Of the seven variables in this study, Hispanic/Latino had the most significant correlation with alcohol billboard advertisements, indicating that alcohol billboard advertisements are more likely to be located in neighborhoods with a predominately Hispanic population. With the K-Means cluster analysis supported geospatially the results of the t-test and correlation analyses, I conclude that alcohol billboard advertisements are located in census tracts with lower median income, lower educational attainment, higher percent Hispanic population, and greater accessibility to alcohol sales outlets than the Bexar County mean.

The data from this study revealed that 6% percent of the 784 billboard faces in Bexar County, located away from highways and major roads, advertised alcohol. These billboards were exclusively advertisements for beer. My quantitative analysis corroborated previous studies in that alcohol billboards target minority neighborhoods (Stoddard, Johnsons, Boley-Cruz, and Sussman 1997; Luke, Esmundo, and Bloom 2000; and Hackbarth et al. 2001). However, previous studies focused on African Americans, while my study revealed that Hispanics are targeted as well. My study also found alcohol billboard advertisements in Bexar County, like tobacco advertisements in St. Louis, were most heavily distributed in the central city rather than the suburbs (Luke, Esmundo, and Bloom 2000).

Bexar County has two highway loops that divide the city of San Antonio. Downtown San Antonio and most of the low income population are located within the inner loop of I-410. The outer loop of Highway 1604 encompasses much of the sprawling suburban area that continues to grow outward. Within inner loop I-410 there are 33 alcohol billboard advertisements. Clusters 1, 5, and 7 are located completely inside loop I-410, while clusters 3 and 6 are at least partially inside the I-410 loop. Thus, 73 percent of the alcohol billboard advertisements greater than 500 feet from highways in Bexar County are predominantly targeting poor Hispanics with lower educational attainment.

This study also illustrates that alcohol marketing is heavily reliant on both race and class. Alcohol companies advertising in Bexar County tend to focus on Hispanics versus the white population. The majority of the Hispanic population within the inner city of San Antonio has less education attainment than the county. As one moves outward toward the county boundaries, the education attainment increases and the number of

alcohol advertisements decrease. This educational gradation supports the idea that alcohol companies target those with less formal education. In addition, as one moves outward from the inner city and north of San Antonio the population changes from almost totally Hispanics to almost completely white. Once again, the number of advertisements decrease in direct relationship to a greater number of whites. These two characteristics, education and race/ethnicity, often go hand-in-hand with those that have lower education attainment, thereby influencing the high number of lower paying jobs.

Mere exposure theory purports that people more exposed to a stimulus, the stronger their feeling toward it becomes (Zajonc 1968). Because Hispanics are the target population for alcohol billboards in Bexar County and because Hispanics are already predisposed to social and economic inequalities, these alcohol advertisements provide them with positive reinforcement that alcohol is the readily available in their community. The advertisers are thus encouraging those with little disposable income to spend it on alcohol products.

Policy Implication

The results of this study show that alcohol billboard advertisements are specifically targeting Hispanics in Bexar County. This research finding is an initial step in providing at the local level educational materials about alcohol and alcoholism, preventive measures, and social assistance for Latinos, particularly young people to provide interventions leading to behavioral modification.

Future Research

Additional research should be conducted in other U.S. cities regarding alcohol billboard advertisements, especially in majority Hispanic areas. Then, a city comparison across the country could determine which areas have the highest intensities of alcohol billboards in Hispanic areas within the social and demographic contexts.

APPENDIX A

PHOTOGRAPHED BILLBOARD ADVERTISEMENTS

Content	Longitude	Latitude
Singer, Budweiser	-98.460308	29.384158
Coors Light	-98.479590	29.388148
Keystone Light	-98.481015	29.331887
Singer, Budweiser	-98.528967	29.412908
Keystone Light	-98.527668	29.424045
Singer, Budweiser	-98.549108	29.430393
Keystone Light	-98.551268	29.430645
Tecate	-98.552878	29.430837
Miller Lite- Dallas Cowboys	-98.557130	29.431102
Miller Lite- Dallas Cowboys	-98.602595	29.467743
Miller Lite- Dallas Cowboys	-98.575683	29.471947
Keystone Light	-98.576493	29.472283
Keystone Light	-98.555265	29.456767
Miller Lite- Dallas Cowboys	-98.547850	29.451765
Keystone Light	-98.539215	29.446465
Dos Equis	-98.537203	29.446312
Keystone Light	-98.527478	29.424640
Coors Light	-98.366945	29.569445
Dos Equis	-98.390558	29.563847
Tecate	-98.398142	29.557497
Keystone Light	-98.399092	29.556970
Singer, Budweiser	-98.499343	29.455092
Bud Light	-98.499250	29.485293
Tecate	-98.507902	29.488025
Keystone Light	-98.507903	29.478697
Bud Light	-98.507987	29.490637
Coors Light	-98.479637	29.388162
Keystone Light	-98.695750	29.490185

