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Location Matters: A Geospatial Analysis of Principal Turnover in the Denver Metropolitan Area

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Abstract

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INTRODUCTION

Background to the Problem

Today, the American educational system faces immense public dissatisfaction, and policy leaders struggle to address the most prominent education issues (Rippner, 2016). In the United States, the majority of K-12 students are not academically proficient (Hanushek, Peterson, & Woessman, 2014), educational achievement gaps exist between members of different racial and socioeconomic groups (Lee, 2016), high-school graduates are not prepared for college level coursework (Rippner, 2016; Wagner, 2010) and young adults are unable to compete in a global economy (Groen, 2012; Wagner, 2010). Urban school districts face additional challenges unique to the urban context, including serving more students that live in poverty (Hanushek, 2014) and having more students drop-out of school than non-urban school districts (Noguera, 2008). Urban school districts on average have lower academic achievement in reading and math than non-urban school districts, and they experience higher teacher turnover (Hanushek, 2014).

Within the last decade, significant demographic change has occurred in metropolitan areas, resulting in more school districts facing the complex challenges typically associated with urban districts (Dreier, Mollenkopf, & Swanstrom, 2014;

Frankenberg & Orfield, 2012; Howell & Timberlake, 2013; Orfield, 2002; Posey-Maddox, 2014; Posey-Maddox, 2016; Stuart Wells, Ready, Duran, Grzesikowski, Hill, Roda, Warner, & White, 2012; Stuart Wells, Baldridge, Duran, Lofton, Roda, Warner, White, & Grzesikowski, 2009). While many Americans still hold the image that urban areas consist primarily of low-income, people of color and suburban areas consist primarily of White, middle-class people, that stereotype has not been accurate for over a decade (Dreier, Mollenkopf, & Swanstrom, 2014; Frankenberg & Orfield, 2012; Frey, 2011; Orfield, 2002; Posey-Maddox, 2014; Posey-Maddox, 2016; Stuart Wells et al., 2009). From 2000 to 2010 in the largest 100 metropolitan areas across the United States, the suburban poor population increased by 53% (Dreier, Mollenkopf, & Swanstrom, 2014) and people of color represented 35% of suburban residents (Frey, 2011). More people of color and residents from low-income households are being pushed to suburban areas due to rising housing costs in cities (Posey-Maddox, 2014). Simultaneously, neighborhood gentrification is changing urban neighborhoods to make them more attractive to middle class residents, which is increasing the movement of White middle class residents into cities (Posey-Maddox, 2014).

This demographic shift has also impacted metropolitan school districts. In general, as a city's housing market changes, the residential demographics will also change, causing the demographics and characteristics of local school districts to shift as well (Frankenberg & Orfield, 2012). Suburban school districts outside of cities now enroll the same number or more students of color as school districts in cities (Stuart Wells et al., 2009). As a result of these demographic changes, school districts in suburban

areas across the United States are now experiencing challenges once thought of as only "urban" problems (Posey-Maddox, 2014). These districts are often ill-prepared to meet the needs of their newly diverse student population (Frankenberg & Orfield, 2012; Posey-Maddox, 2016) and schools are finding that they need to shift their culture and instructional practices to meet the needs of their students (Harris-Russell, 2014).

The school principal is well positioned to lead this cultural and instructional change in school districts and respond directly to the needs of their students through school improvement efforts (Leithwood & Seashore-Louis, 2011; Li, 2017; Robinson, Lloyd & Rowe, 2008). As the central source of leadership in schools, principals are responsible for establishing a school's culture and climate (Hitt & Tucker, 2016; MacNeil, Prater & Busch, 2009; Mascall & Leithwood, 2012; Seashore Louis, Leithwood, Wahlstrom, & Anderson, 2010). Principals can create supportive school environments conducive to student achievement and set clear school-wide goals to support student learning for all learners (Hitt & Tucker, 2016; Johnson, Kraft, & Papay, 2012; Valentine & Prater, 2011). They can also provide instructional leadership to teachers, which has an indirect effect on student achievement (Hallinger & Heck, 2010; Heck & Hallinger, 2009; Hitt & Tucker, 2016; Johnson, Kraft, & Papay, 2012; Leithwood & Jantzi, 2008; Leithwood & Mascall, 2008; Shatzer, Caldarella, Hallam & Brown, 2014; Valentine & Prater, 2011). Additionally, principals can create an environment that encourages student voice and engagement in school (Mitra, 2008). Principals can also provide opportunities for parents to engage with their child's school (Ishimaru, 2013) which can increase academic achievement for students of color (Jeynes

2016a, 2016b). Furthermore, research has indicated that principals can prevent teacher turnover (Brown & Wynn, 2009; Holme & Rangel, 2012; Mancuso, Roberts, & White, 2010; Simon & Johnson, 2015), while simultaneously increasing teacher motivation (Leithwood & Mascall, 2008), and the desire to engage in school improvement work (Holme & Rangel, 2012; Li, 2017). Overall, principals have the ability to positively influence a school's culture and instructional practices through school improvement to meet the needs of their student population.

