

2014

West Virginia's Low Percentage of Population With At Least A Four-Year College Education

Britt Arcadipane
britt.arcadipane@gmail.com

Follow this and additional works at: <http://mds.marshall.edu/etd>



Part of the [Higher Education Commons](#), and the [Human Geography Commons](#)

Recommended Citation

Arcadipane, Britt, "West Virginia's Low Percentage of Population With At Least A Four-Year College Education" (2014). *Theses, Dissertations and Capstones*. Paper 834.

This Thesis is brought to you for free and open access by Marshall Digital Scholar. It has been accepted for inclusion in Theses, Dissertations and Capstones by an authorized administrator of Marshall Digital Scholar. For more information, please contact zhangj@marshall.edu.

**WEST VIRGINIA'S LOW PERCENTAGE OF POPULATION WITH AT LEAST A
FOUR-YEAR COLLEGE EDUCATION.**

A thesis submitted to
The Graduate College of
Marshall University

In partial fulfillment of
the requirements for the degree of
Master of Science

In Geography

by

Britt Arcadipane

Joshua Hagen, Ph.D., Committee Chairperson
James Leonard, PhD.
Kevin Law, PhD.

Marshall University

May 2014

ACKNOWLEDGMENTS

I would like to thank my advisors Dr. Joshua Hagen, Dr. James Leonard, Dr. Kevin Law and Dr. Godwin Djietror of the Marshall University Geography Department for all of their assistance and support. I would also like to thank Mr. Timothy Greene of the Jersey Shore Area High School for his pedagogical knowledge he imparted on me. Finally, Dr. Todd Nesbitt of Lock Haven University for introducing me to the discipline of geography.

TABLE OF CONTENTS

Acknowledgements.....	ii
Table of Contents.....	iii
List of Figures.....	v
Abstract.....	vii
Chapter 1	
Introduction.....	1
Chapter 2 Review of the Literature	
Appalachian Region.....	9
Coal Mining Industry.....	13
Factors Influencing Bachelor’s Degree Attainment.....	16
Postsecondary Education.....	21
Chapter 3 Methodology	
3.1 Study Area and Data Collection.....	25
3.2 Explanatory Variables.....	28
Chapter 4 Analysis	
State Level Analysis.....	31
County Level Analysis.....	45
Chapter 5 Discussion.....	62
Chapter 6 Conclusion.....	70
Bibliography.....	78

Appendix: Letter from Institutional Research Board84

LIST OF FIGURES

Figure 1.1. Bachelor's Degree or More Attainment by Percentage 1940 to 2010

Figure 2.1. Regional Map of Appalachia

Figure 4.1. Bachelor's Degree Attainment Results in the United States

Figure 4.2. Univariate LISA Results for United States Bachelor's Degree Attainment

Figure 4.3. Univariate LISA Results for United States Bachelor's Degree Attainment Cluster Analysis

Figure 4.4. Univariate LISA Results for United States Persons Below Poverty Level

Figure 4.5. Univariate LISA Results for United States Persons Below Poverty Level Cluster Analysis

Figure 4.6. Bivariate LISA Results for United States Bachelor's Degree Attainment and Poverty Significance

Figure 4.7. Bivariate LISA Results for United States Bachelor's Degree Attainment and Poverty Cluster Analysis

Figure 4.8. High School Degree Attainment Results in the United States

Figure 4.9. High School Dropout Rate Results in the United States

Figure 4.10. First-Time College Retention Rates Results in the United States

Table 4.1. Definition of Endogenous and Exogenous Variables

Table 4.2. United States Correlation Matrix

Figure 4.11. Bachelor's Degree Attainment Results in West Virginia

Figure 4.12. Univariate LISA Results for West Virginia Bachelor's Degree Attainment

Table 4.13. Univariate LISA Results for West Virginia Bachelor's Degree Attainment Cluster Analysis

Figure 4.14. Univariate LISA Results for West Virginia Persons Below Poverty Level

Figure 4.15. Univariate LISA Results for West Virginia Persons Below Poverty Level Cluster Analysis

Figure 4.16. Bivariate LISA Results for West Virginia Bachelor's Degree Attainment and Poverty Significance

Figure 4.17. Bivariate LISA Results for West Virginia Bachelor's Degree Attainment and Poverty Cluster Analysis

Figure 4.18. High School Degree Attainment Results in West Virginia

Figure 4.19. High School Dropout Rate Results in West Virginia

Figure 4.20. College-Going Rates in West Virginia

Figure 4.21. First-Generation Students in West Virginia

Figure 4.22. Coal Production in West Virginia

Table 4.3. West Virginia County Correlation Matrix

ABSTRACT

This report analyzes key factors concerning West Virginia's rank as last in the nation with residents that have obtained a four-year bachelor's degree or higher. This quantitative study will examine political, economic, and sociological components at the state and county level using data collected primarily from various government and state institutions. An emphasis is placed on three main factors: poverty, parental education levels, and low socio-economic status (SES) high schools. Other variables analyzed will be high school graduation and dropout rates, free or reduced-price lunch (FRPL) eligibility, college retention rates, first-generation student population, and the influence of resource-extractive industries. Poverty had the highest correlation with educational attainment at the state level, but FRPL eligibility had the highest correlation with bachelor's degree attainment in West Virginia. In relation to President Obama's 2020 College Completion Goal, West Virginia needs to address this persistent problem in order to improve the strength of the state's economy and compete with neighboring states. These results are applicable to state policy decisions concerning higher education.

Key words: West Virginia, college education, high school education, bachelor's degree attainment.

CHAPTER 1

INTRODUCTION

Bachelor's degree attainment has been shown to increase overall well-being through higher income, improved health-related behaviors, lower reliance on public assistance programs, and increased engagement in political processes (Baum, Ma, and Payea, 2013). Another benefit is an easier transition to the workforce. According to Haaga, "Workers who have persisted and succeeded in their academic career are more likely than others to have the specific skills, general knowledge, ability to acquire new skills, and other personal characteristics that employers value" (Haaga, 2004, p. 3). An additional benefit is economic and social mobility for disadvantaged students. In other words, education provides an opportunity to increase earnings and improve social class standing. According to the National Center for Education Statistics (NCES) (2012), in 2010, 67% of high school graduates were employed compared to 85% of those who earned a bachelor's degree. Amarasinghe summarizes the wide-range of benefits, "Education is one of the key determinants of human capital, not only providing an economic return, but also increasing employment rates and earnings, and improving health, well-being and parenting" (Amarasinghe, 2006, p. 126).

West Virginia is part of a region that has not historically valued higher education. Secondary private academies created in the early 19th century were for the privileged elites. In most rural Appalachian communities, not only were difficulty of access to and high cost of higher education deterrents, but it simply was not valued. In fact, "[e]ducational attainment beyond the eighth grade was considered exceptional, rather than the norm, until about WWII"

(Shaw, DeYoung, & Rademacher, 2005, p. 308). Families and churches served as the primary learning institutions until the early twentieth century when rural school participation began to grow (Shaw, DeYoung, & Rademacher, 2005). Thus few West Virginians attended college; many who received a college degree traveled to states with stronger, more diversified economies such as neighboring Pennsylvania or Ohio for employment.

The slow development of higher education had long-term economic consequences for West Virginia. Towards the end of the 20th century, national and global markets began moving towards cleaner and high-tech industries. These markets are primarily located in post-industrial societies, which have a tendency to be dependent on citizens that have obtained higher education. West Virginia needs to increase its graduation rate in order to stay competitive within the global market system and enhance its political and economic well-being. It is estimated that half of the state's workforce will require a postsecondary degree by 2018 (WVHEPC, 2013).

The importance of higher education is underscored in President Obama's 2020 College Completion Goal (Kanter et al., 2011). The 2020 Goal emphasizes two strategic visions, "10 million more graduates from community colleges, four-year colleges and universities by 2020 (beyond 2+ [sic] million expected due to growth) and the creat[ion] and support [of] opportunities for every American to complete one year or more of higher education or advanced training in his/her lifetime" (Kanter et al., 2011).

The first point President Obama focused upon was job creation. According to a speech he gave to the Hispanic Chamber of Conference on Education in 2009, "...by 2016, four out of every ten new jobs will require at least some advanced education or training" (Lee, 2009). Beyond the realm of job creation, Obama focused upon the relationship between informed and educated Americans and their ability to help solve persistent problems this nation faces. West

Virginia will inevitably improve its own economic condition by striving to adhere to Obama's Completion Goal by placing more emphasis on influencing residents to pursue postsecondary education.

According to the NCES, educational attainment refers to highest level of education achieved (i.e. less than high school completion, high school completion, some college, or a bachelor's degree or higher). In order to obtain a bachelor's degree, a student must receive a high school diploma or its equivalent. The United States Census Bureau measures the percentage of persons age 25+ that are high school graduates or higher at the county and state levels. High school attainment exhibits a close spatial relationship with another Census statistic: the percentage of persons age 25+ that have a bachelor's degree or higher. At 17.9% of residents with four-year degrees, West Virginia has the lowest percentage of any state in the nation (Census, 2014). In this study, rates of bachelor's degree attainment are analyzed at two spatial levels: among the 50 states and among the 55 counties of West Virginia. The effects of these independent variables on the bachelor's degree attainment rate are considered: dropout rates, poverty, parental educational attainment, and low socio-economic status (SES) of high schools.

Dropout and retention rates are two key statistics that explain why West Virginia has the lowest percentage of residents with four-year degrees. Dropout rates are measured using the percentage of 16 through 24-year-olds who are not enrolled in school and have not earned a high school credential (either a diploma or an equivalency) (NCES, 2012). Retention rates are the percentage of first-time college freshman returning for their second year. The long term economic impact of dropping out is severe, "For every dollar earned by college graduates, those who drop out without a degree earn sixty-seven cents" (Selingo, 2013, p. ix). Not only are there

economic repercussions for the individual but also the state loses important tax revenue when a student chooses to dropout. Nationally, about 7% of 16-24 year-olds were not enrolled in school and have not earned a high school credential in 2010 (NCES, 2012).

Based on national trend data published by the NCES, this thesis will analyze three distinctive factors that contribute to West Virginia's low percentage of residents with a four-year degree or higher. Research has shown one of the most influential determinants as to whether a student pursues and receives a four-year degree is the poverty rate at local, county, and state levels. Data on household income and the number of people living in the household is combined with the poverty threshold, which is published by the Census Bureau, to determine the value of this factor (NCES, 2013). Poverty poses a primary challenge to students concerning academic performance, educational persistence and outcomes at the elementary and secondary levels, and physical health (NCES, 2012). Research shows obesity levels are inversely related to the percentage of population with a completed college degree (Amarasinghe, 2006).

The second factor to be analyzed is parental or guardian educational attainment. Long before a student graduates from a postsecondary institution, parental education has an impact on the foundational learning abilities of children. Research shows college-educated mothers spend more time with their children and help to develop their children's cognitive skills (Baum, Ma, & Payea, 2013). Highly educated mothers participation in early childhood education programs has been positively associated with daily reading to their children by a family member. In contrast, a smaller percentage of children whose parents are below the poverty line was read to (Planty et al. 2009). In addition, West Virginia has a large first-generation student population whom do not

have highly educated parents. These students struggle with staying in college at a higher rate than traditional college students (Nunez & Carroll, 1998).

Low socio-economic status (SES) refers to high schools that are located in high poverty areas that administer to a large majority of low-income students. Low SES schools have a profound impact on educational attainment, college-going rates and postsecondary achievement. Low SES schools usually do not provide the opportunity for students to complete advanced coursework through which students can earn college credit and often do not provide adequate access and contact with high school guidance counselors. Research shows increased interaction with guidance counselors increases high school graduation rates, college aspirations, and financial-aid awareness (NCES, 2012). A school's SES is measured using the percentage of enrollment that is eligible for the National School Lunch Program's free or reduced-price lunch (FRPL) (NCES, 2012).

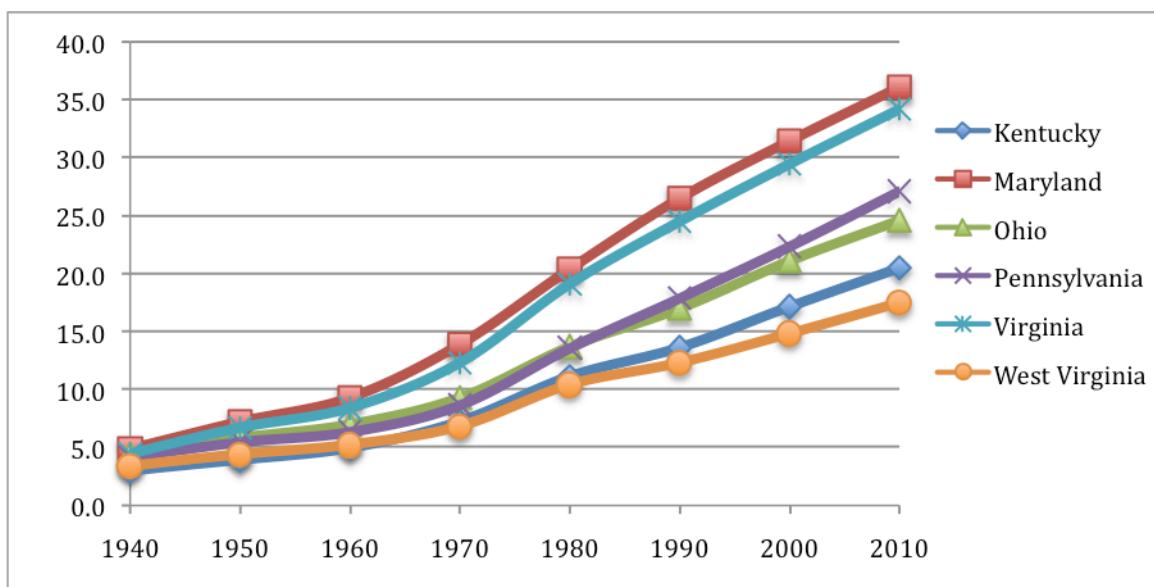
There are multiple reasons why West Virginia's low percentage of population with at least a four-year college education is significant. As the world becomes increasingly connected due to the growth of the global market, workers without skills that require participation in formal learning will find themselves unemployed during periods of economic downturn (Voorhees, 2005). There is a direct correlation between a state's level of post-secondary education and the health of that state's economy.

Neighboring states outperform West Virginia for corporate sector investments and siphon off its existing higher education labor pool. West Virginia continues to lose its skilled workforce, which deters the investment of companies from overseas to companies within the state and, as a result, diminishes the prospects for positive growth. States with many college graduates support

strong economies and attract Foreign Direct Investments (FDIs). FDIs provide the benefits of financial stability, promote economic development, and enhance the well being of societies (OECD, 2008). West Virginia would not be viewed as a destination for FDIs due to the low percentage of four-year college graduates in its labor pool.

Unfortunately, and in spite of the obvious disadvantages, West Virginia's low percentage of four-year graduates persists. West Virginia also has the lowest growth rate of residents with four-year education compared to neighboring states from 1940 and 2010 (Figure 1.1).

Figure 1.1. Bachelor's Degree Or More Attainment by Percentage 1940 to 2010



West Virginia and its surrounding states started at about 4% bachelor's attainment in 1940. By 2010, West Virginia trailed all of its bordering states in bachelor's degree attainment. Residents (and potential residents) who have postsecondary education leave the state for employment at an alarming rate. Research by Hammond (2010) calculated during the period of 1996-1997 and 2008-2009 found only 45.2% of West Virginia's public higher education

graduates worked within the state. The same study found between 2008-2010 an average of 61% of in-state graduates from West Virginia's higher education institutions remained in West Virginia for employment compared to only 9% of the total out-of-state student population. The trend in West Virginia is similar to the rest of Central Appalachia, "...[Central Appalachia] experienced nontrivial outflows of more skilled adults, which were largely counterbalanced by inflows of less skilled ones...[but it is not] clear why low-skilled workers would choose Appalachia as a destination" (Ziliak, 2012, p.199-200). This "brain-drain" further compounds the problem as educated youth that could potentially help solve the problem leave.

This thesis will further the small body of knowledge specifically intended to facilitate understanding of key explanatory variables that challenge West Virginia's ability to raise its percentage of residents with four-year degrees. The research findings can be applied through statewide policy decisions concerning higher education.

CHAPTER 2 REVIEW OF THE LITERATURE

Multiple factors figure into attainment of higher education, but this thesis will focus on four categories: the Appalachia region, the Coal Mining Industry, Factors Influencing Bachelor's Degree Attainment and Postsecondary Education. The first two categories are specific to West Virginia. Figure 2.1 depicts West Virginia as the only state completely within the Appalachian region as designated by the Appalachian Regional Commission (ARC). Thus the state serves as a microcosm of the entire Appalachian region as a proud facilitator of "mountain culture" while simultaneously exhibiting negative attributes such as poverty traps that are found across the region. West Virginia has an economic and cultural association with the coal mining industry, but the lack of economic diversification led to higher poverty rates and lower educational attainment. The latter two categories are broader in scope and application. School-level SES and parental education has a significant impact on bachelor's degree attainment. The local and state economic benefits of postsecondary education have been subject to numerous studies, but West Virginia specifically needs to reverse the rural "brain drain" phenomenon of students migrating for employment opportunities.

Figure 2.1. Regional Map of Appalachia



Source: http://www.arc.gov/images/appregion/Appalachian_Region_Map.pdf_map1.jpg

APPALACHIAN REGION

According to the Appalachian Regional Commission (ARC), “forty-two percent of the Region’s population is rural, compared with 20 percent of the national population” (ARC n.d.). The Office of Management and Budget (OMB) delineated the majority of West Virginia’s counties as rural (26); the remainder classified as 8 micropolitan counties (core urban area greater than or equal to 10,000 but less than 50,000 population) and 21 metropolitan counties (50,000 or more population). The percentage of rural public schools in West Virginia in 2005-06 was 49%, compared to 19% nationally (U.S. Department of Education, n.d.).

In his work titled *Uneven Ground* (2008), Eller provides a comprehensive study of the Appalachian region from the 1940s to the present day. Eller elaborates on the underlying reality

that Appalachia has lagged behind in terms of educational attainment, infrastructure, and economic development in comparison to the rest of the United States. West Virginia's economic development has been limited through a variety of factors: "(1) a tradition for individualism...reinforced by the lack of, weak, or corrupt law enforcement in early company towns, (2) the influx of outside industrialist capital...following the Civil War which allowed outside interests to obtain disproportional influence in local politics, (3) the failure of subsistence farming and weak local economies based on coal and lumber industries, which created widespread poverty, and (4) the combination of outside influence on the political process, weak law enforcement, and a sense of helplessness attached to poverty..." (Dorsey, 2011, p. 134).

Today, one in six West Virginians aged 18 and older (16 percent) lives in poverty (Hess, Hegewisch, & Williams, 2013). Much work has been completed on the detrimental effects of poverty on educational attainment levels within the Appalachian region (Abramsky, 2013; Ziliak, 2012; Dorsey, 2011; Myers, 2011; Eller, 2008; Lichter and Campbell, 2005). The socioeconomic environment of Central Appalachia enhances the longevity of poverty traps discussed further by Ziliak, "[A] poverty trap can be suspected when poverty is persistent, is not self-correcting, and is perpetuated by the institutions and culture of the region" (Ziliak, 2012, p. 12). Poverty is persistent in the region due to fluctuating labor market strength, lack of economic diversification, the concentration of capital within the hands of major natural resource companies and low public political participation to reverse the process. Other studies have focused on changing family dynamics within Appalachia, specifically the growing number of female-headed households, as a root cause of poverty (Lichter and Cimbula, 2010).