Miller Lite- Dallas Cowboys	-98.691958	29.489388
Keystone Light	-98.638617	29.479447
Keystone Light	-98.614923	29.554983
Bud Light	-98.477648	29.425052
Tecate	-98.433987	29.420912
Bud Light	-98.433655	29.421035
Tecate	-98.373693	29.475232
Keystone Light	-98.353835	29.566000
Keystone Light	-98.615473	29.476398
Keystone Light	-98.515462	29.409985
Keystone Light	-98.558443	29.448395
Singer, Budweiser	-98.572268	29.449675
Singer, Budweiser	-98.555950	29.483233
Singer, Budweiser	-98.526017	29.477083
Tecate	-98.433438	29.528598
Bud Light	-98.434930	29.438050

APPENDIX B

TWO SAMPLE T-TEST SPSS OUTPUT

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Median Annual Household Income	Equal variances assumed	19.381	.000	4.212	364	.000	16811.835	3991.575
	Equal variances not assumed			6.667	148.875	.000	16811.835	2521.702
High school or higher	Equal variances assumed	.923	.337	3.359	364	.001	8.8417539	2.6321075
	Equal variances not assumed			3.736	82.178	.000	8.8417539	2.3666512
Bachelor's or higher	Equal variances assumed	26.703	.000	4.057	364	.000	11.4251798	2.8161647
	Equal variances not assumed			5.845	120.429	.000	11.4251798	1.9545959
White	Equal variances assumed	21.172	.000	5.075	364	.000	.1548331	.0305092
	Equal variances not assumed			6.976	110.191	.000	.1548331	.0221958
Black	Equal variances assumed	.290	.591	1.264	364	.207	.0158398	.0125284
	Equal variances not assumed			1.133	68.667	.261	.0158398	.0139769

55

Hispanic or Latino	Equal variances assumed	7.009	.008	-5.691	364	.000	-.1941806	.0341210
	Equal variances not assumed			-6.745	88.385	.000	-.1941806	.0287884
Not Hispanic or Latino	Equal variances assumed	7.197	.008	5.606	364	.000	.1906541	.0340064
	Equal variances not assumed			6.625	88.053	.000	.1906541	.0287798
No. of Alcohol Retailers within 500ft	Equal variances assumed	.048	.826	-4.079	364	.000	-2.479	.608
	Equal variances not assumed			-4.385	79.385	.000	-2.479	.565

PEARSON CORRELATION SPSS OUTPUT

Correlations		Alcohol Billboards within 500ft	Median Income	High school	Bachelors
Alcohol Billboards in 500ft	Pearson Correlation	1	-.209[**]	-.194[**]	-.198[**]
	Sig. (2-tailed)		.000	.000	.000
	N	366	366	366	366
Median Annual Household Income	Pearson Correlation	-.209[**]	1	.677[**]	.796[**]
	Sig. (2-tailed)	.000		.000	.000
	N	366	366	366	366
High school or higher	Pearson Correlation	-.194[**]	.677[**]	1	.754[**]
	Sig. (2-tailed)	.000	.000		.000
	N	366	366	366	366
Bachelor's or higher	Pearson Correlation	-.198[**]	.796[**]	.754[**]	1
	Sig. (2-tailed)	.000	.000	.000	
	N	366	366	366	366
White	Pearson Correlation	-.257[**]	.708[**]	.594[**]	.807[**]
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366
Hispanic or Latino	Pearson Correlation	.279[**]	-.635[**]	-.595[**]	-.756[**]
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366
Not Hispanic or Latino	Pearson Correlation	-.276[**]	.658[**]	.647[**]	.772[**]
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366