Statement of the Problem

Research has indicated school improvement efforts cannot be successful unless the principal remains at the school for extended periods of time (Fuller, Orr, &Young, 2008). School improvement efforts can take a minimum of five years before large scale change occurs (Fuller, Orr, & Young, 2008; Mascall & Leithwood, 2012). Principals that are only in their schools for two to three years are unlikely to get beyond the stage of early implementation in school improvement work (Mascall & Leithwood, 2012). Currently, principal tenure in a single school is an average of three years (Fuller & Young, 2008; Mascall & Leithwood, 2012), and on average, 20% of principals leave their schools every year nationwide (Battle, 2010; Berry, 2014; Goldring, Taie, & Owens, 2014).

Frequent principal turnover and district principal rotation practices in a school can cause organizational instability (Béteille, Kalogrides, & Loeb, 2012; Farley-Ripple, 2012; Fink & Brayman, 2006; Weinstein et al., 2009). Organizational instability can have a significantly negative impact on school districts and impede the school improvement

efforts that are necessary for schools to change their instructional practices to meet diverse student needs (Béteille, Kalogrides, & Loeb, 2012; Harris-Russell, 2014; Mascall & Leithwood, 2010; Mascall & Leithwood, 2012; Superville, 2014). In schools with frequent principal turnover, teachers can learn to resist or ignore a subsequent principals' school improvement efforts (Fink & Brayman, 2006). Teachers can develop cynical attitudes about school improvement (Mascall & Leithwood, 2012). Frequent principal turnover can also undermine a school's efforts to implement instructional programs designed to increase student achievement (Béteille, Kalogrides, & Loeb, 2012). This organizational instability is disruptive to school improvement efforts.

Furthermore, principal turnover has a negative impact on student achievement. Principal turnover can cause student test scores to decrease following a principal's departure (Burkhauser, Gates, Hamilton, & Ikemoto, 2012; Miller, 2013). This decrease in academic achievement may continue to fall for two years after a principal has left (Miller, 2013), which further slows school improvement efforts. Additionally, research indicates that students make lower achievement gains when they have a new principal (Béteille, Kalogrides, & Loeb, 2012). Principal turnover also has large negative effects on student achievement in high poverty schools and in schools that received a failing score on the state accountability system (Béteille, Kalogrides, & Loeb, 2012). Overall, frequent principal turnover seems to have a negative impact on the probability of a student succeeding in school.

If principals are not remaining at their schools for the amount of time research suggests is necessary for successful implementation of school improvement efforts, then

additional research is needed to learn more about the factors that impact principal turnover . Research also indicates that contextual categories such the school's geographic location may have an impact on principal retention (DeAngelis & White, 2011; Partlow & Ridenour, 2008; Podgursky, Ehlert, Lindsay, & Wan, 2016; Young & Fuller, 2009). Furthermore, as districts in metropolitan areas experience demographic shifts and experience similar educational challenges there is a call for education research to examine its definition of "urban" (Possey-Maddox, 2012).

Purpose of the Study

The purpose of this non-experimental study is to explore principal turnover in the Denver metropolitan area. In this study, I examined the geospatial variation between school characteristics, student achievement, and principal turnover. I used geospatial analysis to visually illustrate this variation through the use of geographic information systems (GIS). Geospatial analysis allowed me to illuminate patterns that can be hidden within traditional quantitative methods, such as multiple regression (Fombuena, 2016). It also helped me display how the relationships can vary by location (Fombuena, 2016; Hogrebe, 2012).

Denver Metropolitan Area Context

To understand principal turnover patterns in the Denver metropolitan area, it is important to understand the Denver metropolitan area context. The Denver metropolitan area has seen significant demographic change in the city and surrounding suburbs within the last ten years. Since 2010, the Denver metropolitan area's strong economic conditions have led to substantial population growth (U.S. Department of Housing and Urban

Development, 2015). Since 2010, Denver has seen major health care, telecommunications, and technology manufacturing companies relocate to the Denver metropolitan area, partially due to the climate, location, and recreational amenities of Denver, leading to a dramatic increase in the number of available jobs (U.S. Department of Housing and Urban Development, 2015). As a result of this economic growth, the city of Denver's population has grown faster than the available supply of housing, leading to a decrease in the availability of housing and increase in the housing prices in response to the demand (Denver Office of Economic Development, 2017). In particular, Denver has seen an increase of young, highly educated residents moving into the city in response to the increase in jobs (Denver Office of Economic Development, 2016; U.S. Department of Housing and Urban Development, 2015).