Myers (2011) discusses two common theories, the culture of poverty and internal colonialism, which attempt to explain the origin of Appalachian poverty. The culture of poverty

theory is a “blame the victim” approach using stereotypes about Appalachian people. The positive Appalachian qualities of being independent, self-reliant, and kinship-oriented are often misconstrued by the national media as backwardness, laziness, and inbred. At the high school level, these stereotypes might be internalized by Appalachian people and serve to limit their educational achievement (Chenoweth and Galliher, 2004). A study examining whether residents of the twenty-three western-most counties of North Carolina identified themselves as “Appalachian,” found that “...lower educated individuals may be more apt to shun the region than more educated respondents” (Cooper, Knotts, & Livingston, 2010, p. 38). This phenomenon may be a result of more educated individuals confronting stereotypes and reflecting on significant contributions Appalachians have made throughout American history. This theory presents an Appalachian culture based on traditionalism and fatalism. Thus the only way to enhance the lives and economy of the region is through cultural transformation. Identifying Appalachians as submissive and unchanging provides a false view of the region and its people (Myers, 2011).

The internal colony theory claims Appalachia is disconnected from the national economy. West Virginia is located within a sparsely populated peripheral region in comparison to American and global markets (Burns, 2007). The natural resources of the peripheral region are exploited at low cost. “Like a colony, the periphery supplies raw materials cheaply so that the core can benefit from the production of goods and services for the national and global market” (Burns, 2007, p. 2). Appalachia is often viewed as a sacrifice zone in which national and corporate interests accept the marginalization of its resources and people (Scott, 2010). Marginalization refers to the negotiation of space, power, and identity in which those in power (businesses and corporations) exploit those in the economic minority (Appalachian residents) for

their land and labor. The enduring legacy of absentee ownership facilitated money flowing out of the region and prevents economic diversification. Additionally, corporate ownership of the land works to block other industries from entering the region (Bell and York, 2010). This theory fails to show the complexity of a capitalistic market with a sole focus on absentee ownership (Myers, 2011).

COAL MINING INDUSTRY

West Virginia continues to have a conflicted relationship with its mono-industry and resource-dependent economy with little interest in economic diversification (Burns, 2007, p. 2). The coal mining industry provides much-needed jobs to the state's residents and an estimated 11% (7.2 billion) of West Virginia's gross state product (O'Leary and Boettner, 2011). Every ton of coal extracted in West Virginia generates a severance tax of 5% of the gross value of coal produced in one year. The majority of this tax flows to the State Revenue Fund that contributes funding to the state's public education system, in addition to state infrastructure and revenue-sharing with local governments (O'Leary, 2011).

Most jobs in coal extraction do not require a four-year degree and those that do are usually filled by out-of-state workers (Goodell, 2006). The loss of mining and manufacturing jobs in Appalachia has led to higher rates of government assistance and lowers rates of college attendance compared to national averages (Chenoweth and Galliher, 2004).

The positive correlation exists between declining employment in mining in West Virginia and the state's dropping labor force participation rate and county population—particularly in the southern coalfields of the state (O'Leary and Boettner, 2012; Dorsey, 2011; Bell and York, 2010; Burns, 2007; Goodell, 2006; Black, McKinnish and Sanders, 2005). The West Virginia Health Statistics Center (HSC) noted that between 1950 and 2000, only seven counties have gained population due to in-migration—mostly service-based, commuter bedroom counties adjacent the Washington D.C. region located in the eastern panhandle. (HSC, 2002). Over half of the total population loss occurred in the 1950s during a coal bust period. The most dramatic out-migration occurred in the southern coal producing counties of McDowell, Logan, and Kanawha and Ohio and Hancock counties in the north (HSC, 2002). According to the West Virginia Office of

Miners' Health Safety and Training (MHS&T, 2014), the peak miner employment year was 1940 with 130,457. As of 2012, there were 16,641 underground miners and 5,455 surface miners making a total of 22,096 (MHS&T, 2014). Between 1971 and 2003, surface mining employment saw a drastic increase while the number of underground mining jobs simultaneously dropped approximately 24 percent (Dorsey, 2011). To make matters worse, O'Leary and Boettner (2011) found that the percentage of public service sector jobs in the natural resources and mining industry was only about 4 percent in 2011. This study will spatially analyze coal production and employment per county to observe clusters of counties that have high coal industry employment and its adverse effects on poverty, dropout rate, high school degree attainment, and bachelor's degree attainment.

The loss of jobs in the coal mining industry is the result of a number of factors including mechanization, the depletion of easily accessible coal seams, competition from western U.S. (primarily Wyoming) mines, the expansion of the natural gas industry, and government regulations (Eller, 2008). Additionally, the industry is susceptible to boom and bust periods that have greatly fluctuated employment. The 1970s provided a brief boom due to the formation of the Organization of the Petroleum Exporting Countries (OPEC) and inflated gas prices abroad but a subsequent bust occurred in the 1980s as gas prices settled (O'Leary and Boettner, 2011; Black, McKinnish, and Sanders, 2005). However, mountain top removal, or MTR, is the primary reason coal mining jobs have declined.

Instead of using the more labor intensive, traditional method of digging for a coal seam underground, MTR lops off the top of mountains in order to more easily access coal seams from the surface. Fueled by the demand for coal during the energy crisis of the 1970s and cheaper operating costs in the 1980s during a coal bust, MTR has reduced employment throughout the

entire region. The “treadmill of production” model illustrates the capitalistic notion of creating greater profits through increased production as more important than ecological issues or employment of the local workforce (Bell and York, 2010). Furthermore, organizations such as Friends of Coal promote employment and a pro-coal ideology to young people through use of flyers, billboards, community events, and commercials.

The decline of the coal industry is intimately connected to poverty and outmigration. According to US Census data, West Virginia’s population decreased from over 2 million in 1950 to about 1.8 million in 2000. During the 1980s, out-migrants traveled to southern or southwestern Sun Belt states for employment. Many Rust Belt companies relocated to Sun Belt regions due to more favorable labor laws and tax structures. As a result, many workers followed. “Of these out-migrants, 63 percent were between the ages of 20 and 34...18 percent of the college-educated population...almost half of all those who came into the state during this period were living below the poverty level” (Dorsey, p. 98-99).

FACTORS INFLUENCING BACHELOR'S DEGREE ATTAINMENT

The most comprehensive source that described factors influencing bachelor's degree attainment was the annual report published by the NCES, titled *The Condition of Education 2013*. This source shed light on parental educational attainment and its influence on educational outcomes of high school students. After an interview process with adolescents from five southern West Virginia counties, students were found to be influenced by high maternal pressure to enter the military right away and the instillation of desire for lower socio-economic jobs; low maternal support was found with students who felt they would not finish high school or college (York, 2000). Conversely, paternal pressure was found for students to attend college later on (York, 2000). However, one study found parents with children aged two to four years old revealed that there was no significant correlation between parent education and their child's academic readiness (Moeller, 2001).

Numerous studies stress parents' educational attainment is a prominent factor in determining a student's pursuit and completion of a postsecondary degree (NCES 2012, Cowley, 2008; Rumberger and Palardy, 2005; Chenoweth and Galliher, 2004; Brown et. al., 1999). According to a study of 242 high school seniors in West Virginia, men were more influenced by parents' education level in predicting college decisions than women (Chenoweth and Galliher, 2004). In another study, a sample of 120 first-year college students found that a larger percentage of in-state student's fathers completed only a high school degree compared to out-of-state students (39% to 0.1%) and on average did not obtain a bachelor's degree (Rumberger and Palardy, 1999).

Parental education level is strongly linked with the percentage of first-generation students that pursue postsecondary education. Although no definitive definition of first-generation student

exists, Davis (2010) suggests: “Individuals can claim first-generation student status if neither one of their parents or guardians possesses a four-year degree” (Davis, p. 2). On the county level, this study will focus on the percentage of first-generation students (aged 25 and over) that choose to attend postsecondary institutions within West Virginia. First-generation students have their own challenges regarding graduation. “Even when controlling for many of the characteristics that distinguished them from their peers, such as socioeconomic status, institution type, and attendance status, first-generation student status still had a negative effect on persistence and attainment” (Nunez and Carroll, 1998, p. iv).

First-generation students face living on the “margins,” wedged between their family on one side and the college community on the other (Cowley, 2008; Hand and Payne, 2008). One characteristic studied by Chenoweth and Galliher (2004), familism, supported the higher probability of a student to attend college if their parents or extended family members had attended college. After a survey of 16 first-generation college students from West Virginia with at least two college semesters completed, the most important factors that influenced academic persistence were: (1) importance of home culture and family, (2) financial concerns, (3) significance of an internal locus of control, (4) relationships and emotional support, and (5) communication of information (Hand and Payne, 2008). College helps students improve their internal locus or self-reliance to achieve career goals instead of a perceived inability to control their future. According to the West Virginia Higher Education Policy Commission (WVHEPC) Report Card 2013, adult-student enrollment has increased by 3.3 percent since 2008.

The college-going rate measures the proportion of students who enrolled the following fall after graduating in the past year from a West Virginian high school. Surveys of West Virginian high schools are the primary resource for out-of-state enrollment estimates, but data

limitations prevent individual examination. Hossler and Gallagher (1987) proposed a three-phased model commonly used as a framework for research studies on college-going aspirations and the student choice process:

1. Predisposition phase: student chooses to pursue postsecondary education.
2. Search phase: student gathers information, apply, and admission process.
3. Choice phase: student prioritizes schools and makes a decision.

During the predisposition phase, factors such as student characteristics, parental income, education, encouragement and attitudes, quality of high school curriculum, and geographic location are all influential determinants as to whether a student pursues postsecondary education (Brown et. al., 1999 and Cowley, 2008). The search phase involves the comparison of schools and the subsequent completion of the application process. During the choice phase, factors such as student ability, encouragement, and socioeconomic status are influential (Brown et. al., 1999 and Hossler et al., 1989).

Students that obtain a secondary degree often leave in order to attend school or work outside their home state. Between the academic years 2008-2012, “Overall, the total number of bachelor’s degrees produced increased by 7.1 percent over the five-year period” (WVHEPC, 2013, p. 11). This percentage may mean little if students choose to migrate out of state. Focusing on a town the authors titled “Ellis” located in northeastern Iowa, Carr and Kefalas (2010) outline four categories of Ellis High graduates: Achievers, Stayers, Seekers, and Returners. Achievers out-migrate to attend university and are of the elite of the class. Achievers are least likely to give anything back to the community as more than half choose to permanently move from Iowa. Stayers work at blue-collar jobs, choose not to attend college and live in their hometown. Seekers are not as affluent as Achievers but are not content with living within their home

communities. They are most likely to join the military because their families are unable to afford college. Returners live up to their namesake, return from abroad with degrees or military service and are likely to settle down and start a family. Achievers out-migration hurts West Virginia as its best and brightest chooses to be employed in other states. Many West Virginians are Stayers as well, those who do not attend university and are most hard-pressed economically.

My third factor as to whether a student pursues a postsecondary degree is high school socio-economic status (SES). The percentage of students that participate in the National School Lunch Program's Free Or Reduced Price Lunch (FRPL) is a determinant of school-level SES. FRPL statistics are correlated with dropout rates at the state and county levels. If a student fails to earn a high school degree or its equivalent, they drop out. The definition of the status dropout rate is "the percentage of 16- through 24-year-olds who are not enrolled in school and have not earned a high school diploma or equivalent credential such as General Education Development (GED) certificate" (Planty et al. 2009). If a student does not complete high school, they are less likely to graduate and pursue postsecondary education. There is no data available concerning postsecondary dropout statistics. This is due to a variety of reasons such as delaying graduation, enrolling part time, switching institutions, or obtaining multiple degrees.

Using FRPL data, 20 percent of students across the United States attended schools where more than 75 percent of students were eligible (NCES, 2012). Statistics show that only 68 percent of 12th graders that attend high-poverty schools graduate with a diploma and only 28 percent attend a four-year institution (NCES, 2012). On the other hand, low-poverty schools graduate about 91 percent of their students and 52 percent of them attend a four-year institution (NCES, 2012). Factors that affect students that attend secondary education facilities such as school belonging, college preparatory curriculum, school safety, financial aid knowledge and

contact with guidance counselors all influence graduation, college-going, and dropout rates (Chenoweth & Galliher, 2004; NCES, 2012). Schools that offer college preparatory programs and inform their students about scholarships such as the West Virginian PROMISE (Providing Real Opportunities for Maximizing In-State Excellence) reinforces student work ethic and entices more graduates to apply to in-state postsecondary institutions (McClellan, 2006). PROMISE scholarship participation increased 1.4 percent from 2011 to 2012 (WVHEPC, 2013). Similarly, one study found that although individual student background characteristics account for greater than 50 percent of variability in school dropout rates, school policies and practices account for almost 25 percent (Rumberger & Palardy, 2005).

Stallmann and Johnson (1996) and Brown et al. (2009) investigate the role of community on educational outcomes amongst Appalachian youth. According to the study of 200 Great Smokey Mountain Study (GSMS) participants by Brown et al. (2009), "...[of the] males living in the quartile of census tracts with the lowest levels of adult educational attainment (10-19 percent holding a college degree), only 16 percent endorsed getting a college degree as an important life goal." This is low compared with 44 percent of males living in the highest quartile (37-67 percent) (Brown et al., 2009). It should be noted that one study found students from rural West Virginian communities actively chose not to attend college where "...college represented a delay or entry into the real work, a "waste" of time, effort, and money and risk. Work represented "the real world" and guaranteed outcomes (Burnell, 2003, p. 108).

POSTSECONDARY EDUCATION

The final resource group emphasizes two themes: individual persistence and retention rates within Appalachia and throughout the nation and the role universities and colleges play as influential contributors to national, state, and local economies. In West Virginia, “First-year retention rates have declined 2.8 percentage points at four-year public institutions from 76.4 percent in 2008 to 73.6 percent in 2012” (WVHEPC, 2013, p. 31).

After acceptance, a student may dropout after their first year of postsecondary education. In this study, retention rates are analyzed at the state level and are commonly utilized to determine the percentage of first-time college freshman returning their second year. This provides a guidepost for analyzing college persistence, as “students are more likely to drop out during their first college year than at any other time” (WVHEPC, 2013, p. 31). Retention rates have limitations such as students that transfer to private or out-of-state institutions are not quantified or accounted for in the data.

In 2012, the National Center for Educational Statistics (NCES) published a document titled *Higher Education: Gaps in Access and Persistence Study*. The study explores numerous topics such as poverty, parents’ educational attainment, poverty in schools, postsecondary enrollment, and persistence and attainment at high school and collegiate levels. The study suggests that lower student persistence and degree attainment are due to: delayed entry, weak academic preparation, little participation in school activities, part-time enrollment, low level of interaction with faculty, working greater than 15 hours per week, attending a two-year community college program first, price of attendance, financial aid, and remedial course taking (NCES, 2012).

Supported by data from the United Kingdom, Yorke and Longden (2004) provided additional information on dropouts at the collegiate level. The cost of dropping out of college is not only financial but also psychological in terms of self-esteem and self-confidence. A student needs a strong sense of purpose and “belonging” both academically and socially in order to have a high chance of graduating (Yorke and Longden, 2004, p. 7-8).

There is a plethora of literature that intrinsically relates higher education and economic development. This research reiterates the importance of workforce participation of college graduates. Four resources utilized were:

- Higher Education and Workforce Development: A Strategic Role for Institutional Research (Voorhees and Harvey, 2006),
- How Universities Promote Economic Growth (Yusuf and Nabeshima, 2006),
- Colleges and Universities and Regional Economic Development (Porter, 2007),
- Universities and Colleges as Economic Drivers: Measuring Higher Education’s Role In Economic Development (Lane and Johnstone, 2012).

Voorhees and Harvey (2005) provide an overview of the benefits between education systems and a skilled workforce. This work looks at workforce development at the government and institutional levels. Rather than focusing at the national level, Yusuf and Nabeshima (2006) provide an international perspective on global and regional development opportunities in relation to higher education and a country’s economic performance. Policy decisions are discussed concerning their emphasis on higher education. The most recent literature found that describes the connection between higher education and the economy is Lane and Johnstone (2012). The authors’ work provides an international perspective by attempting to unite a body of scholars to collectively facilitate the importance of higher education and economic growth. As a whole,

literature within this category provides reasoning behind the benefits of a better-educated labor force.

There are far fewer resources that have the distinct objective of voicing concern about education attainment of Appalachian residents or effects of Appalachian culture upon educational attainment goals (McClellan, 2006). The West Virginia Higher Education Policy Commission (WVHEPC) and Community and Technical College System provide a yearly report card that analyzes progress towards postsecondary objectives. The report outlines research on college preparation, enrollment, degrees awarded, access, cost and affordability, and workforce development.

Another important contribution to this lack was the “Demographic and Socioeconomic Change in Appalachia” reports published by the Appalachian Regional Commission (ARC). Using 2000 Census data, Haaga (2004) examined the need for an educated workforce within the Appalachian region. A similar study that utilized 2000 Census data, Shaw, DeYoung, and Rademacher (2004), found that even though since 1980 the Appalachian region caught up to non-Appalachian regions in terms of high school graduation rates and increased its percentage of population with a four-year degree, the number of residents with a college degree lagged behind the rest of the nation. A comprehensive study about the advancements and disadvantages of females in West Virginia was utilized for its educational component by the Institute for Women’s Policy Research, titled “The Status of Women and Girls in West Virginia” (Hess, Hegewisch, & Williams, 2013).

The importance of attaining postsecondary education has been the subject of numerous scholarly pursuits. Placed within an Appalachian context, West Virginia struggles with educational attainment due to persistent poverty, low parental education levels, relative lack of

economic diversification, student out-migration, and the difficulties faced by the first-generation population. This thesis will analyze a small segment of research that pertains to postsecondary educational attainment: poverty rates, parental education levels, and school-level socio-economic status.

CHAPTER 3 METHODOLOGY

STUDY AREA AND DATA COLLECTION

This chapter identifies the methodology chosen at both the state and county units of analysis in conjunction with my three-factor approach (i.e. poverty rates, parental educational attainment, and high school socio-economic status) that contribute to West Virginia's low percentage of population with at least four-year college education. First, the study area is examined in depth at the state and county levels. Data derived at the state level is investigated followed by county level data sources. Finally, analysis tools are discussed at length.

The study area will be concentrated at the state level when describing the United States and county level when describing West Virginia unit of analysis. The state unit of analysis was chosen to place West Virginia within the national context to deduce inferences and regional discrepancies across the United States. The county units were analyzed because West Virginia shares a common geography, heritage, and state governing body.