No. of Alcohol Retailers within 500ft	Pearson Correlation	.206[**]	-.286[**]	-.149[**]	-.206[**]
	Sig. (2-tailed)	.000	.000	.004	.000
	N	366	366	366	366

|		White	Hispanic or Latino	Not Hispanic or Latino	No. of Alcohol Retailers within 500ft
Alcohol Billboards within 500ft	Pearson Correlation	-.257**	.279**	-.276**	.206**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366
Median Annual Household Income	Pearson Correlation	.708**	-.635**	.658**	-.286**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366
High school or higher	Pearson Correlation	.594**	-.595**	.647**	-.149**
	Sig. (2-tailed)	.000	.000	.000	.004
	N	366	366	366	366
Bachelor's or higher	Pearson Correlation	.807**	-.756**	.772**	-.206**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	366	366	366	366
White	Pearson Correlation	1	-.900**	.919**	-.251**
	Sig. (2-tailed)		.000	.000	.000
	N	366	366	366	366
Hispanic or Latino	Pearson Correlation	-.900**	1	-.977**	.257**
	Sig. (2-tailed)	.000		.000	.000
	N	366	366	366	366
Not Hispanic or Latino	Pearson Correlation	.919**	-.977**	1	-.250**
	Sig. (2-tailed)	.000	.000		.000
	N	366	366	366	366
No. of Alcohol Retailers within 500ft	Pearson Correlation	-.251**	.257**	-.250**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	366	366	366	366