Numerous government agencies were accessed to retrieve quantitative data pertinent to this study. The United States Census Bureau and the American Community Survey provided detailed statistical analysis of high school and postsecondary graduation rates at the state and county level through the school years 2008-2012. Additionally, the Census provided percent of persons below poverty between said years for state and county levels. Another government agency, the National Center for Educational Statistics (NCES), provided studies concerning public high school dropout rates for 2006-2010. The NCES published a yearly document that was averaged and utilized for the high school level socio-economic status factor: Percent of Students Eligible for Free or Reduced Price Lunch by State and Eligibility Status: School Year(s)

2006-2007, 2007-2008, 2008-2009, and 2009-2010. Postsecondary retention rates were quantified through use of National Center for Higher Education Management Systems (NCHEMS), a private nonprofit organization, that provided retention rates for first-time college freshman returning their second year for the years 2006-2010. The NCHEMS provided data on a year-to-year basis. As of the writing of this study, 2010 is the latest statistical year offered. A four-year average retention rate was calculated for each state in order to better correlate with four-year graduation rates.

At the state level the West Virginia Department of Education provided high school dropout data at the county level through the school years 2007-2011. The five-year average was found to better correlate with percentage of students eligible for Free and Reduced Price Lunch (FRPL). The West Virginia Higher Education and Policy Commission (WVHEPC) provided data on first-time adult (age 25 and over) enrollment by public postsecondary students at the county level. Data was collected between the years 2007-2011 and averaged for a four-year estimate. Although the WVHEPC provides data on West Virginia residents' enrollment in public institutions up to Fall 2011, no equivalent retention rates for first-time college freshman could be found for a county level analysis. Instead, WVHEPC estimated county college-going rates for West Virginia High School graduates are utilized for 2012. The estimates of enrollment in out-of-state higher education institutions are based on surveys of West Virginia high schools. Not all out-of-state higher education enrollment can be tracked, therefore, these figures will not exactly match nationally-published overall going rates for West Virginia. The poverty level of county schools was measured using Children Approved for Free and Reduced-Price School Meals (Grades 6-12) through the KIDS COUNT data center. Data between the years 2007 and 2011 were averaged for a four-year estimate. Finally, statistics on county underground and surface

coal mining production and employment was gathered through the West Virginia Office of Miners' Health Safety and Training (MHS&T).

This study utilized the US Census Bureau's Metropolitan and Micropolitan Statistical Areas that provided additional county demographic information. This data is utilized by the American Community Survey that the Census collects for its data records. Created by the Office of Management and Budget (OMB) for federal records, they are useful for organizing data around metro areas (core urban area equals 50,000 or more) population, micro areas (core urban area greater than or equal to 10,000 but less than 50,000) population, and rural counties. This classification system helps the map viewer to more accurately analyze population effects on examined factors.

EXPLANATORY VARIABLES

My dependent variable is percent of population 25 and older who have a bachelor's degree or higher in West Virginia. My primary independent variables are percentage of persons below the poverty level, parental educational attainment, and free or reduced-price lunch (FRPL) eligibility.

Pearson produce-moment correlation was used to measure the relationship between each factor. “[Pearson] is a measure of the strength of a linear association between two variables and is denoted by r ... [Pearson] attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, r , indicates how far away all these data points are to this line of best fit (how well the data points fit this new model/line of best fit)”

(<http://statistics.leard.com>). In statistics it is generally accepted that the following scale can be used to judge the strength of the association between variables. If Pearson's $r > 0.5$ or $r < -0.5$ a strong relationship exists, for $0.5 > r > 0.3$ or $-0.5 < r < -0.3$ a moderate relationship exists; for $0.3 > r > -0.3$ a weak relationship exists. Excel calculates Pearson's r correlation coefficient.

For each state, a correlation analysis was calculated between educational outcomes averaged between 2008-2012 and persons below the poverty level (av. 2008-2012), dropout rates (av. 2006-2010), college retention rates (av. 2006-2010) and FRPL eligibility (av. 2006-2010). The same process was repeated at the county level with one exception. Due to the lack of college retention statistics at the county level, college-going rates (av. 2008-2012) were used as a correlation variable. College-going rates are not available at the national level. Likewise, college retention rates were used as a correlation variable at the state level due to unavailability at the county level. A correlation analysis was calculated using the same variables mentioned above with the other two factors of poverty rates and FRPL eligibility. ArcMap automatically calculates

five percentage ranges based on the natural breaks (Jenks) classification, which identifies similar groupings of values and maximizes the difference between classes.

Analysis of educational attainment among demographic groups such as Black, Asian, and Hispanic were outside the scope of this study as a result of West Virginia having a very low minority population (about 6% in 2012 according to the Census). Another demographic group, the elderly population, was intentionally ignored. Only about 23 percent of those aged 65 or older have received a bachelor's degree (Federal-Interagency Forum on Aging Related Statistics, 2010).

In order to represent common themes within my research, choropleth maps were utilized as useful tools to identify spatial trends and percent changes over time at the state and county level. The inherent analytical difficulty when reading or using choropleth maps is noted due to the false impression of abrupt change at boundaries and often the inability to identify total values. When data availability allowed with matching year criteria, many of the maps were created to depict two factors that potentially influence one another. This provides the map viewer with an ability to spatially recognize patterns and make an observational correlation analysis.

After the computation of correlations, bachelor's attainment and poverty rates at the state and county levels will be further scrutinized using GeoDa analysis software, downloaded from <https://geodacenter.asu.edu>. Poverty rates were chosen based on the National Center for Educational Statistics (NCES) research as identified in the literature review that emphasized the strongest correlation with bachelor's degree attainment. GeoDa is a geospatial analysis and computation tool that allows a user to use LISA (Local Indicator of Spatial Autocorrection) statistics to evaluate whether similar values of my key variables are spatially clustered. Spatial autocorrelations can be positive (spatial clusters for high values surrounded by high values or

low values surrounded by low values) and negative (spatial outliers for high-low or low-high values). GeoDa utilizes the concept of Tobler's First Law of Geography, "whereby closer areas are more similar in value than distant ones. Negative spatial autocorrelation exists when high values correlate with low neighboring values and vice versa"

(<https://geodacenter.asu.edu/node/390#sa>).

GeoDa can provide univariate and bivariate analysis. Univariate is a measure of spatial autocorrelation for a single factor. Univariate maps visualize the spatially significant clusters of the single-variable analysis. Bivariate analysis is similar to Pearson's r in the sense that the spatial distributions of two variables are compared to detect the strength of "relationship," in this case the strength of spatial autocorrelation. Bivariates utilize the x and y values of a variable in two different locations. The subsequent comparison of this study's two-fold approach using univariate and bivariate results will allow the states and counties with the highest significant correlations to be more accurate and statistically significant. Statistical sampling errors may occur within the various generated maps with subtle differences in results. This could be due to a variety of issues including the years in which data was collected or how the data was collected and measured.

CHAPTER 4 ANALYSIS

STATE LEVEL

The states with the lowest percentage of population age 25 or older that have attained a bachelor's degree or higher between the years 2008-2012 were Alabama (22.3%), Arkansas (19.8%), Indiana (23%), Nevada (22.2%), Oklahoma (23.2%), Tennessee (23.5%), and the basis for this study, West Virginia (17.9%). The results show that Kentucky (21%), Louisiana (21.4%), and Mississippi (20%) once again fell within the lowest category of educational attainment and poverty. Arkansas joined the group and it fell within the highest percentage range of population below the poverty level. Oklahoma, Tennessee, and West Virginia fell within the second highest poverty percentage range (15.7% - 18.1%).

The states with the highest percentage of population with a bachelor's degree were Colorado (36.7%), Connecticut (36.2%), Maryland (36.3%), Massachusetts (39%), New Hampshire (33.4%), New Jersey (35.4%), New York (32.8%), Rhode Island (30.8%), Vermont (34.2%), and Virginia (34.7%). The majority of these states fell within the lowest poverty percentage range (8.4-11.2%) while Colorado, Rhode Island, and Vermont fell within the second lowest poverty percentage range, respectively (11.3-13.8%). New York fell within the middle poverty percentage range (13.9-15.6%). After completing a correlation analysis, population with bachelor's attainment was negatively correlated with poverty rate, as $r = -0.72$, which can be considered a large effect. This means as bachelors percentage improved, poverty rates decreased and vice versa. There is a strong correlation.

The GeoDa analysis using the univariate Moran's I approach of bachelor's degree attainment resulted in the most significant (0.01) states being Arkansas, Louisiana, Mississippi,

Ohio, and Texas. States with less than a 5 percent error (0.05) are Alabama, Illinois, Massachusetts, Missouri, New York, Rhode Island, Tennessee, and Vermont. The univariate cluster analysis of high-high values (states with high rates of bachelor's degree attainment surrounded by other states with high bachelor's degree attainment) resulted in Massachusetts, New York, Rhode Island, and Vermont in the northeast, low-low values in Arkansas, Alabama, Louisiana, Mississippi, Missouri, Ohio, Tennessee, and Texas in the south, and a single high-low value in Illinois.

Figure 4.1. Bachelor's Degree Attainment Results in the United States

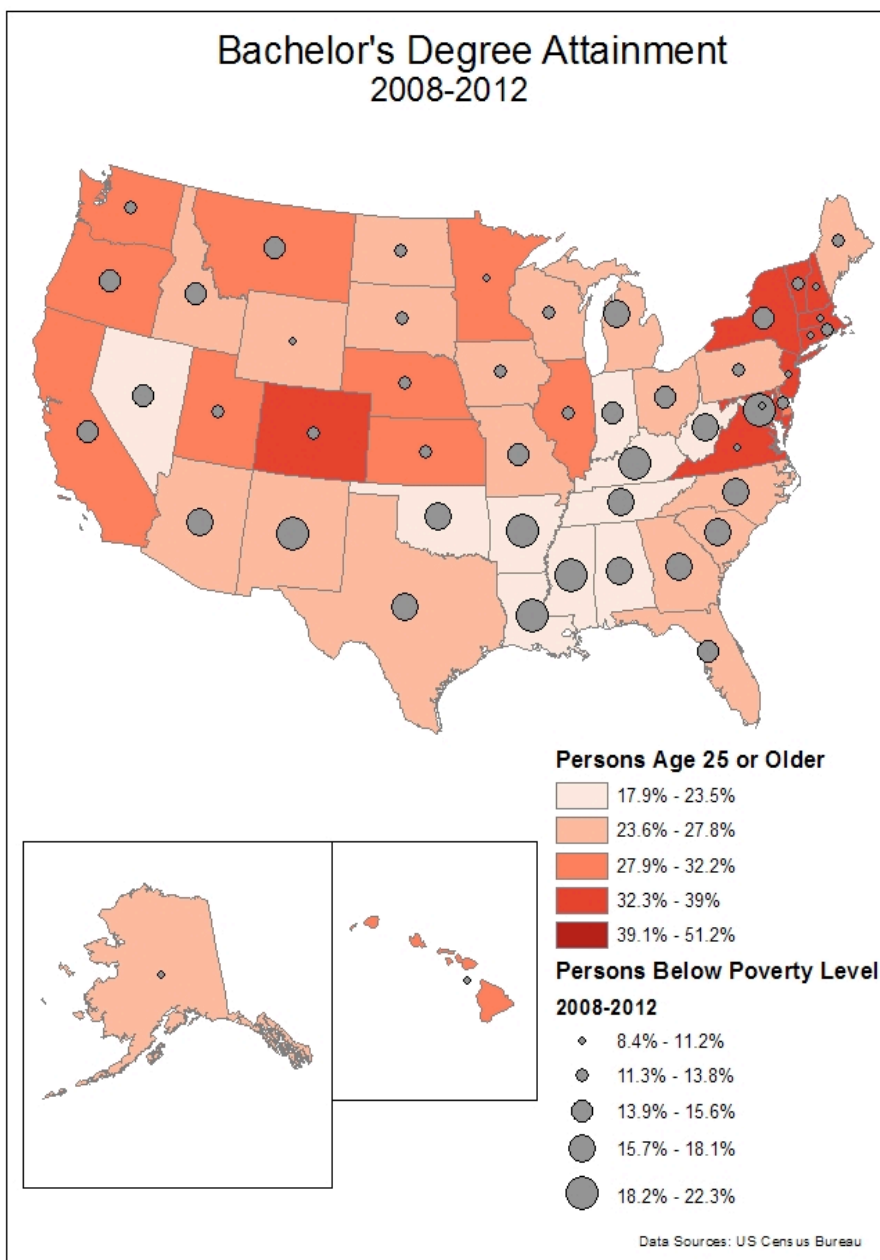


Figure 4.2. Univariate LISA Results for United States Bachelor's Degree Attainment

Figure 4.3. Univariate LISA Results for United States Bachelor's Degree Attainment
Cluster Analysis

Poverty has a profound impact on this region; poverty and high school attainment had the strongest correlation at the state-level (-0.78), while poverty and bachelor's attainment had the second strongest correlation (-0.72) calculated. Dropout statistics do not follow any observable pattern (a correlation of -0.11 with bachelor's attainment) but tend to be lower in states with higher rates of population with high school degree attainment.

The univariate analysis of persons below poverty resulted in the highest statistical significance (0.01) in Alabama, Arkansas, Louisiana, Mississippi, Tennessee, and Texas. States with a less than five percent error (0.05) are Delaware, Georgia, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and South Dakota. The univariate high-high cluster analysis of persons below poverty resulted in a southern cluster of Alabama, Arkansas, Georgia, Louisiana, Mississippi, Tennessee, and Texas. A low-low cluster was found to be located primarily in the northeast in Maine, Massachusetts, New Hampshire, and Rhode Island with Delaware and South Dakota also falling within this classification. Virginia was found to be low-high and New York high-low.

The GeoDa bivariate analysis resulted in a cluster of high bachelors degree attainment and low poverty rates in the Northeast (Connecticut, New Hampshire, New Jersey, and Vermont) although Montana is the lone western state included and Connecticut was the most significant (0.01). Low bachelors degree attainment and high poverty rates were clustered in the south (Alabama, Florida, Georgia, Louisiana, Mississippi, Missouri, and North Carolina) with Louisiana as significant (0.01). Virginia was the only state computed to have high rates of both bachelor's degree attainment and poverty that are significant. Conversely, Ohio has lower rates of both bachelor's degree attainment and poverty that are significant.

Figure 4.4. Univariate LISA Results for United States Persons Below Poverty Level

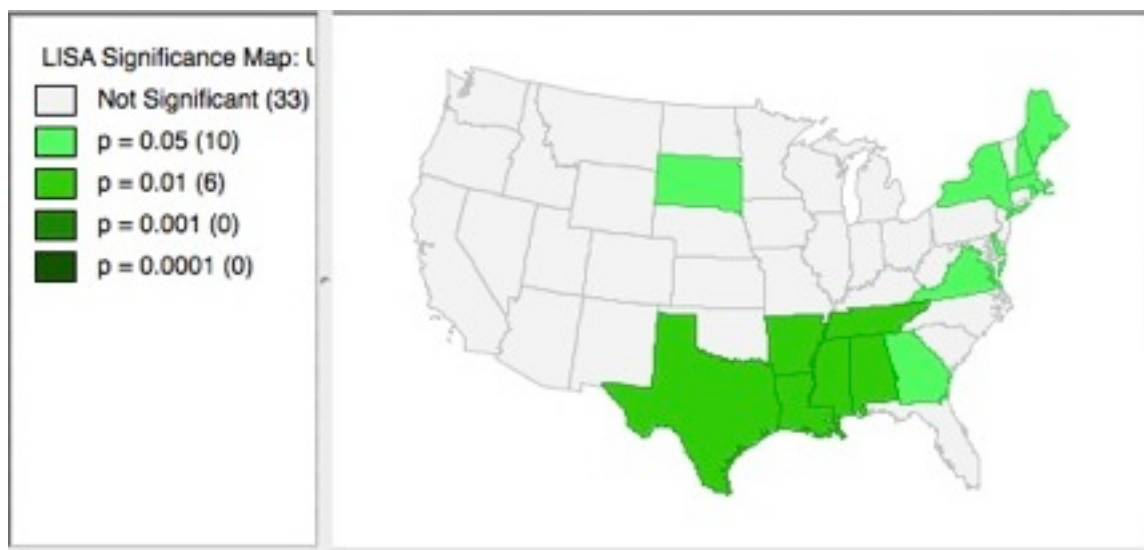


Figure 4.5. Univariate LISA Results for United States Persons Below Poverty Level

Cluster Analysis

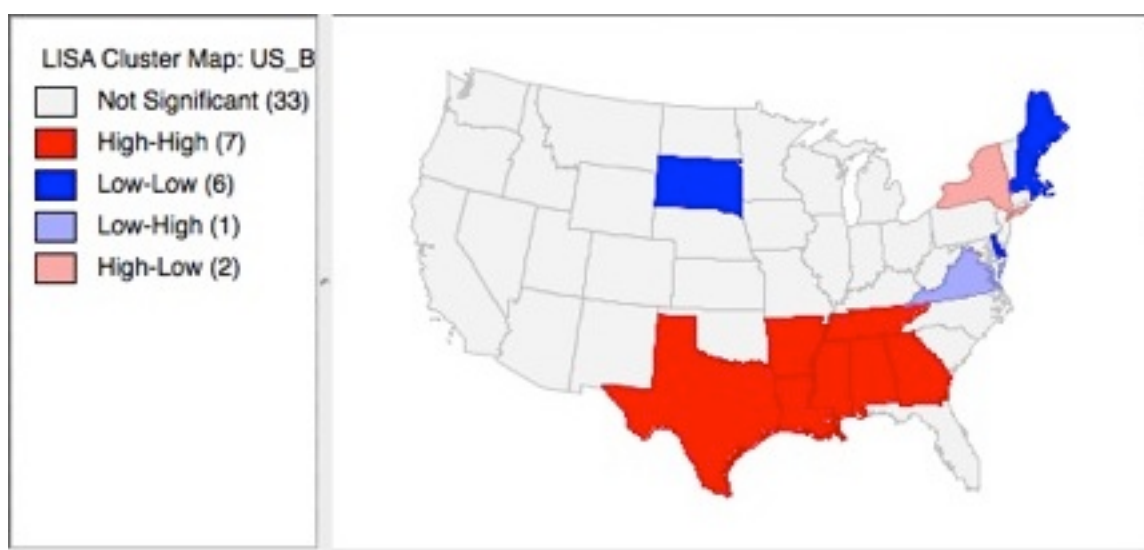


Figure 4.6. Bivariate LISA Results for United States Bachelor's Degree Attainment and Poverty Significance

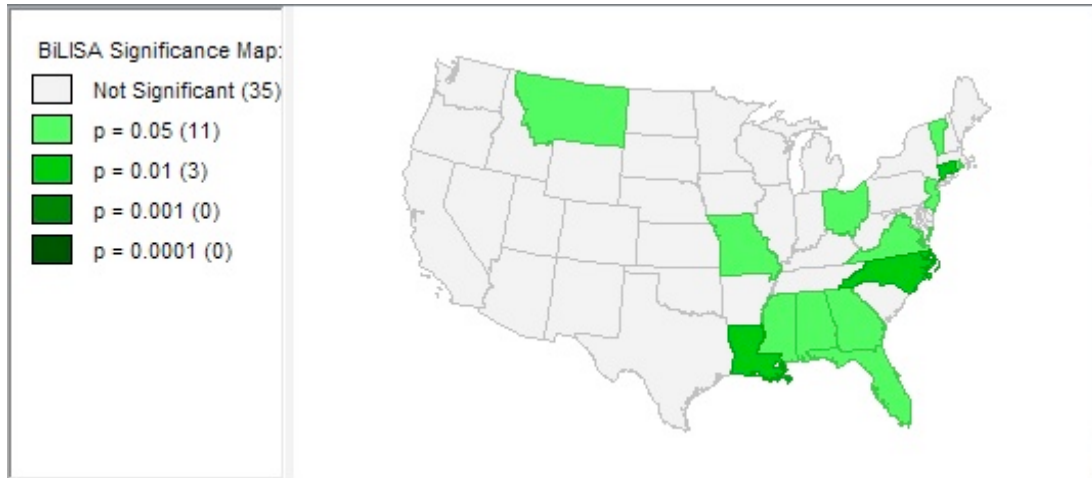
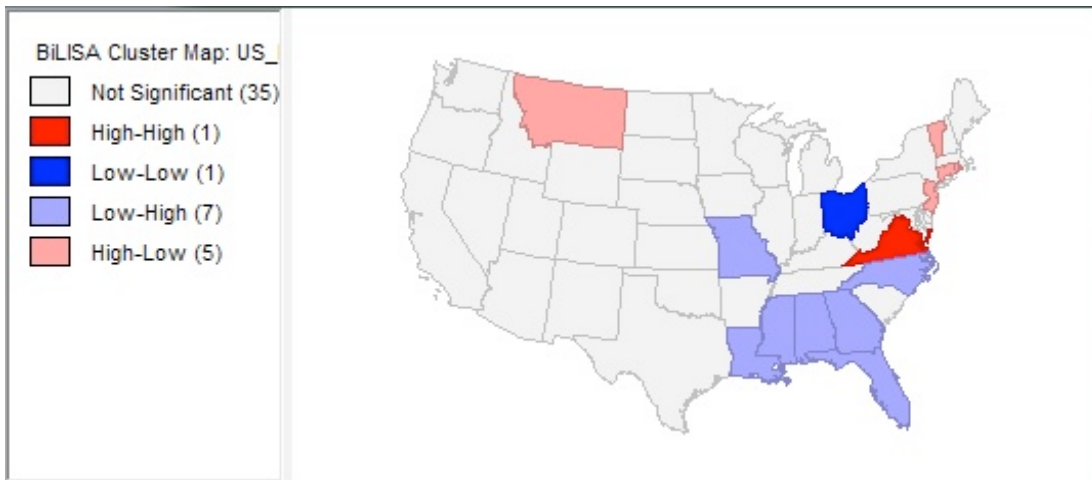


Figure 4.7. Bivariate LISA Results for United States Bachelor's Degree Attainment and Poverty Cluster Analysis



The states that averaged the lowest percentages of high school degree holders age 25 or older between the years 2008-2012 are Alabama (82.6%), California (81%), Kentucky (82.4%), Louisiana (82.2%), Mississippi (81%) and Texas (80.8%). These states generally had high percentages of persons below the poverty level. Kentucky, Mississippi, and Louisiana fell within the highest percentage range of 18.2% – 22.3% population below poverty level while Alabama fell within the second highest, 15.7% - 18.1%, respectively. The states with the highest average percentage of residents that have obtained a high school degree were Alaska (91.6%), Minnesota (91.9%), Montana (91.9%), New Hampshire (91.4%), Vermont (91.3%), and Wyoming (92.1%). Alaska, Minnesota, New Hampshire, and Wyoming all fell within the lowest percentage range of population below the poverty level (8.4%– 11.2%) while Vermont fell within the second lowest percentage range (11.3% - 13.8%), respectively. After completing a correlation analysis, high school graduation rate totals were negatively correlated with poverty rates, $r = -0.78$, which can be considered a large effect. In other words, the higher the percentage of population with high school education the lower amount of population below the poverty level and vice versa. Similarly, high school graduation rates were negatively correlated with FRPL eligibility, $r = -0.82$, which is a strong correlation. Although West Virginia has the lowest bachelor's degree attainment, there are states with lower high school degree attainment. Thus there is not a direction correlation between high school and college degree attainment at the national level.

The states with the highest average dropout rates between the years 2006-2010 were Alaska (7.1%), Arizona (7.6%), Colorado (6.2%), Illinois (5.9%), and Louisiana (6.6%). Although Louisiana fell within the highest percentage range of FRPL eligibility (58-68.4%), other states fell around the average FRPL eligibility. The states with the lowest dropout rate percentages were Alabama (2%), Idaho (1.9%), Indiana (1.9%), New Hampshire (2.3%), and

New Jersey (1.7%). New Hampshire and New Jersey fell within the lowest FRPL percentage eligibility (20-31.7%). Interestingly, Alabama fell within the second highest percentage range (46.4-57.9%). West Virginia has an average dropout rate that displays variability and lack of strong correlation between dropout rates and the other analyzed variables. After completing a correlation analysis, dropout rates were positively correlated with FRPL eligibility, $r = 0.36$, which can be considered a medium effect size. This means as dropout rates increased, FRPL eligibility tended to increase and vice versa. There is not a strong correlation.

The main objective of this study is to analyze factors that influence bachelor's attainment, but other correlations were calculated between bachelor's attainment and high school attainment ($r = 0.47$), high school dropout rate ($r = 0.11$), and FRPL eligibility ($r = -0.63$). The strongest correlation was between bachelor's attainment and FRPL eligibility; the higher amount of population a state had with bachelor's degrees, the trend showed a relative decrease in FRPL eligibility. Almost no correlation was found between bachelor's attainment and high school dropout rate. The relationship between bachelor's and high school attainment displayed a medium effect with a general positive trend.

Figure 4.8. High School Degree Attainment Results in the United States

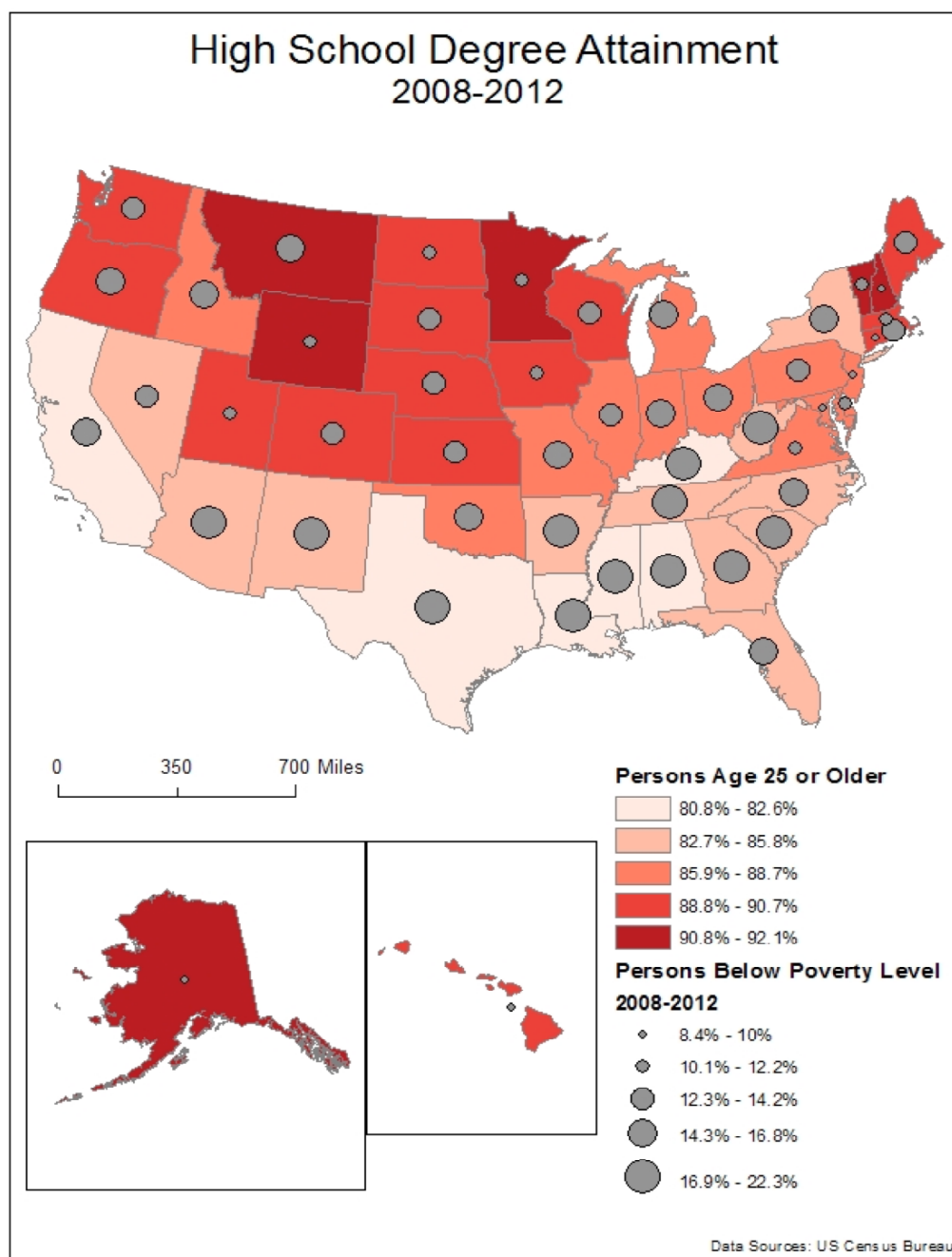
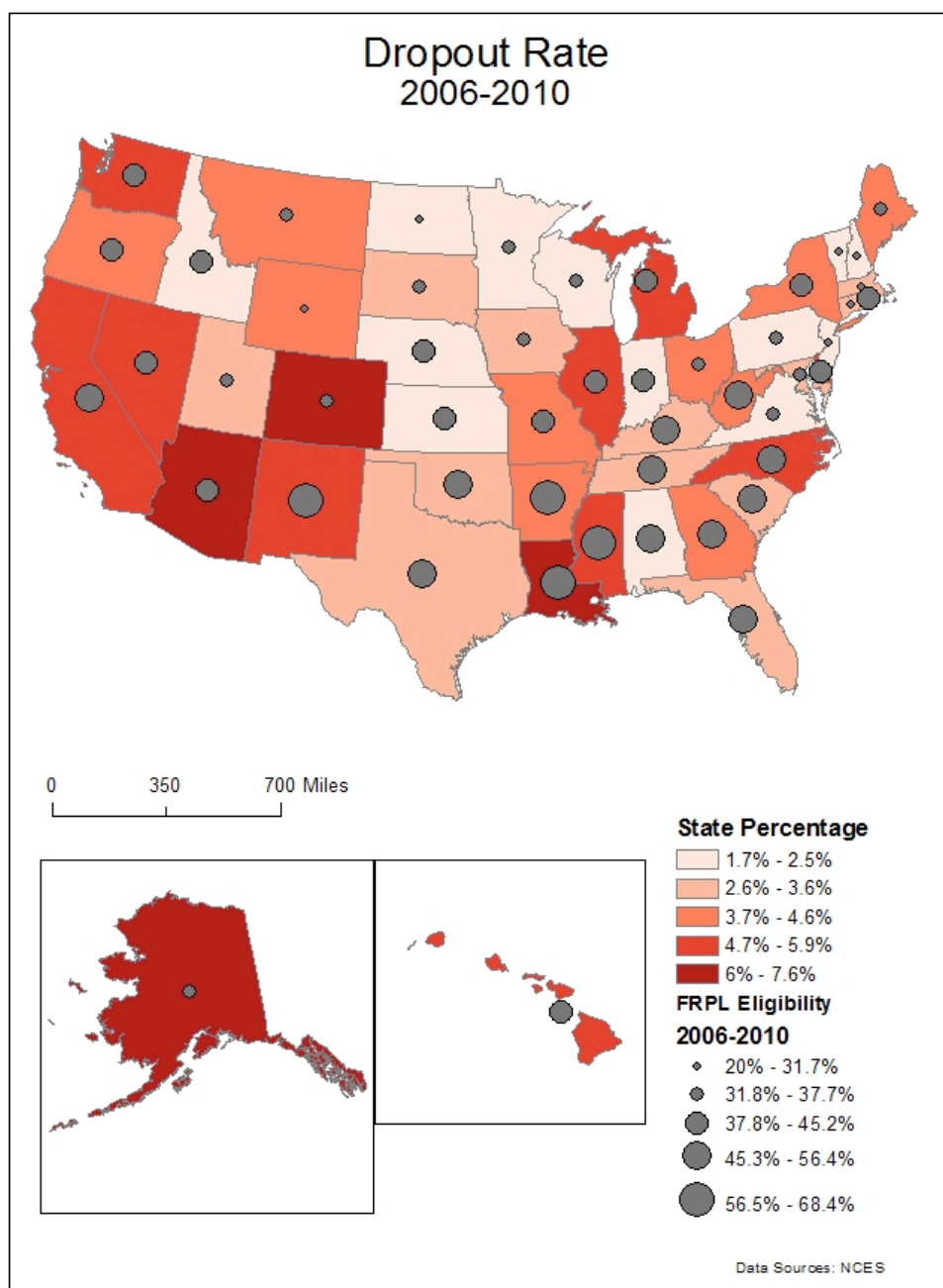


Figure 4.9. High School Dropout Rate Results in the United States



The final statewide variable analyzed was retention rates or the percentage of freshman returning their second year as first-time college goers. States that fell within the lowest retention percentage range (63.3% - 70.5%) were Alaska (63.3%), Idaho (68.5%), Montana (68.4%), South Dakota (68.2%), and West Virginia (68.3%). Noticeably, West Virginia has the lowest retention rates within the entire eastern region of the United States. The states that fell within the highest retention rate percentage range (80.4% - 84%) were California (84%), Connecticut (81.9%), Massachusetts (83.9%), New Jersey (82.1%), and Rhode Island (81.6%). After completing a correlation analysis between retention rates and bachelor's attainment rates, $r = 0.59$, which is a medium effect size. As retention rates increased, bachelor's attainment population did as well. This correlation is somewhat strong. It should be noted that due to data availability, retention rates were averaged between the years 2006-2010.

There are spatial clustering's of regions within the United States that are highly populated with high school and bachelor degree recipients. The best example is in the northeast—specifically the New England area but when the two factors are correlated across the nation, the relationship weakens (0.47). The northeast boasts high college retention rates as well. Lower levels of educational attainment, higher amounts of FRPL eligibility, and higher amounts of persons below the poverty level are clustered within the south and southwestern regions. A good example is the strong negative correlation (-0.63) between bachelor's attainment and FRPL eligibility.

Figure 4.10. First-Time College Retention Rates Results in the United States

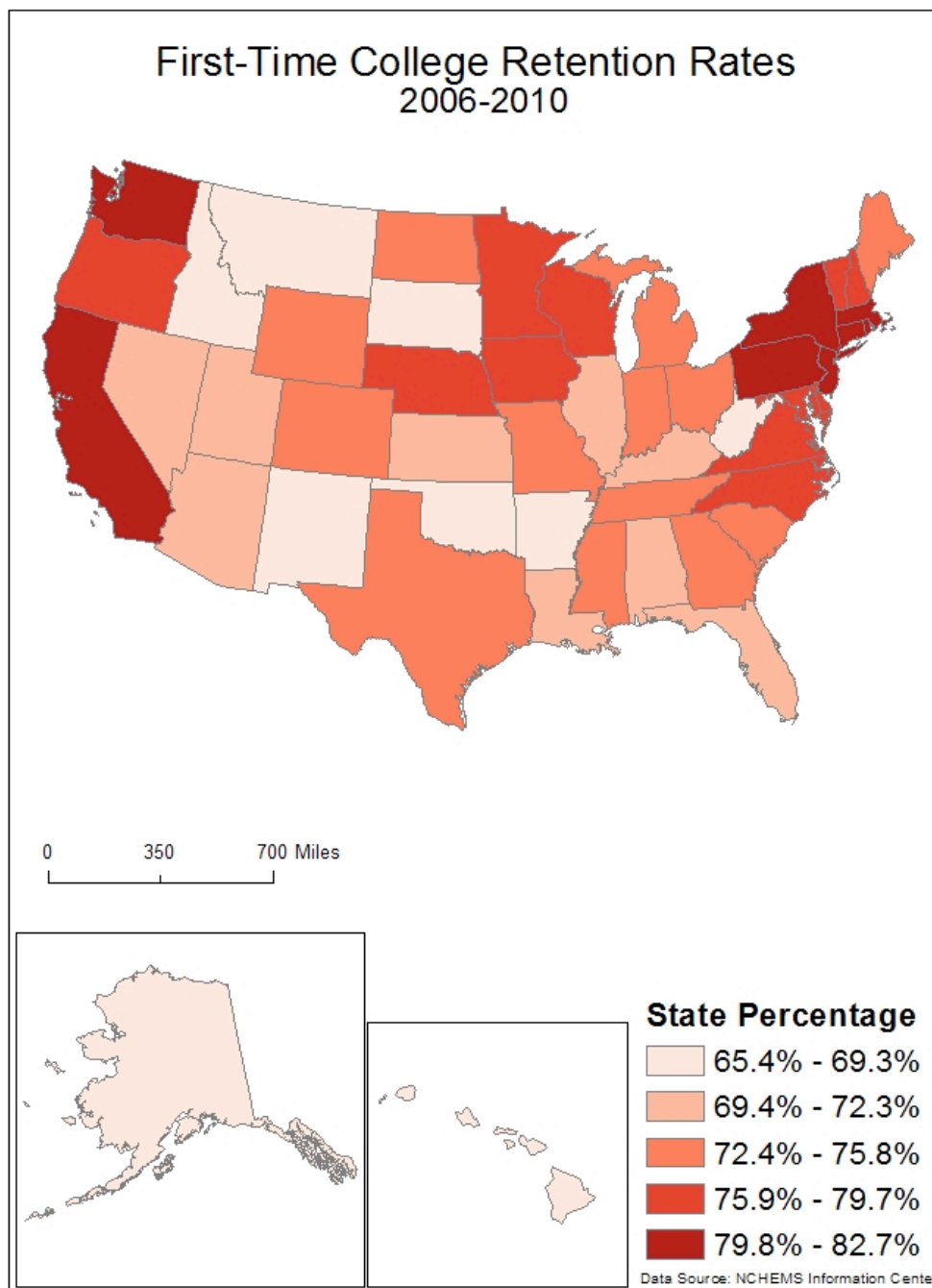


Table 4.1. Definition of Endogenous and Exogenous Variables

Variable	Variable Definitions	Source
HS	High school graduate or higher, percent of persons age 25+ from 2008 to 2012	US Census
COL	Bachelor's degree or higher, percent of persons age 25+ from 2008 to 2012	US Census
POV	Persons below poverty level, percent, from 2008 to 2012	US Census
DRPT	Percent of 9th to 12th graders who dropped out of public schools from 2006 to 2011	NCES
FRPL	Percent of students eligible for free or reduced-price lunch by state and eligibility status: school years from 2006 to 2011	NCES
RETN	First-time college freshman returning their second year from 2006 to 2010	NCHEMS
COLG	College-going rate (includes private and estimated out-of-state enrollment)	WVHEPC

Table 4.2. United States Correlation Matrix

STATE	HS2008-12	COL2008-12	POV2008-12	DRPT2006-10	FRPL2006-10	RETN2006-10
HS2008-12	1	0.47	-0.78	-0.22	-0.82	0.1
COL2008-12	0.47	1	-0.72	-0.11	-0.63	0.6
POV2008-12	-0.78	-0.72	1	0.27	0.89	-0.4
DRPT2006-10	-0.22	-0.11	0.27	1	0.36	-0.22
FRPL2006-10	-0.82	-0.63	0.89	0.36	1	-0.39
RETN2006-10	0.1	0.6	-0.4	-0.22	-0.39	1

County Level

After examining West Virginia at the county level, counties with bachelor's attainment of residents age 25 or older averaged for the years 2008-2012 within the highest percentage range (20.1% - 37.3%) were Cabell, Jefferson, Kanawha, Monongalia, Ohio, and Putnam. All of these counties are delineated as metro. Kanawha County is the seat of state government and is positioned along a major-interstate junction. Four of the counties (Jefferson, Kanawha, Ohio, Putnam) fell within the two lowest poverty percentage range (10.1% - 13.3% and 13.4% - 16.4%). Interestingly, Cabell and Monongalia fell within the second highest poverty percentage range (19.5% - 22.9%). Counties within the lowest percentage range (5.7% - 8.9%) of bachelor's attainment were Boone, Calhoun, Clay, Lincoln, Logan, McDowell, and Webster. Boone, Clay, and Lincoln counties are rural delineated, while Calhoun, McDowell, and Webster are classified as rural. Logan County represents a micropolitan statistical area. As mentioned previously, Clay, Lincoln, McDowell, and Webster fall within the highest poverty percentile while Boone, Calhoun, and Logan counties fall within the second highest poverty percentage range (19.5% - 22.9%). After completing a correlation analysis between bachelor's attainment and persons below the poverty level, $r = -0.38$, which is a relatively weak effect.