APPENDIX D

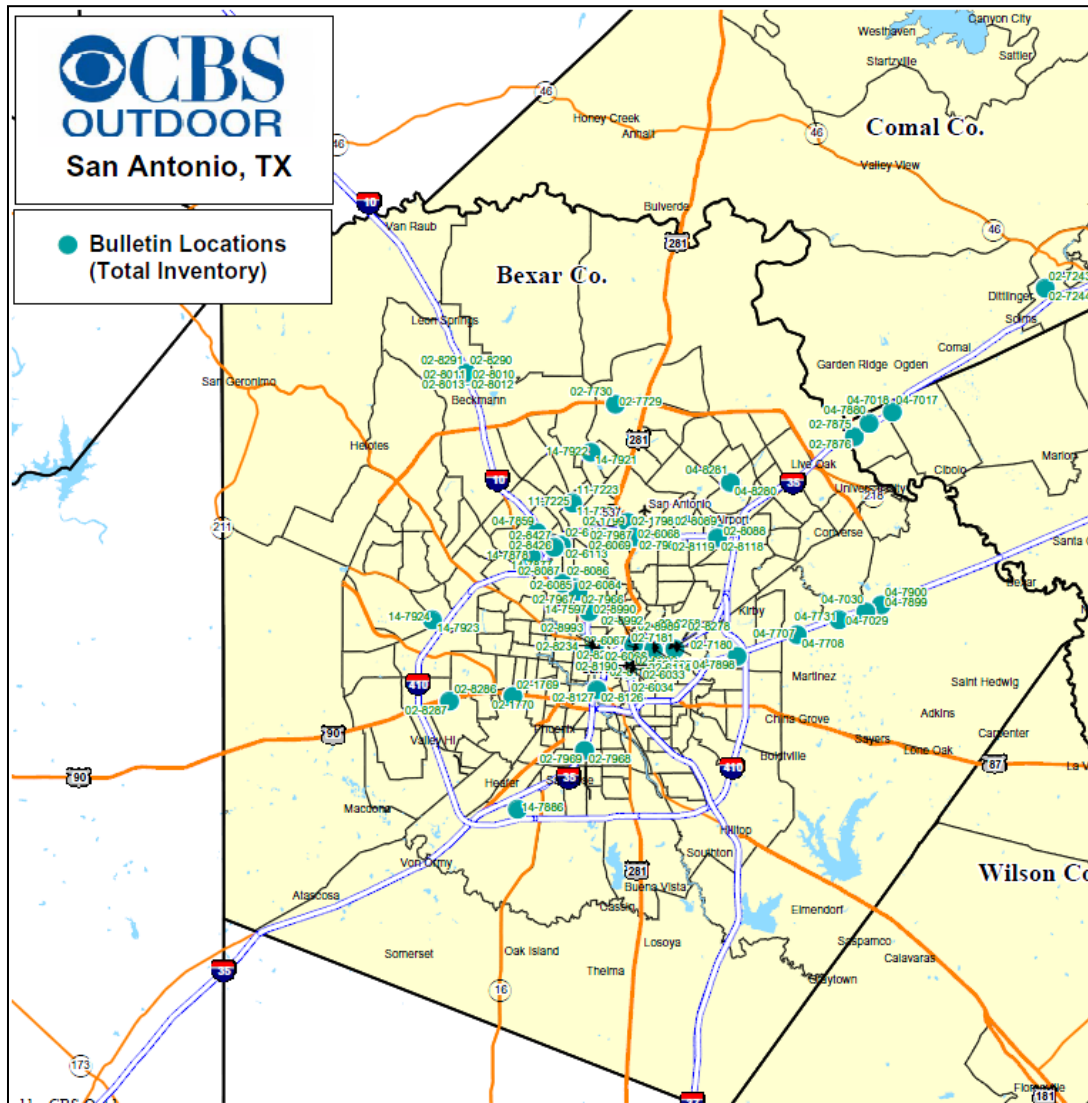## REPORTED BILLBOARDS OWNED BY LAMAR ADVERTISING COMPANY
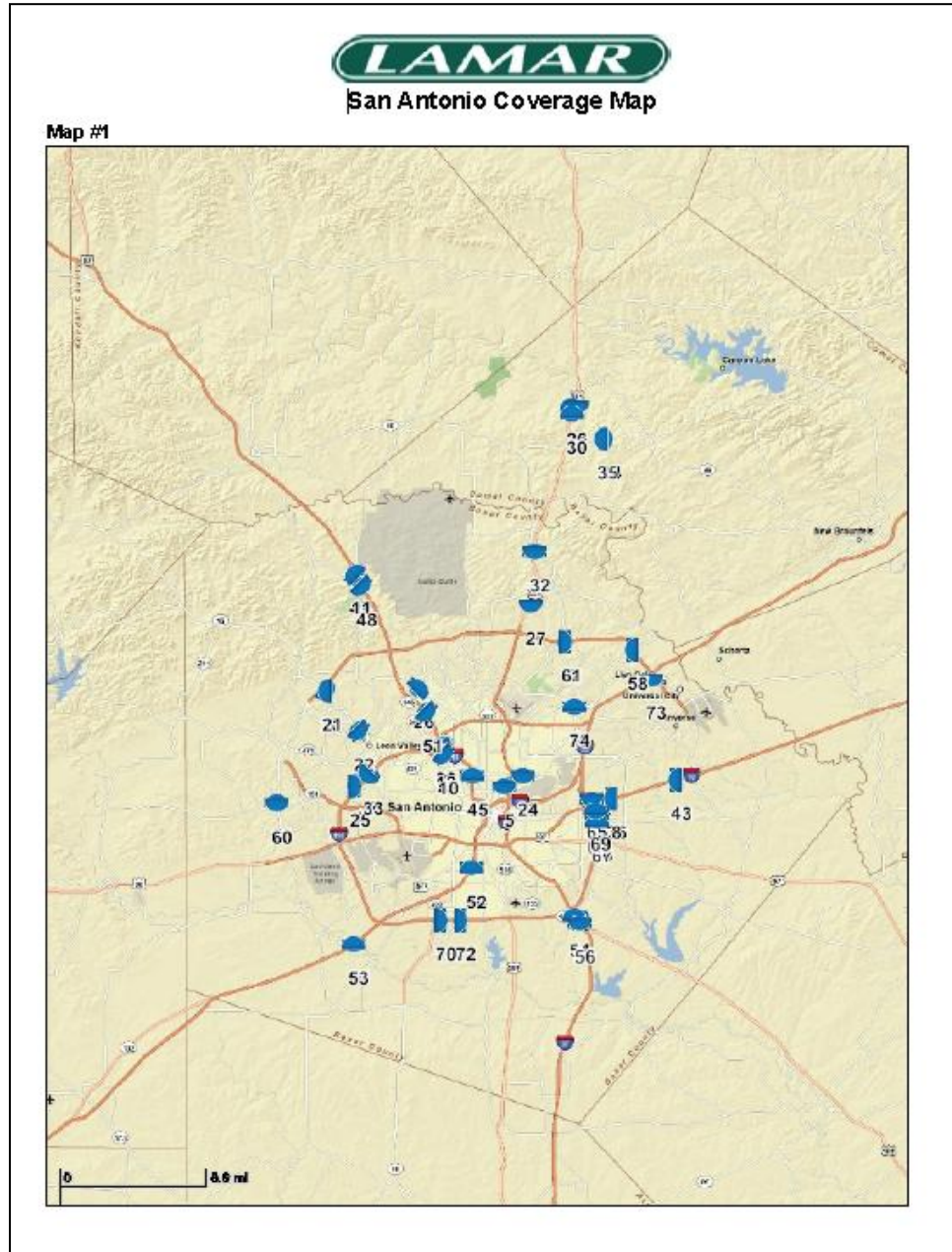
APPENDIX E