The GeoDa Moran's I univariate analysis of bachelor's degree attainment resulted in Mingo County being the most significant (0.01) while Braxton, Calhoun, Logan, Marion, Mason, Mineral, and Wyoming counties had less than 5 percent sampling error (0.05). The univariate cluster analysis of bachelor's degree attainment found Marion County was high-high, Logan, Mingo and Wyoming in the south and Braxton, Calhoun, and Mineral in the central region of the state low-low. Mason County was the lone low-high result.

Figure 4.11. Bachelor's Degree Attainment Results in West Virginia

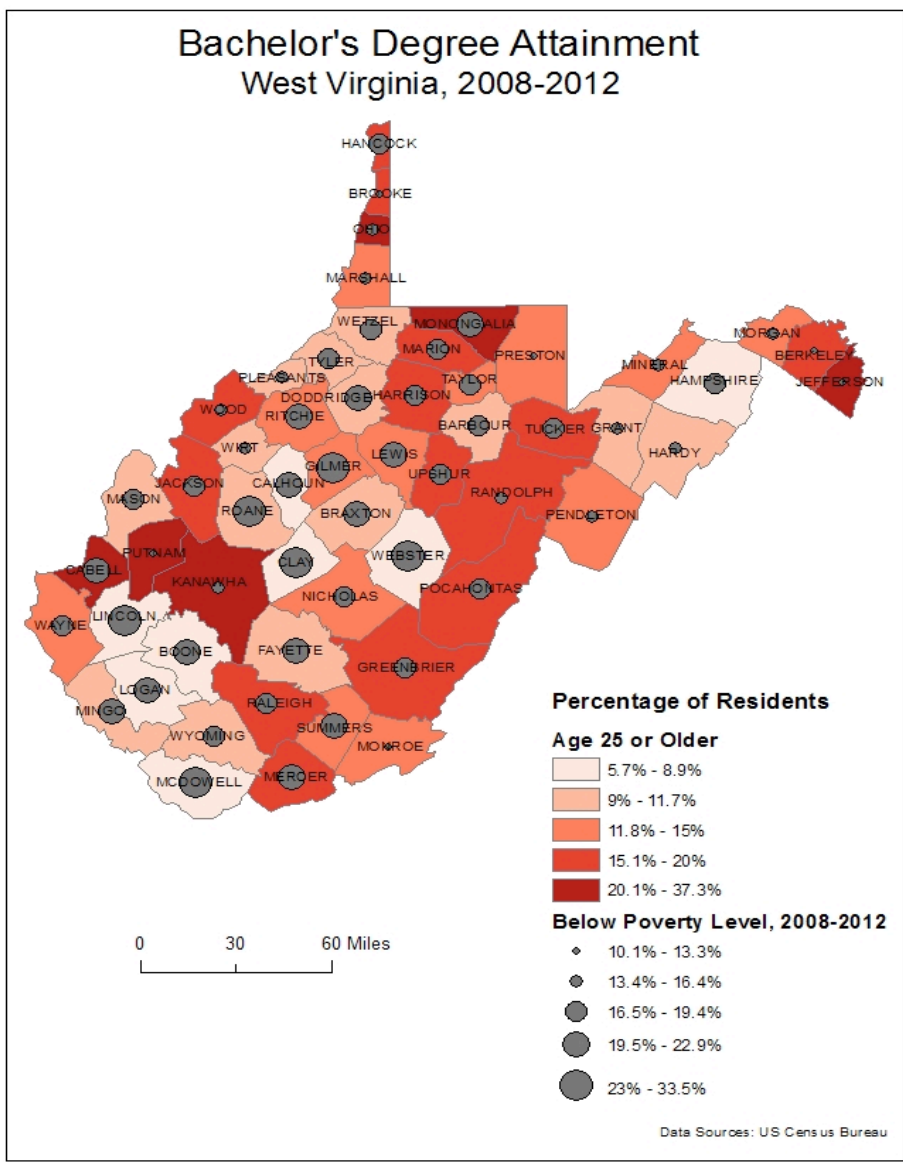


Figure 4.12. Univariate LISA Results for West Virginia Bachelor's Degree Attainment

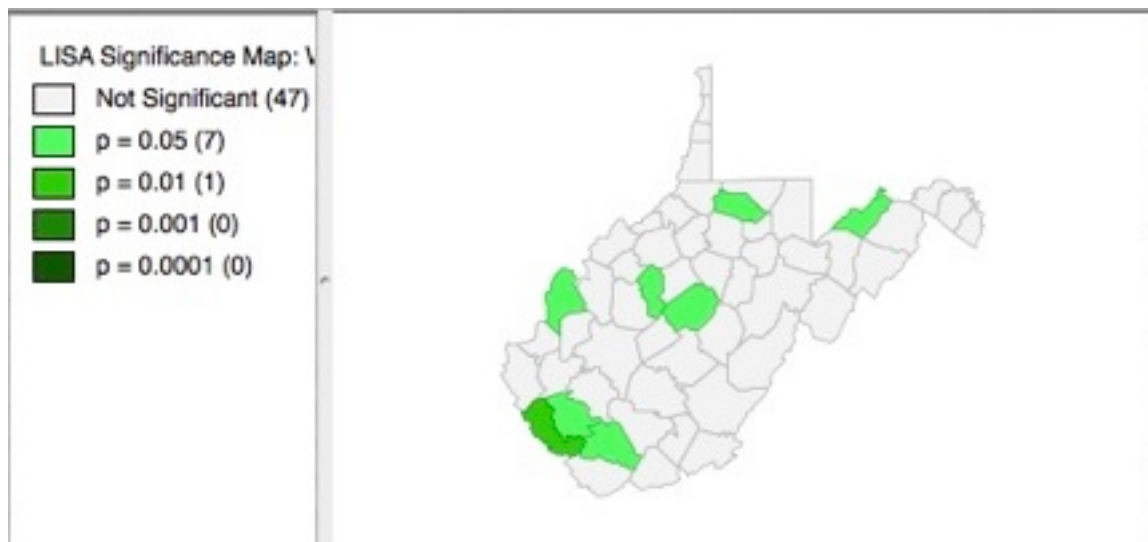
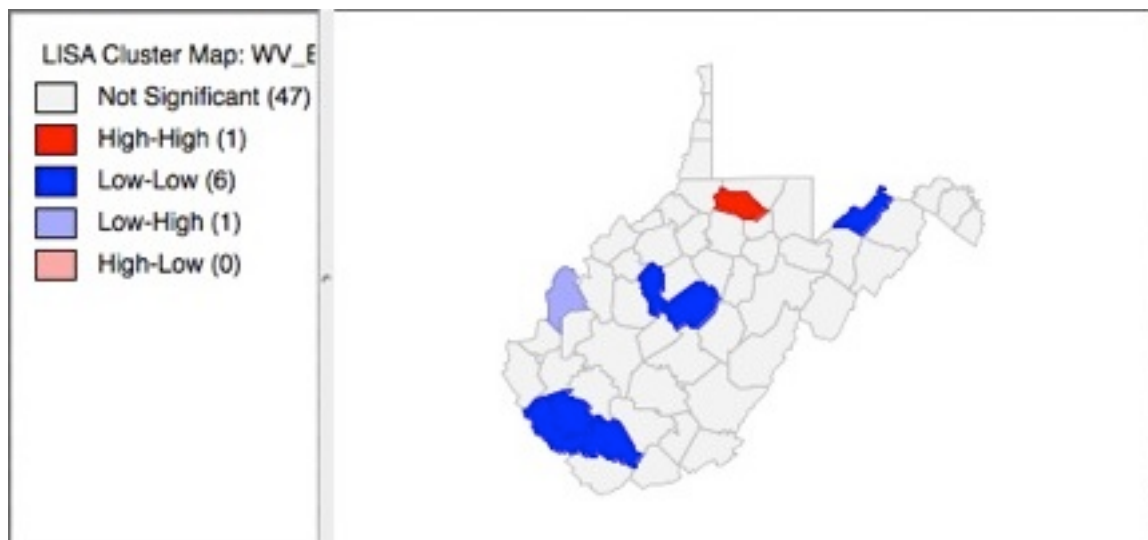


Figure 4.13. Univariate LISA Results for West Virginia Bachelor's Degree Attainment

Cluster Analysis



The univariate analysis of persons below poverty resulted in Berkeley and Grant counties in the eastern panhandle region and Braxton, Calhoun, and Mingo counties in the central-southern regions have the most significance (0.01). A large number of counties: Gilmer, Kanawha, Hampshire, Hancock, Lewis, Logan, Mercer, Ohio, Tucker, Wayne, and Wyoming counties were found to have less than five percent sampling error (0.05). The univariate cluster analysis resulted in a central cluster of Braxton, Calhoun, Gilmer, and Lewis counties and southern cluster of Logan, Mercer, Mingo, Wayne, and Wyoming counties representing a high-high relationship. An eastern panhandle cluster of Berkeley, Grant, Hampshire, and Tucker and a northern panhandle cluster of Hancock and Ohio counties were found to exhibit a low-low relationship. Kanawha County was the only county that displayed a low-high relationship.

The GeoDa analysis resulted in a small cluster of counties with high bachelors degree attainment and low poverty that were significant in the eastern panhandle region (Berkeley and Jefferson) and Hancock County in the northern panhandle. A larger cluster of counties in the southern region had low bachelors degree attainment and high poverty (Logan, Mingo, Wayne, and Wyoming) but Mingo and Wyoming counties were not as significant (0.01). Calhoun and Braxton counties displayed the same characteristics as their southern peers in the central region of the state. Gilmer and Lewis counties are neighbors to Calhoun and Braxton but displayed both high rates of bachelor degree attainment and high poverty. Conversely, Grant and Hampshire counties in the eastern panhandle region displayed both low rates of bachelor degree attainment and poverty.

Figure 4.14. Univariate LISA Results for West Virginia Persons Below Poverty Level

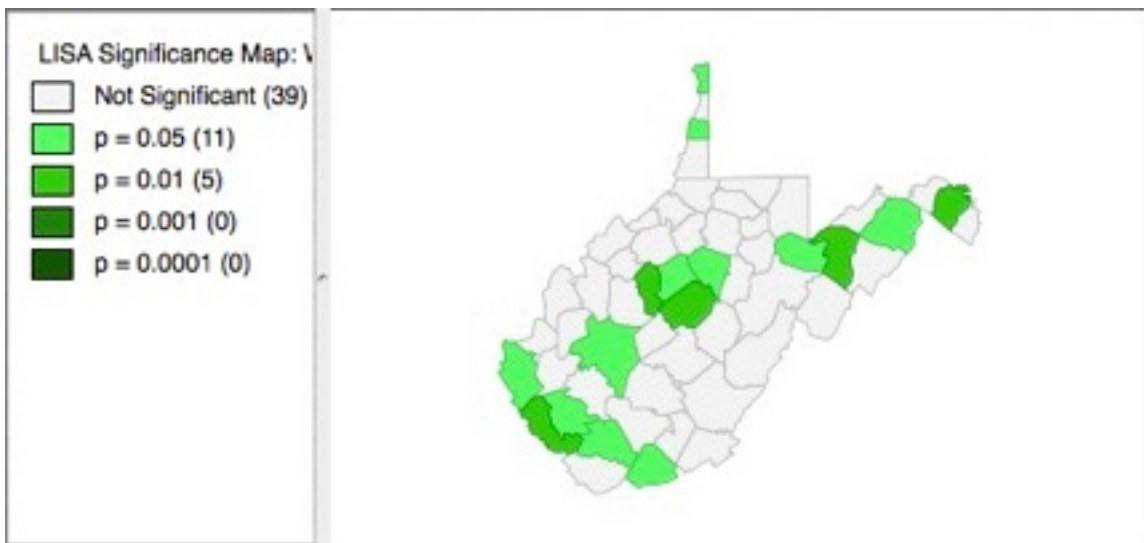


Figure 4.15. Univariate LISA Results for West Virginia Persons Below Poverty Level

Cluster Analysis

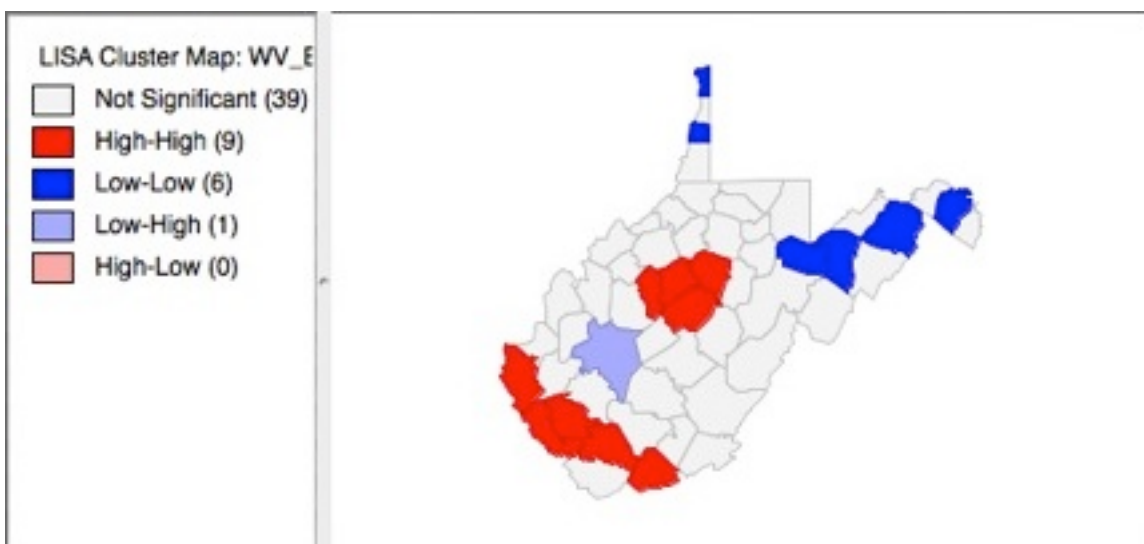


Figure 4.16. Bivariate LISA Results for West Virginia Bachelor's Degree Attainment and Poverty Significance

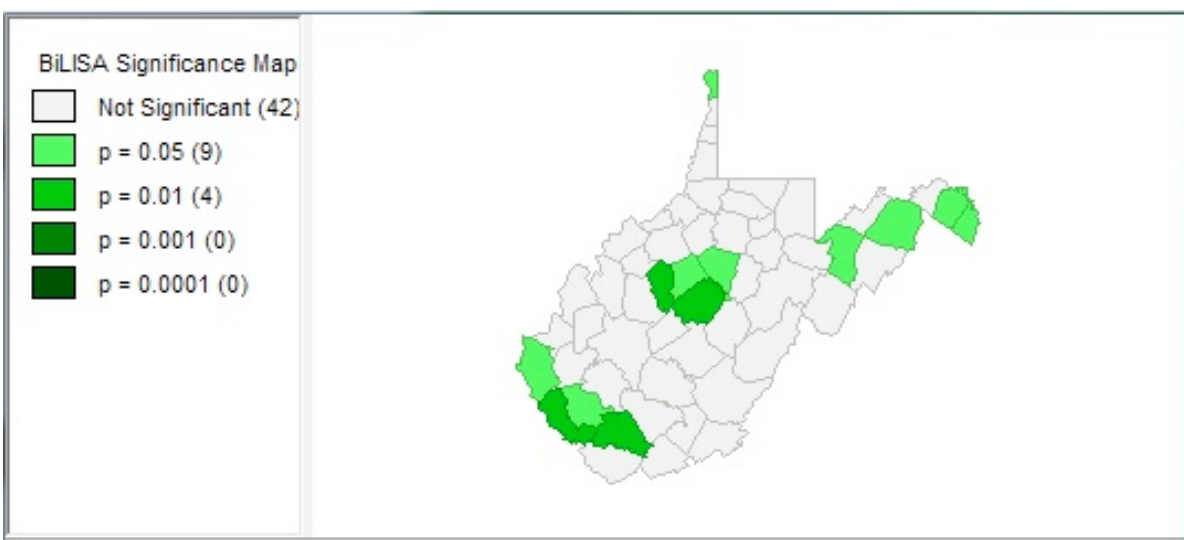
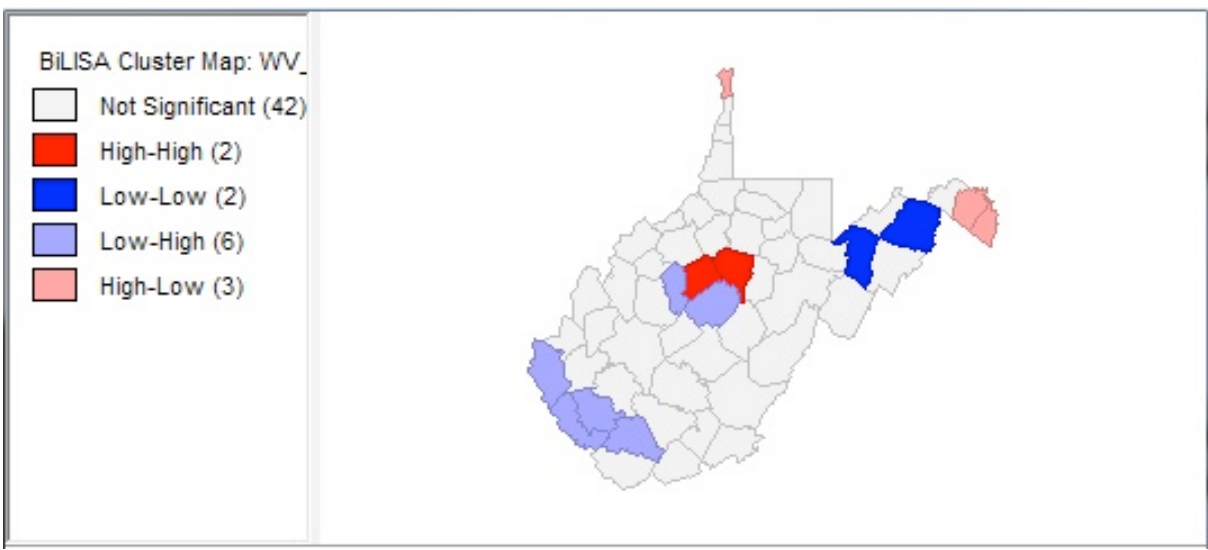
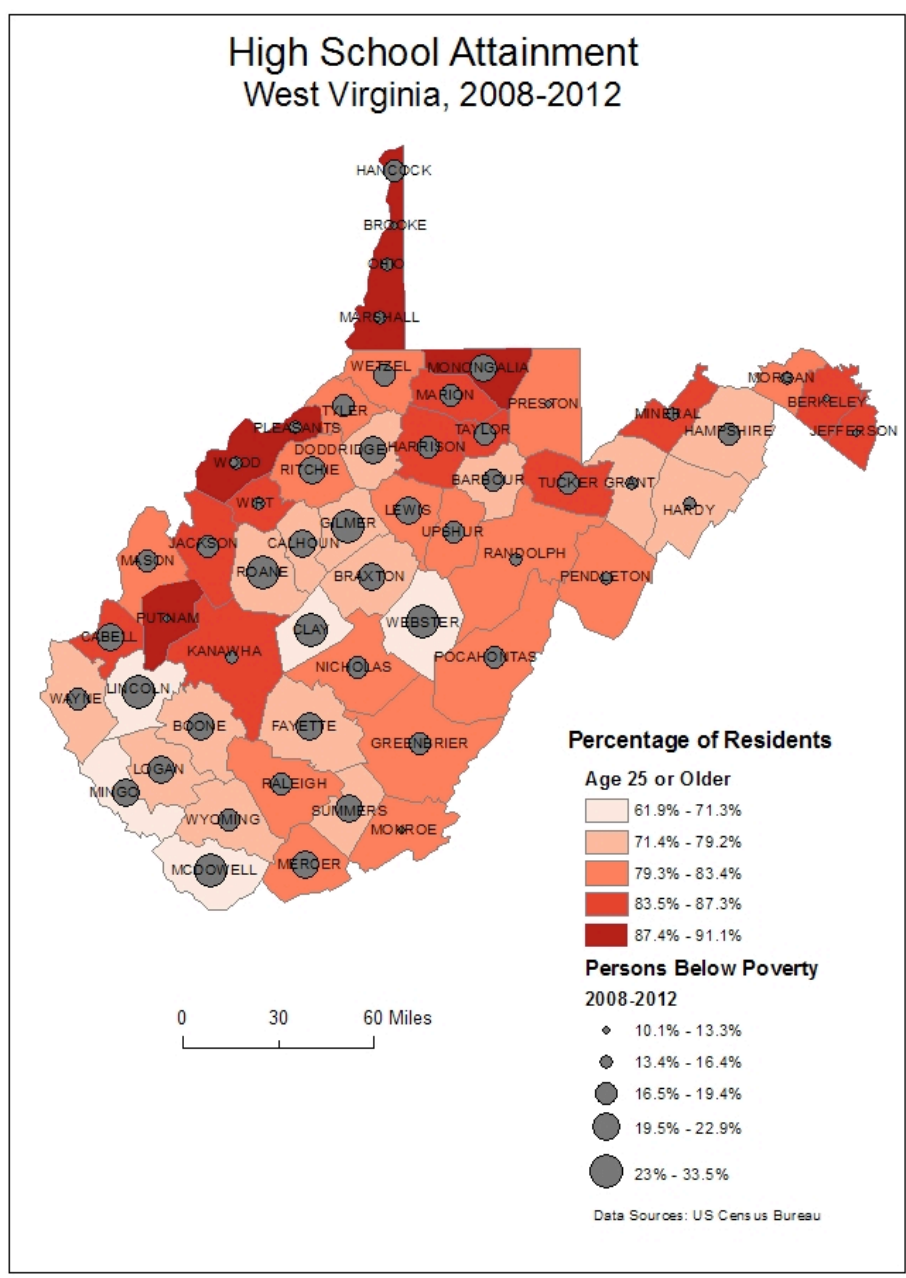


Figure 4.17. Bivariate LISA Results for West Virginia Bachelor's Degree Attainment and Poverty Cluster Analysis



The counties that fell within the highest percentage range (87.4% - 91.1%) of residents 25 or older averaged for the years 2008-2012 that have attained a high school degree were Brooke, Hancock, Marshall, Monongalia, Pleasants, Putnam, and Wood. Six of the counties (Brooke, Marshall, Ohio, Pleasants, Putnam, and Wood) fell within the lowest poverty percentage range (10.1% - 13.3%) or second lowest percentage range (13.4% - 16.4%). All of these counties except Pleasants are metro delineated counties. Pleasants County is classified as rural. The counties with the lowest percentage of residents with high school education were Clay, Lincoln, McDowell, Mingo, and Webster. Three of the five counties (McDowell, Mingo, and Webster) are delineated as rural while Clay and Lincoln fall within the Charleston/Huntington metro area. Four of the five counties (Clay, Lincoln, McDowell, and Webster) fell within the highest poverty percentage range (23% - 33.5%) and Mingo fell within the second highest percentage range (23% - 33.5%). After completing a correlation analysis between high school attainment and persons below the poverty level in West Virginia, $r = -0.74$, which can be considered a large effect. Counties that averaged higher percentages of population with high school attainment usually had lower levels of poverty and vice versa.

Figure 4.18. High School Degree Attainment Results in West Virginia



Counties that displayed the highest secondary dropout percentages (3.5% -4%) averaged between the school years 2007-2011 were Fayette, Kanawha, McDowell, and Summers. Fayette and Kanawha are metro delineated, while McDowell was rural. The majority of these counties fell within the highest percentage ranges eligible for free or reduced-price lunch (58.9% - 82%) while Kanawha County fell within the middle percentage range (52.8% - 58.8%). The counties with the lowest percent dropout rate (0.7% - 1.5%) were Brooke, Gilmer, Hancock, Mineral, Pleasants, Tucker, and Tyler. Brooke, Hancock, and Mineral are metro counties while the rest are rural. Interestingly, these counties did not fall within the lowest FRPL eligibility percentage range. Brooke, Hancock, Mineral, and Pleasants counties fell within the second lowest percentage range (40.3% - 52.7%), Tyler fell in the middle percentage range, and Gilmer and Tucker fell within the second highest percentage range (58.9% - 64.6%). After completing a correlation analysis between dropout rates and FRPL eligibility, $r = 0.40$, which has a medium effect. This correlation is somewhat weak.

The counties that fell within the highest percentage range (63.8% - 70.9%) college-going rate for high school seniors averaged between the years 2008-2012 were Monongalia, Mineral, Ohio, Pleasants, Putnam, Wirt, and Wood. All of these counties are within a metro statistical area except Pleasants. In addition, Jefferson and Putnam counties were given attainment status by the Appalachian Regional Commission (ARC). The attainment classification ranks the economy of Jefferson and Putnam counties within the best 10 percent in the nation. The counties that fell within the lowest percentage range (25% - 39%) college-going rate were Calhoun, Doddridge, McDowell, and Wyoming. All fall within the rural statistical area except Doddridge, which is classified as a micropolitan statistical area. After completing a correlation analysis between high school attainment and college-going rates, $r = 0.82$, which is a large effect. This is a strong

positive correlation. Counties that displayed a high percentage of population with high school attainment had high college-going rates and vice versa. Another correlation analysis was calculated between bachelor's degree attainment and college-going rates. The result was $r = 0.68$, which is a large effect. Similar to high school attainment, counties that had a high percentage of population with bachelor's attainment had fairly high college-going rates and vice versa.

The college-going rate for students age 25 or older are clearly represented in counties that have high population, do not rely on the coal industry, and most likely contain a higher education institution. Counties that fall within the highest proportional symbol category (about 100 residents) are Berkeley, Cabell, Kanawha, and Pleasants. The counties with the smallest proportional symbol category (about 1 resident) are Pendleton, Pocahontas, and Tucker. All three are classified as rural counties and are relatively distant from higher education institutions.

Figure 4.19. High School Dropout Rate Results in West Virginia

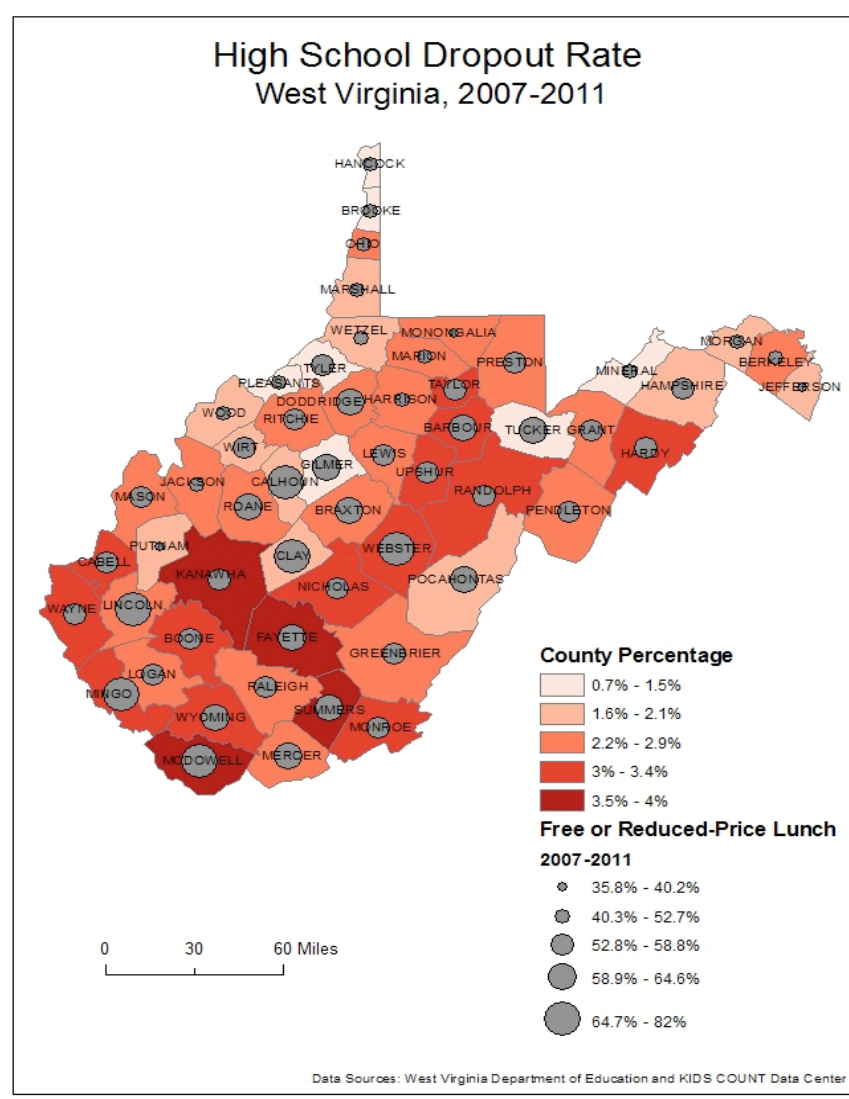
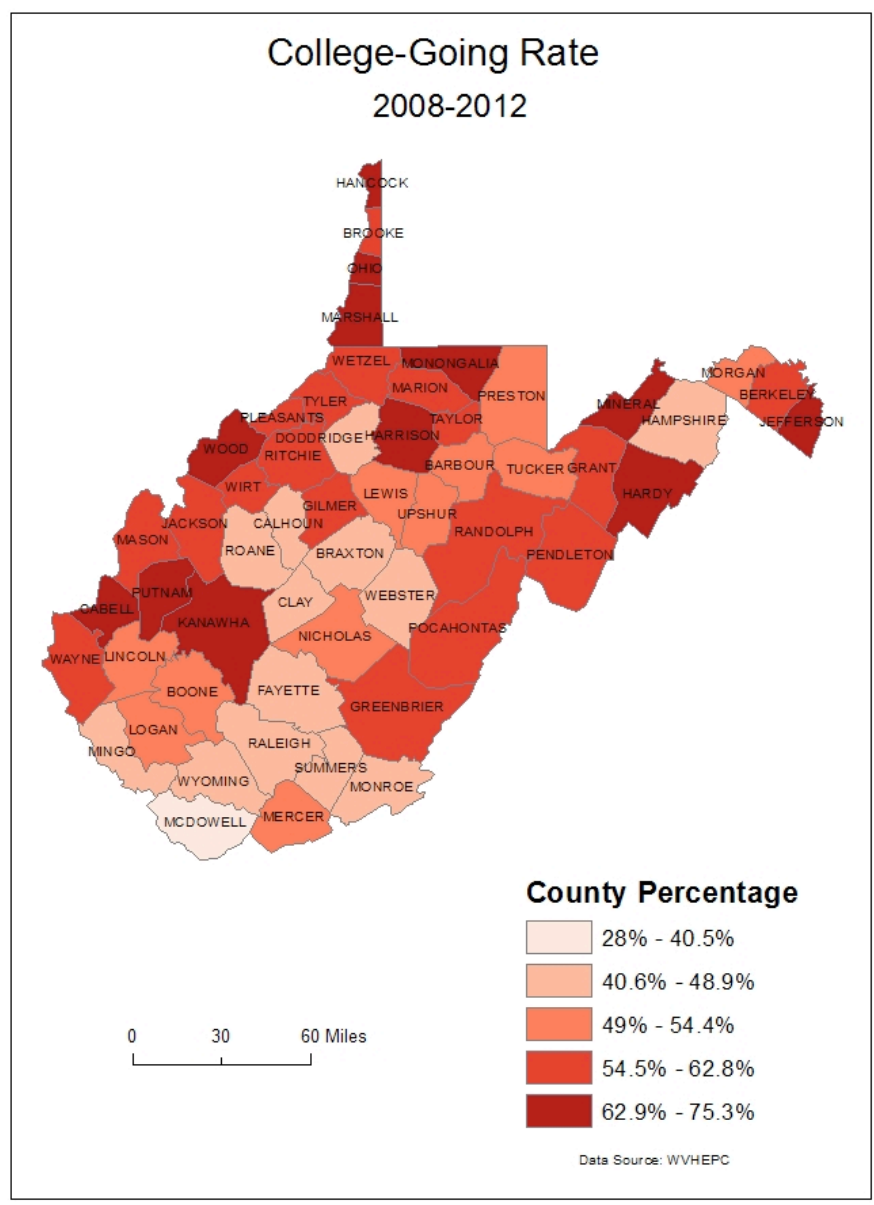


Figure 4.20. College-Going Rate Results in West Virginia



The coal mining industry continues to influence employment practices particularly in southern and north central West Virginia. The top five counties that employed the most coal miners in 2012 were Boone (3,349), Raleigh (2,102), Logan (2,038), Marshall (1,761), and Kanawha (1,379). Of these top five, Boone produced the most surface coal tonnage (7,210,187 tons) followed by Logan (6,681,267 tons) and Kanawha fifth (3,152,380 tons). The top five employment counties had three of the top five underground coal mining tonnage. Marshall (17,154,805 tons), Boone was third (8,541,515 tons), and Logan fifth (6,378,276 tons). Marshall, Boone, and Logan counties were the top three coal producing counties in the state.

Counties that displayed the largest amount of population with high school degree attainment were located in the northern panhandle regions, around the Morgantown and Parkersburg areas, and the Charleston-Huntington metro corridor. These regions generally had less poverty and demonstrated a strong negative correlation (-0.74) between high school attainment and persons below the poverty level. These regions had high rates of bachelor's degree attainment as demonstrated by the strong positive correlation between high school attainment and bachelor's attainment (0.71) and college-going rates (0.68). In contrast, regions that displayed the lowest high school and bachelors attainment were clustered in the more rural central and southern regions of the state that had the highest coal mining production and employment. These regions generally had high secondary dropout rates and FRPL eligibility; although a somewhat weak positive correlation (0.40) exists between these two variables. GeoDa statistics identified three significant clusters of bachelor's attainment and poverty.

A cluster of low bachelor's degree attainment and high poverty was located in the southern counties of Logan, Mingo, Wayne, and Wyoming. This southern cluster was further supported by univariate results that found that bachelor's degree attainment and poverty was

significant in Mingo, Logan, and Wyoming counties. A second significant cluster was found in the rural central region of the state. Similar to the southern coal mining counties, the bivariate results found Calhoun and Braxton counties to be located in a cluster of low bachelor's attainment and high poverty. This was further supported by univariate findings of neighboring counties Gilmer and Lewis that were included in a significant poverty cluster. The final regional cluster was in the northern panhandle. The bivariate results indicated Berkeley, Grant, Hampshire, and Jefferson counties had high bachelor's attainment and low poverty. This was supported by univariate results that found a significant low cluster of poverty in Berkeley, Hampshire, Grant, and Tucker counties.