REPORTED BILLBOARD LOCATIONS OWNED BY CBS OUTDOOR
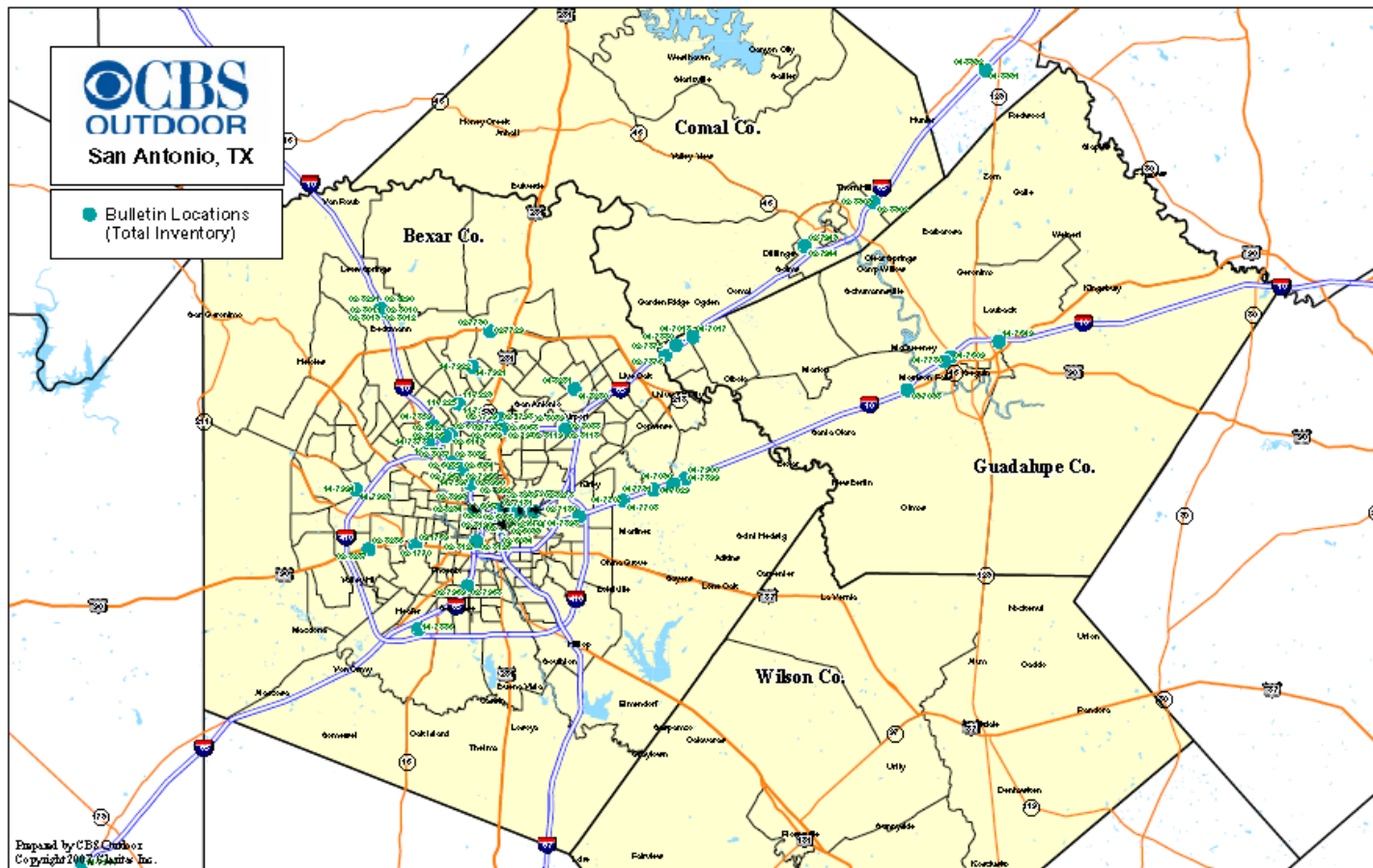
APPENDIX F

CBS BILLBOARD LOCATIONS IN BEXAR COUNTY

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