Figure 4.21. First-Generation Students in West Virginia

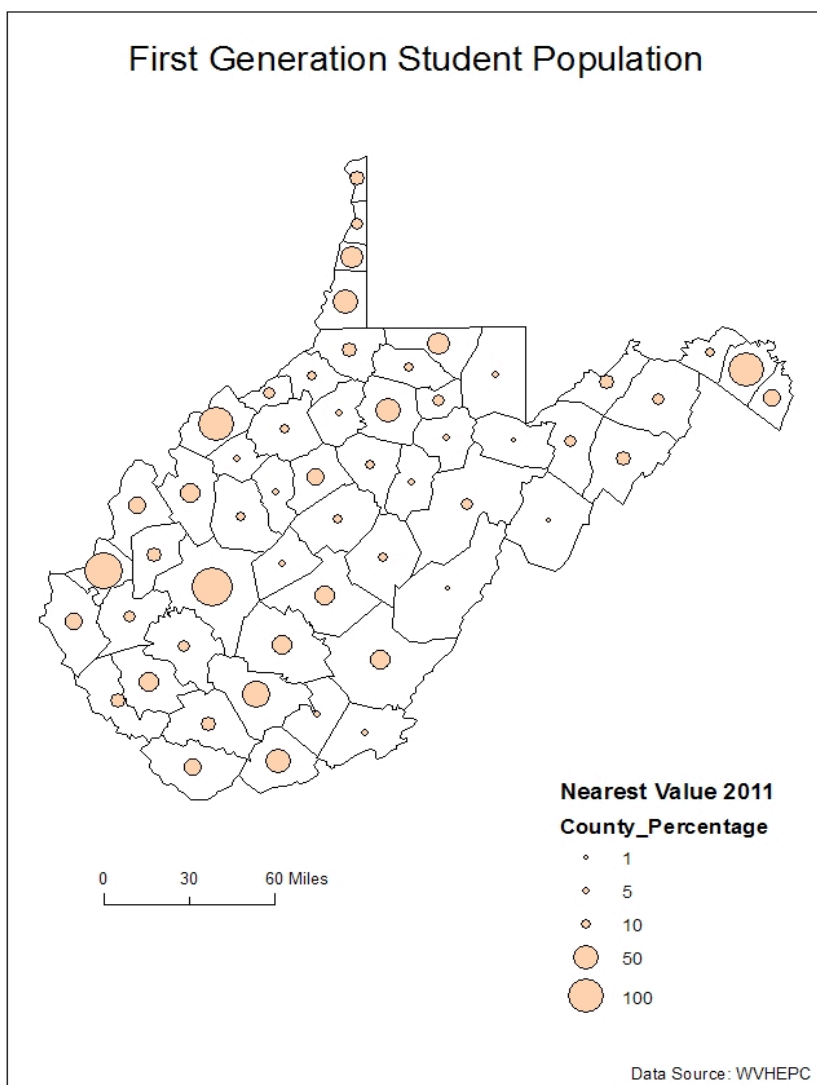


Figure 4.22. Coal Production in West Virginia

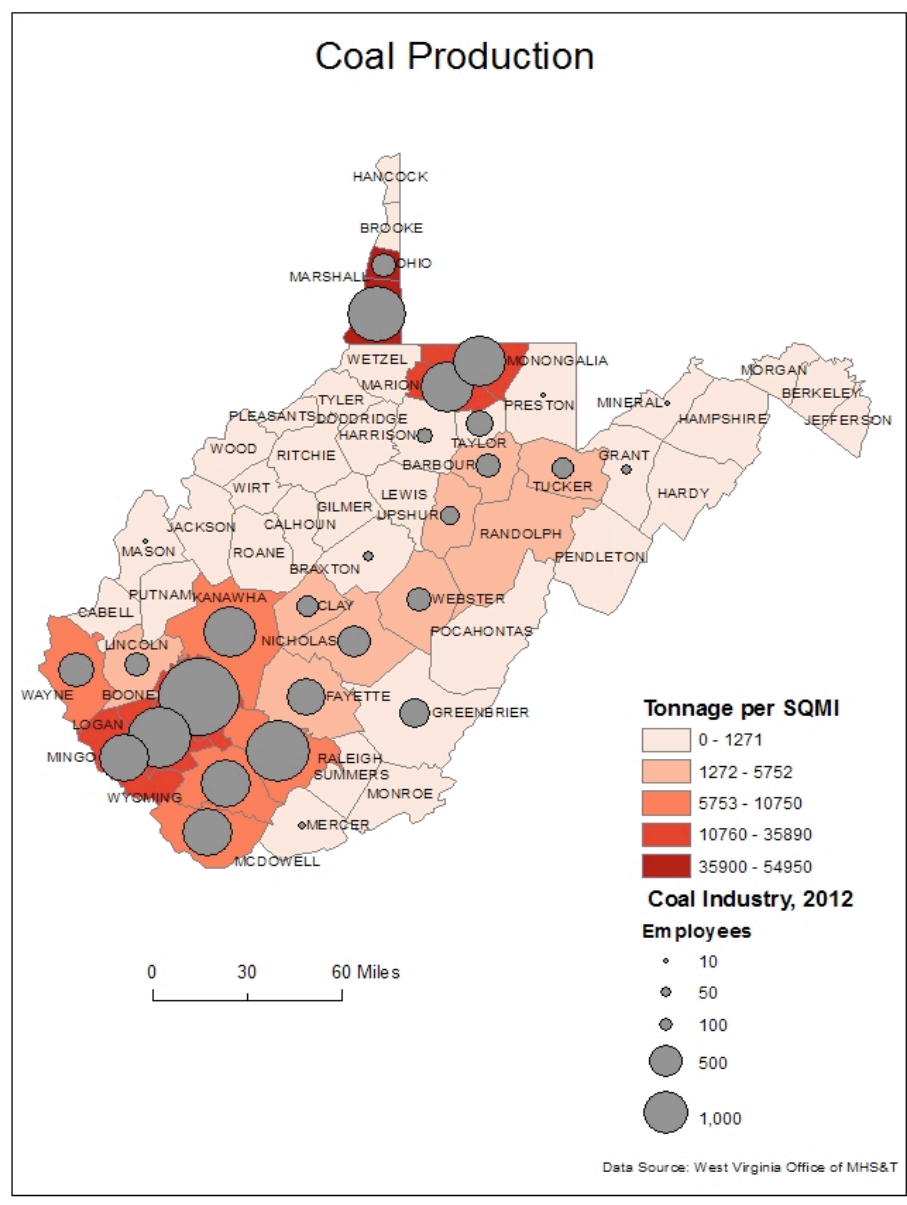


Table 4.3. West Virginia County Correlation Matrix

COUNTY	HS2008-12	COL2008-12	POV2008-12	DRPT2007-11	FRPL2007-11	COLG2008-12
HS2008-12	1	0.71	-0.74	-0.43	-0.87	0.82
COL2008-12	0.71	1	-0.38	-0.09	-0.72	0.68
POV2008-12	-0.74	-0.38	1	0.29	0.7	-0.55
DRPT2007-11	-0.43	-0.09	0.29	1	0.4	-0.1
FRPL2007-11	-0.87	-0.72	0.7	0.4	1	-0.49
COLG2008-12	0.82	0.68	-0.55	-0.1	-0.49	1

CHAPTER 5 DISCUSSION

After analyzing the effects of poverty, parental education, and high school-level socio-economic status and various sub-variables in which to draw correlations with bachelor's degree attainment at the state and county level of West Virginia, two dominant divides emerged: north-south and urban-rural. This study indicates that West Virginia fell within the southern-rural classification due to a disproportionate amount of low-populated counties to metropolitan areas.

The first trend depicts a north-south divide at the state and county level. States located north of the Mason-Dixon Line and in the Upper Midwest tend to have population with more secondary education and bachelor's degrees, lower rates of poverty and FRPL eligibility, and higher retention rates for first-time college freshman. GeoDa bivariate results indicated a cluster of high bachelor's degree attainment and low poverty in the states of Connecticut, Rhode Island, and Vermont. Perhaps this finding is a result of a culture that emphasizes college. Lower poverty and FRPL eligibility may indicate better funded schools that offer college-level advanced placement (AP) credits and counselors that navigate students through the college application process. Besides an exception of counties within the Charleston-Huntington statistical area, counties within the northern and eastern panhandles of West Virginia are economically connected to highly populated regions that base their economies on multiple industrial pursuits within states such as Pennsylvania and Ohio. These counties display similar education and poverty statistics as their northern counterparts on the state level.

In contrast, southern and southwestern states tend to have lower rates of population with secondary and bachelor's degrees, higher rates of poverty and FRPL eligibility, and lower college retention rates. GeoDa bivariate results indicated a cluster of low bachelor's degree

attainment and high poverty in the states of Alabama, Florida, Georgia, Louisiana, and Mississippi. The same can be said for counties in the southern and central regions of West Virginia that border the less populated regions of Kentucky and southwest Virginia. These regions do not have diversified economies but instead are focused on natural resource extraction.

The second trend is urban-rural in nature. States that have a high population tend to do better than their more rural southern counterparts in the aforementioned factors. This is true for highly populated West Virginian counties. These counties usually are in commuting distance to major cities (Pittsburgh or Washington D.C.), provide more job opportunities, and have a higher median income, which in turn provides a facilitating environment for postsecondary institutions. As a result of close institution proximity, these counties tend to have higher college-going rates for high school seniors and first-generation students. On the other hand, rural counties lack the population and infrastructural resources (i.e. major transportation networks, large business employers), tend to have a lower median income and fewer job opportunities that would require postsecondary education. As a result, there is a lower college-going rate. West Virginia has far more counties classified as rural than metropolitan within the Census Bureau's statistical areas.

A correlation can be made between counties with high percentage of population with high school degrees or its equivalent and counties with high percentage of population with bachelor's degrees. The correlation coefficient is -0.71, which means there is a positive relationship between secondary and postsecondary educational attainment. These counties are clustered in metropolitan statistical areas in the northern panhandles, Morgantown metropolitan area, Parkersburg metropolitan area, and the Charleston-Huntington corridor in the southern region. Rural southern and central counties correlate low levels of high school attainment with low population with bachelor's degree attainment. This correlation is most prevalent in counties

that produce the most tonnage per square mile in the state; employment in the resource extraction industries may supersede and devalue the value of education through the importance of cultural and employment within family lineage. This correlation affirmed that parental education levels are indicative of educational attainment levels.

The correlation between secondary and postsecondary attainment does not hold its strength at the state level. The correlation coefficient is 0.47; a relatively weak relationship exists between the two factors. The results indicate some states have low secondary attainment and higher levels of postsecondary attainment and vice versa. For example, North Dakota has a relatively large population with secondary education but a lower amount of population with postsecondary education. Additionally, the relationship between bachelor's attainment and college retention is medium strength, $r = 0.59$. States with lower retention rates usually have a lower amount of population with bachelor's degree attainment. West Virginia demonstrates this relationship.

Poverty is more pervasive within the numerous southern and central counties when compared to the relatively smaller number of counties within the more affluent northern and eastern panhandles, as well as the Charleston-Huntington metro area. A strong correlation can be made between counties with low secondary and postsecondary educational attainment and higher rates of population below the poverty line. At the secondary-level, the correlation coefficients calculated between both factors are almost identical at the state and county level. The state correlation coefficient was found to be (-0.78) and the county (-0.74). Interestingly, the relationship between population with postsecondary education and poverty is not as definitive at the county level. The state correlation coefficient found is -0.72, a fairly strong relationship,

while at the county-level is coefficient is -0.38. Thus county level poverty does not impact population with bachelor's attainment as strongly as at the state level.

Two notable exceptions to the education attainment and poverty correlation are Cabell and Monongalia counties. Due to the location and regional influence of West Virginia University in Monongalia County and Marshall University in Cabell County, these counties have very high educational attainment percentages when compared to other counties across the state. In stark contrast to other counties with high rates of bachelor degree attainment, these counties have a high percentage of population below the poverty level.

Of all variables analyzed, county dropout rates are the most sporadic of all the variables and do not correlate well with students eligibility for FRPL. This study indicates school-level socio-economic status may not have a direct influence on secondary graduation rates. In fact, the correlation between dropout rates and FRPL eligibility between 2007-2011 result in a correlation coefficient of 0.36 at the state-level and 0.40 at the county-level. When population with bachelor's attainment was correlated with dropout rates, the correlation coefficients found wither -0.11 at the state level and -0.09 at the county level. There is almost no relationship between the two. Dropout rates may be a reflection of smaller units of analysis such as district and school-level policies. There does seem to be a general north-south divide within the state as the northern panhandle and north-central regions on average have lower dropout rates when compared to southern or south-central regions. This may be due to the rural nature of southern counties and the lower perceived value of secondary education. As mentioned previously, notable exceptions to the urban-rural divide conclusion are the metropolitan areas of the Charleston-Huntington metro corridor.

One of the strongest correlations this study found was between FRPL eligibility and persons below the poverty level at both the state and county levels. The state level found the correlation coefficient to be 0.89, which is a strong relationship. States located in the south—such as West Virginia—had higher levels of poverty and many students eligible for FRPL. States located in regions such as New England do not have as many people living below the poverty level and do not have as many schools that serve low-income students. Thus FRPL eligibility is itself an indicator of school-level poverty and a reflection of family median-income levels, which is an indicator of the overall population below the poverty level.

There is a correlation between FRPL eligibility and high school attainment. As mentioned previously, FRPL eligibility does not correlate well with dropout rates. Interestingly, the correlation coefficient between population with high school degree attainment and FRPL eligibility is -0.82 at the state-level and -0.87 at the county-level. A strong negative correlation exists; counties with high secondary graduation rates have low FRPL eligibility and counties with many students eligible for FRPL tend to have lower secondary graduation rates. This study indicates school-level poverty levels have an impact on graduation rates.

FRPL eligibility also has an impact on bachelor's attainment. The correlation coefficient found at the state-level was -0.63 and -0.72 at the county-level. West Virginia counties with higher percentages of students eligible for FRPL have lower amount of population with bachelor's attainment. This result compared to the relationship between all persons below the poverty line and bachelor's attainment was much weaker (-0.38).

There is a correlation between counties with high college-going rates and bachelor's attainment. The relationship is fairly strong, $r = 0.68$, counties with higher college-going rates tend to have a larger population with bachelor's attainment. Metropolitan counties have higher

percentages of population that are college-going and benefit when students choose to remain within the area and support the local economy. This analysis lends itself well to counties that support large postsecondary institutions. These counties not only benefit from local students who choose to stay within the region but often provide out-of-state students opportunities to be employed within the county or region.

Rural counties that have high college-going rates lose their ability to attract college graduates and many students are attracted elsewhere for employment. This conclusion is supported by state level data; West Virginia has very low first-time college freshman retention rates comparatively even to the Southern Appalachian region and especially to the neighboring states of Pennsylvania and Virginia. These counties display lower levels of population with bachelor's attainment because their students migrate to larger job markets with more employment opportunities.

Counties located in the east-central region of West Virginia have high average college-going rates but they do not display high percentages of bachelor's degree attainment. Most of these counties are classified as rural which lends itself to the migration analysis presented above. Kanawha County is an exception to the rule due to having a high population that affords many students to dropout while simultaneously supporting many students who are college-going.

Similarly, counties with higher percentages of population with secondary education have higher college-going rates, while counties with lower percentages of population with high school attainment tend to have lower college-going rates. This correlation is stronger than the college-going-bachelor's relationship. The correlation coefficient of 0.82 was found between counties with a large population with high school degree attainment and college-going rates. This is an obvious result, as students graduate many will pursue postsecondary education in-state or out-of-

state for the numerous benefits outlined in the introduction. Additionally, there is a weak correlation between college-going rates and FRPL eligibility, $r = -0.49$.

Between 2007-2011, an urban-rural divide occurred, as first-generation students were concentrated in high-populated counties within close proximity to numerous postsecondary institutions that offer two or four-year degree pathways. Although not within the confines of this study, these counties offered non-traditional students a variety of options at community and technical colleges. Many first-generation students may be using these types of institutions as springboards to pursue their bachelor's. These are counties with high percentages of population with secondary and postsecondary education. The regions with the lowest number of first-generation students are within the rural central and southern regions of the state. Rather than focusing their economy on education, counties in this region may rely on tourism or coal mining to support their local economies.

As of the writing of this study, 2012 was the most recent year of data for coal production and employment at the county level. These variables provide a correlation between counties that are the largest coal producers per square mile and coal industry employment. There is a correlation between coal employment and secondary and postsecondary attainment. The counties that rely on the economic benefits of the coal industry usually have very low educational attainment levels. An exception to the rule is in the northern panhandle region of the state. These counties have some of the highest secondary attainment, college-going, and bachelor's attainment rates in the state but produce large tonnage amounts using underground mining methods. The northern panhandle region benefits economically from the dichotomy between education within the service sector and coal mining within the primary sector.

Without the influence and economic reach of a large postsecondary institution or metropolitan area, the social-construct between the perceived value of the mono-coal mining industry and the devaluing of education may account for the low levels of educational attainment and high dropout rates in the southern region of the state. These counties have low rates of population with high school attainment when compared to other regions. Additionally, these counties have high percentages of population living below the poverty level and high rates of FRPL eligibility in the schools. Thus it can be concluded that proceeds from the industry are flowing out of the region to absentee ownership in other states. Due to the fundamental requirement of land for resource extraction industries, these counties are usually classified as rural and are farther from major transportation networks and postsecondary institutions.

CHAPTER 6 CONCLUSION

“How can West Virginia’s leaders create this new type of mining, one that extracts the talents and resources of its people?”

--McClellan, 2006, p. 4

This study indicates that a multitude of factors within West Virginia and across the United States that are not mutually exclusive determine whether a person attains higher education. These results are not exhaustive and personal bias cannot be avoided, as a researcher must choose what factors to include and exclude within the parameters of analysis. This study analyzed poverty rates, parental educational levels, and high school socio-economic status (SES) that research has shown to have a direct impact on educational attainment (NCES, 2012). Correlation and spatial autocorrelation analysis of trends and patterns at the state and county level makes apparent the interconnectedness of all three factors; of the three, poverty rates have proven to be the most accurate indicator of bachelor’s attainment at the state level and FRPL eligibility (another indicator of poverty) at the county level.

Within West Virginia counties, poverty rates is not the sole determinant of the percentage of population with bachelor’s attainment. Poverty is interconnected with a host of factors at the school, county, and state level of analysis. There is a strong negative correlation between FRPL eligibility at the school level and population with high school attainment. There is an even stronger positive correlation between population with high school attainment and college-going rates. Counties that simultaneously display low FRPL eligibility, a larger amount of population with high school attainment, and high college-going rates correlate with a relatively large

percentage of people with bachelor's attainment. The reality is a minority of West Virginia's 55 counties (only Berkeley and Jefferson in the eastern panhandle region according to LISA bivariate results) meets these criteria.

Rural counties face numerous disadvantages compared to more affluent metropolitan counties. The rugged topography provides limits land for housing, commercial development, and major transportation systems. Rural counties often do not have institutions of higher education; about half of all rural students live in counties without colleges (Poole and More, 2001). Without suitable land for housing and infrastructure, the population remains low in these areas, which limits the amount of tax revenue generated. Dorsey (2011) goes further with West Virginia's tax related issues, "In 2005, state taxes per capita were 15th highest in the nation while the tax burden as a percent of income is 4th highest" (Dorsey, p. 80). According to the 2012 Budget Outlook by the West Virginia Center on Budget & Policy, families that earn less than \$14,000 pay 9.7% of their income to state and local taxes while families who earn \$298,000 and above pay 6.5%. The tax burden is partially a result of the lack of economic diversification within rural regions in the state. The political control and historical legacy of the state's mono-industry economy does not allow for alternative employment options for many within rural counties.

Rural counties are further disadvantaged by the loss of natural resource extraction jobs due to increased mechanization, the proliferation of MTR (surface mining), and the inherent boom and bust cycles of coal production. Dr. James Ziliak goes further when discussing boom and bust cycles in Central Appalachia, "So incomes tend to be quite volatile for the people in these regions...they're going to have a lot of uncertainty trying to make long-term plans...many people getting by on a hand-to-mouth existence" (Abramaky, p. 131). The question arises, if families across the region are more concerned about surviving day-to-day how will they plan to

pursue higher education? LISA bivariate autocorrelation results indicate two significant clusters of counties—both of which are in rural, coal producing regions—that display low rates of bachelor’s degree attainment and high rates of poverty. Clustering of counties that univariate and bivariate autocorrelation depict as having significant low rates of poverty are far fewer in number and are located within the eastern panhandle region due to the proximity of the Washington D.C. metro area.

This study debunks the notion that counties with the highest coal tonnage and employ the most miners are within the rural southern regions of West Virginia. In fact, coal production has shifted from traditional southern counties to northern counties. “From 2008 to 2012, the number of direct coal miners increased from 5,337 to 6,460 in northern West Virginia – a gain of 1,083 – compared to an increase of just 86 jobs (15,550 to 15,626) in the southern coalfields” (Boettner, 2013). Coal seams within southern West Virginia are beginning to be depleted and the expense of extraction has increased. In fact, due to the increased production expenses, the major electric producer Southern Company plans to stop burning Central Appalachian coal by 2016 (Epps, 2013). A faster rate of productivity loss has resulted in an uncompetitive market for Central Appalachian coal compared to coal produced in northern West Virginia.

Not all metropolitan counties have a low percentage of population below the poverty level. When compared with other counties that were within the highest bachelor’s attainment percentage range in the state, Monongalia County and Cabell County fell within the second highest poverty percentage range (19.5-22.9%). Interestingly, the two largest four-year postsecondary colleges are located within these counties (West Virginia University in Monongalia; Marshall University in Cabell, respectively). The reality is students either are unemployed or work low-wage, part-time jobs that result in lower per capita income levels. In

2010, about 71% of college-going 16-24 year-olds were employed, about 19% of which worked over 35 hours per week and 31% worked 20-34 hours per week (NCES, 2012). After analyzing 305 predetermined college towns across the United States, Gumprecht (2008) states, “Nearly one quarter of...residents in 2000 on average lived below the federal poverty line, twice the national rate and higher than chronically depressed regions such as Appalachia (Gumprecht, p. 9). Thus large student body populations skew poverty rates. An additional note should be considered, student body poverty data is misleading because students are often economically supported by their families.

Dropout rates at the state and county level provided inconclusive correlations and are more spatially sporadic than any of the other variables analyzed. Unlike FRPL eligibility that have shown a direct correlation with high school and bachelor’s degree attainment levels, dropout rates do not correlate well with either education outcome at the state and county level. Dropout rates also do not correlate well with poverty or as mentioned above, FRPL eligibility. This result runs counter to national findings for those between the ages of 18 and 24 according to the Department of Education which stated dropouts experienced a poverty rate of 30.8% compared to 13.5% for individuals who have attained at least a bachelor’s degree (NCES, 2011).

Although there should be a correlation between high graduation rates and low dropout rates, inconsistencies of observed dropout rates may be a result of how the NCES collects its Common Core of Data (CCD). At the state level, counts may be over reported or underreported due based on policy changes or population shifts.

At the county level, dropout rates are affected by how school districts report their dropout statistics. Six common sources of dropout data variation are: “(a) the accounting period for calculating the dropout rate; (b) how long it takes for an unexplained absence to be counted as

dropping out; (c) inaccurate data reporting, resulting in duplicate counts of students; (d) the grade levels included in calculating dropout rates; (e) the ages of students who can be classified as dropouts; and (f) whether students who attend alternative educational settings are considered as enrolled in school” (Thurlow, Sinclair, & Johnson, 2002, para. 13). As mentioned above, another point of contention is whether students with disabilities should affect dropout rates. Determining which students are considered dropouts and how findings should be reported differ depending on district, county, and state guidelines.

This study has many facets and presents many opportunities for expansion across a wide variety of disciplines. One factor not included within this study is teen pregnancy and its correlation with educational outcomes, poverty rates, parental education, and school socio-economic status. Poverty rates have statistically been proven to be high for single mothers, 44% in 2010 (NCES, 2012). As researched within the Institute for Women’s Policy Research: *The Status of Women and Girl’s in West Virginia*, West Virginia’s teen pregnancy rate has a profound impact on “educational and economic prospects” (Hess, Hegewisch, & Williams, p. 60). Whether high rates of teen pregnancy are unique to West Virginia or the entire Appalachian region would be subject to further inquiry.

Other demographic groups, the elderly and minority populations, influence bachelor’s degree attainment percentages. Research has shown West Virginia’s median age is growing faster than every other state (Paulhus and Pore, 2012; Christiadi, 2010). West Virginia is currently ranked the second oldest state and the aging baby boomer population is growing. In comparison, West Virginia’s minority population is much smaller and concentrated in a few urban areas (such as Charleston) and southern coal mining counties. Many black residents of southern West Virginia are descendants of coalminers who migrated to be employed within a

booming industry in the late 19th and early 20th century. Extensive research on the elderly and minority demographics and educational attainment is advised.

Although touched upon within the confines of West Virginia, the relationship between coal mining employment and educational attainment could be the subject of diverse research across the entire Appalachian region and provide an interesting comparison to the nation using much broader brushstrokes. As the mechanization of coal mining advances, mountaintop removal (MTR) has steadily become the dominant extraction technique. Due to the complexity of surface extraction, MTR jobs often require postsecondary education. Two problems occur concerning MTR employment: there are too few jobs and many positions are filled from workers not hired locally.

Finally, community and technical colleges and associate level degree attainment are not incorporated into the data due to this study's focus on four-year (bachelor's) education. Other studies are encouraged to pursue the relationship between community and technical colleges' graduation rates, bachelor's degree attainment, and the host of other factors analyzed. Community colleges are commonly extensions of larger four-year institutions; the relationship between first-generation students who attend four-year colleges, dropout, and enroll at two-year institutions would be valuable for political and economic decision making for local and county government.

Dorsey (2011) divides West Virginians into three broad categories: traditionalists, progressives, and the welfare class. Traditionalists fight for the nostalgic history of West Virginia and value independence, resourcefulness, and family-centeredness. They do not value modernization, which they view as an intrusion and dislike industrial and technological advancement. Progressives champion regional development even if traditional cultural values are

forgotten. Progressives want to lose regional stereotypes placed upon them and often put their faith in the coal industry to improve the livelihood of the state. Finally, the welfare class is identified as a result of the “culture of poverty” theory. This category does not have access to economic opportunities the other two groups are accustomed to and rely on public assistance on a day-to-day basis to meet their needs.

Higher education allows a backward-looking traditionalist an opportunity to learn more about their culture and an ability to defend their Appalachian heritage in a more significant way. Postsecondary education allows future-looking progressives an avenue to explore economic diversification in which the state so sorely needs. (Or it could lead to improvements with commonly touted “clean coal” technology). Those on welfare who cannot look beyond their present struggles may benefit from programs that help them attend—if not four-year universities—two-year technical schools. Higher education can help individuals escape public assistance, earn a daily wage, and look towards the future. For many West Virginian residents, access and desirability of attending universities are important hurdles to overcome for those wishing to attend college but there are ramifications for the individual, county, and state if legislative emphasis is not placed on higher education.

West Virginian’s must be aware that by 2018, “half of the state’s workforce will require a postsecondary degree” (WVHEPC, 2013, p. 1). New West Virginia policy must combat numerous issues if it plans to increase the percentage of population with bachelor’s degree attainment—let alone President Obama’s 2020 College Completion goal; the most pervasive of which is poverty. New policy must also address increasing the persistence and graduation rate of first-generation student in order to increase labor-market participation and improve local economies. Research has shown increasing the educational attainment of a population leads to

greater earnings, employment, health-levels, lower reliance on public assistance programs (and increased tax revenues for government), civic-participation, and general well-being (Baum, Ma, & Payea, 2013; NCES, 2013). The question arises, how can rural public schools, which are the foundation of college-going student population, promote educational attainment? Cowley (2008) concludes, “It will take a collaborative, concerted effort—by parents, families, schools, communities, and businesses—to ensure rural youth have access to the tools and information needed to inform their decision-making in terms of educational aspirations and goals” (p. 76). If West Virginia wants to reap the social and economic benefits of a higher educated population, it must value educating its citizens as a top priority.

BIBLIOGRAPHY

Abramsky, S. (2013). *The American Way of Poverty: How the Other Half Still Lives*: New York, New York: Nation Books.

Amarasinghe et al. (2006). *A Socioeconomic and Spatial Analysis of Obesity in West Virginia: Policy Implications*. West Virginia University.

Appalachian Regional Commission. Retrieved from http://www.arc.gov/appalachian_region/TheAppalachianRegion.asp.

Baum, S., Ma, J., and Payea, K. (2013). *Education Pays: The Benefits of Higher Education for Individuals and Society*. Retrieved from <http://trends.collegeboard.org>.

Bell, S. E. and York, R. (2010). Community Economic Identity: The Coal Industry and Ideology Construction in West Virginia. *Rural Sociology*, 75(1), 111-143.

Black, D., McKinnish, T., and Sanders, S. (2005). The Economic Impact of the Coal Boom and Bust. *The Economic Journal*, 115(503), 449-476.

Boettner, T. (2013). *Coal Production Shifting to Northern West Virginia*. West Virginia Center on Budget & Policy Blog. Retrieved from <http://www.wvpolicy.org/coal-production-shifting-to-northern-west-virginia>.

Brown, R. C. et al. Factors Influencing Student College Choice Between In-State and Out-of-State Students. *Journal of the Indian University Student Personnel Association*. 1999.

Burnell, B. A. (2003). The “Real World” Aspirations of Work-Bound Rural Students. *Journal of Research in Rural Education*, 18(2), 104-113.

Burns, S.S. (2007). *Bringing Down the Mountains: The Impact of Mountaintop Removal on Southern West Virginia Communities*. Morgantown, West Virginia: West Virginia Press.

Carr, P. J. and Kefalas, M. J. (2009). *Hollowing Out the Middle: The Rural Brain Drain and What It Means for America*. Boston: Beacon Press.

Chenoweith, E., and Galliher, R. V. (2004). Factors Influencing College Aspirations of Rural West Virginia High School Students. *Journal of Research in Rural Education*, 19(2).

Christiadi. (2010). *Why West Virginia Population is Aging Faster than the United States*. Bureau of Business and Economic Research. West Virginia University College of Business and Economics. Retrieved from http://www.be.wvu.edu/demographics/documents/WVAgingPopulation_006.pdf.

Cooper, C., Knotts G., and Livingston D. (2010). Appalachian Identity and Policy Opinions. *Journal of Appalachian Studies*, 16(1&2), 26-41.

Cowley, K. S. (2008). "Investigating West Virginia Students' Perceptions of the Factors Affecting Their Educational Aspirations". Theses, Dissertations and Capstones. Paper 51.

Davis, J. (2010). *The First Generation Student Experience: Implications for Campus Practice, and Strategies for Improving Persistence and Success*. Virginia: Stylus Publishing.

Data Portal. West Virginia Higher Education Policy Commission. (2013). Retrieved from <http://www.wvhepc.com/resources/data-portal/>.

Dorsey, C. (2011). *Southern West Virginia and the Struggle for Modernity*. North Carolina: McFarland & Company, Inc.

Eller, R. D. (2008). *Uneven Ground: Appalachia Since 1945*. Lexington: The University Press of Kentucky.

Epps, D. *Southern Co. plans to all but stop burning Central Appalachian coal by 2016*. SNL Financial LC. Retrieved from <http://www.snl.com/InteractiveX/Article.aspx?cdid=A-25219049-11825>.

Federal Interagency Forum on Aging-Related Statistics. (2010). *Older Americans 2010: Key Indicators of Well-Being*. Federal Interagency Forum on Aging-Related Statistics. Washington, DC: U.S. Government Printing Office.

GeoDa Center for Geospatial Analysis and Computation. Arizona State University: School of Geographical Sciences and Urban Planning. Retrieved from <https://geodacenter.asu.edu/node/390#sa>.

Goodell, J. (2006). *Big Coal: The Dirty Secret Behind America's Energy Future*. Boston and New York: Houghton Mifflin Company.

Gumprecht, B. (2008). *The American College Town*. Boston: The University of Massachusetts Press.

Haaga, J. (2004). *Educational Attainment in Appalachia*. Appalachian Regional Commission: Demographic and Socioeconomic Change in Appalachia.

Hammond, G.W. (2010). *West Virginia Economic Outlook 2011*. Bureau of Business and Economic Research at the College of Business and Economics. West Virginia University Research Corporation. Retrieved from <http://www.be.wvu.edu/bber/pdfs/BBER-2010-23.pdf>.

- Hand, C. & Payne, E.M. (2008). First-Generation College Students: A Study of Appalachian Student Success. *Journal of Development Education*, 32(1).
- Hess, C., Hegewisch, A., & Williams, C. (2013). *The Status of Women and Girls in West Virginia*. Institute for Women's Policy Research. Washington, D.C.
- Hossler, D. and Gallagher, K.S. (1987). Studying Student College Choice: A Three-Phase Model and the Implications for Policymakers. *College and University*, 62(3), 207-221.
- Hossler, D., Braxton, J.M., & Coopersmith, G. (1989). Understanding Student College Choice. *Higher Education: Handbook of Theory and Research*, 5, 231-288.
- Kanter, M. et al. (2011). Meeting President Obama's 2020 College Completion Goal [PowerPoint slides]. United States Department of Education. Retrieved from www.ed.gov/sites.../winning-the-future.ppt.
- Lane, J. E. and Johnstone, D. B., eds. (2012). *Universities and Colleges as Economic Drivers: Measuring Higher Education's Role in Economic Development*. Albany: State University of New York Press.
- Leard Statistics. (2013). *Pearson Product-Moment Correlation*. Lund Research Ltd. Retrieved from <http://statistics.leard.com>.
- Lee, J. (2009). *Taking on Education*. The White House Blog. Retrieved from www.whitehouse.gov.
- Lichter, D. T. and Campbell, L.A. (2005). *Changing Patterns of Poverty and Spatial Inequality in Appalachia*. Appalachian Regional Commission: Demographic and Socioeconomic Change in Appalachia.
- Lichter, D., and Cimbula, L. (2010). *Family Change and Poverty in Appalachia*. University of Kentucky Center for Poverty Research Discussion Paper Series, DP2010-04. Retrieved from <http://www.ukcpr.org/Publications/DP2010-04.pdf>.
- McClellan C. S. (2006). "The Perceptions of 12th Grade Students, Their Families, and School Officials Related to Affordability and the Accessibility of the West Virginia PROMISE Scholarship Program at Logan High School". West Virginia University Thesis and Dissertations.
- Moeller, S.N. (2001). "The Relationship Between Parent Education and Their Child's Academic Readiness". Marshall University Thesis and Dissertations.
- Myers, M. S. (2011). "Deindustrialization and the Decline of Community in the Coalfields: McDowell County, West Virginia, 1950—2000". West Virginia University Thesis and Dissertations.

National Center for Education Statistics. (2012). Higher Education: Gaps in Access and Persistence Study. Retrieved from <http://nces.ed.gov/pubs2012/2012046.pdf>.

National Center for Higher Education Management Systems (NCHEMS). (2013). *First-Time College Freshmen Returning Their Second Year*. Retrieved from [http://www.higheredinfo.org/dbrowser/index.php?submeasure=223&year=2006&level=nation&mode=data &state=0](http://www.higheredinfo.org/dbrowser/index.php?submeasure=223&year=2006&level=nation&mode=data&state=0).

Nunez, A., Cuccaro-Alamin, S., and Carroll, C. (1998). *First-Generation Students: Undergraduates Whose Parents Never Enrolled in Postsecondary Education*. National Center for Education Statistics.

O'Leary, S. (2011). *Investing in the Future: Making the Severance Tax Stronger for West Virginia*. West Virginia Center on Budget and Policy. Retrieved from <http://www.wvpolicy.org/downloads/SeveranceTax022812.pdf>.

O'Leary, S. and Boettner, T. (2011). *State of Working West Virginia 2011*. West Virginia Center on Budget and Policy. Retrieved from <http://www.wvpolicy.org/downloads/SWWV2011.pdf>.

O'Leary, S. and Boettner, T. (2012). *State of Working West Virginia 2012 – In Depth: The Gas Boom and Coal Bust*. West Virginia Center on Budget and Policy. Retrieved from http://www.wvpolicy.org/downloads/SWWV2012_091912.pdf.

Organization for Economic Co-Operation and Development (OECD). (2008). *Annual Report 2008*. Retrieved from <http://www.oecd.org/newsroom/40556222.pdf>.

Paulhus, E. and Pore, R. (2012). *The State of Older Adults in West Virginia: Economic Security and the Over 65 Population*. West Virginia Center on Budget & Policy. Retrieved from <http://www.wvpel.org/downloads/State%20of%20Older%20Adults%20Ec%20Sec%20in%20WV%20July%202012.pdf>.

Planty et al. (2009). *The Condition of Education 2009*. National Center for Education Statistics.

Poole, D.L. and More, S. (2001). *Participation of Rural Youth in Higher Education: Factors, Strategies, and Innovations*. Austin: Texas Rural Communities, Inc.

Porter, M. (2007). *Colleges and Universities and Regional Economic Development: A Strategic Perspective*. Forum for the Future of Higher Education. Cambridge. Retrieved from <http://net.educause.edu/ir/library/pdf/ff0710s.pdf>.

Rumberger, R.W. and Palardy, G. J. (2005). Test Scores, Dropout Rates, and Transfer Rates as Alternative Indicators of High School Performance. *American Educational Research Journal*, 42(1), 3-42.

- Scott, R.R. (2010). *Removing Mountains: Extracting Nature and Identity in the Appalachian Coalfields*. Minneapolis: University of Minnesota Press.
- Selingo, J.J. (2013). *College (Un)bound: The Future of Higher Education and What It Means for Students*. Boston and New York: Houghton Mifflin Harcourt Publishing Company.
- Shaw, T. C., DeYoung, A. J., & Rademacher, E. W. (2004). Educational Attainment in Appalachia: Growing with the Nation but Challenges Remain. *Journal of Appalachian Studies*, 10(3), 307-329.
- Stallmann, J. I. and Johnson, T. G. (1996). Community Factors in Secondary Educational Achievement in Appalachia. *Youth & Society*, 27(4), 469-484.
- Thurlow, M.L., Sinclair, M.F., and Johnson, D.R. (2002). *Students with Disabilities who Drop Out of School – Implications for Policy and Practice*. Examining Current Challenges in Secondary Education and Transition. National Center on Secondary Education and Transition. 1(2).
- U.S. Census Bureau. (2014). State and County QuickFacts. Retrieved from <http://quickfacts.census.gov/qfd/states/54000.html>.
- U.S. Department of Education, National Center for Education Statistics. (n.d.). The NCES Common Core of Data (CCD) survey. *Local Education Agency Universe Survey, 2005-06*. Retrieved from http://nces.ed.gov/surveys/ruraled/TablesHTML/06_district_total.asp.
- Voorhees, R. A. and Harvey, L. (2005). Higher Education and Workforce Development: a Strategic Role for Institutional Research. *New Directions for Institutional Research*, 128, 5-12.
- West Virginia Coal Mining Facts. (2014). West Virginia Office of Miners' Health, Safety, and Training, 2014.
- West Virginia Health Statistics Center: Statistical Brief Number 8. (2002). *A Look at West Virginia's Population by Decade, 1950-2000 Brief No. 8*. Department of Health and Human Resources. Retrieved from <http://www.wvdhhr.org/bph/oehp/hsc/briefs/eight/default.htm>.
- York, R. K. (2000). "Parental Influences on High School Student Achievement and Goals". West Virginia University Thesis and Dissertations.
- Yorke, M. and Longden, B. eds. (2004). *Retention and Student Success in Higher Education*. The Society for Research into Higher Education. Open University Press.
- Yusuf, S. and Nabeshima, K., eds. (2007). *How Universities Promote Economic Growth*. Washington D.C.: The World Bank.

Ziliak, J. P., ed. (2012). *Appalachian Legacy: Economic Opportunity after the War on Poverty*. Washington, D.C.: Brookings Institution Press.

APPENDIX

LETTER FROM INSTITUTIONAL RESEARCH BOARD



Office of Research Integrity

February 14, 2014

Britt Phillip Arcadipane
626 17th St.
Huntington, WV 25703

Dear Mr. Arcadipane:

This letter is in response to the submitted thesis abstract entitled "*West Virginia's Low Percentage of Population with at Least Four-Year College Education.*" After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the information in this study does not involve human subjects as defined in the above referenced instruction it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and a determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

A handwritten signature in blue ink that reads 'Bruce F. Day'.

Bruce F. Day, ThD, CIP
Director

WE ARE... MARSHALL™

401 11th Street, Suite 1300 • Huntington, West Virginia 25701 • Tel 304/696-7320
A State University of West Virginia • An Affirmative Action/Equal Opportunity Employer