To accommodate the influx of young, highly educated working professionals moving into the city, real estate investors have concentrated on building smaller residential units in place of affordable single-family homes (Denver Public Schools, 2017). This reduction in availability of single-family homes combined with the increase in housing prices has exacerbated the movement of low-income families into the surrounding suburbs (Denver Public Schools, 2017; U.S. Department of Housing and Urban Development, 2015). Most individuals in low-skilled occupations requiring a high school diploma or no high school diploma can no longer afford to live in the city of Denver, and are moving to the surrounding suburbs in search of affordable housing (Denver Office of Economic Development, 2016).

These recent changes in the Denver housing market have also impacted school districts within the Denver metropolitan area. In general, as a city's housing market changes, the residential demographics will also change, causing the demographics and characteristics of local school districts to shift as well (Frankenberg & Orfield, 2012). Table 1 shows the percentage of students of color by district for 2010-2011 compared to 2014-2015.

Table 1

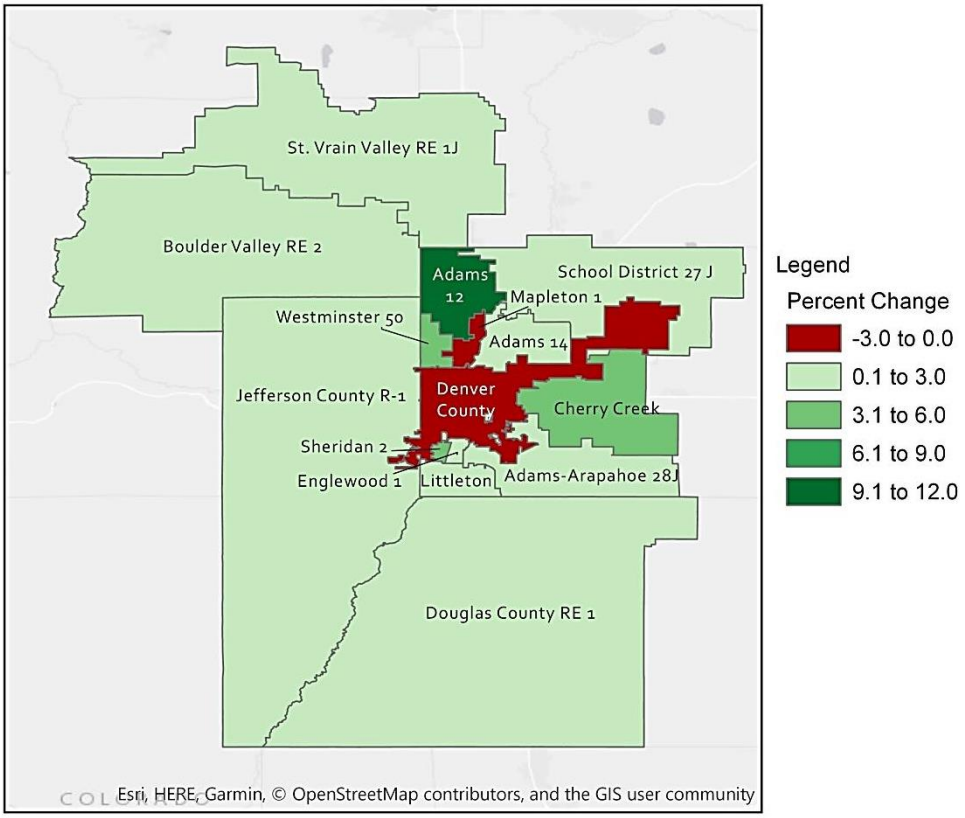
Percentage of Students of Color by District, 2010-2015

District Name	2010-2011	2014-2015	Percent Change
Adams 12 Five Star Schools	37.32%	48.27%	10.95%
Adams County 14	86.30%	87.42%	1.12%
Adams-Arapahoe 28J	77.93%	82.25%	4.32%
Boulder Valley RE 2	29.02%	30.32%	1.30%
Cherry Creek 5	43.39%	45.29%	1.90%
Denver County 1	80.04%	77.95%	-2.09%
Douglas County RE 1	22.71%	24.65%	1.94%
Englewood 1	45.22%	47.98%	2.76%
Jefferson County R-1	31.59%	32.85%	1.26%
Littleton 6	24.64%	26.00%	1.36%
Mapleton 1	68.37%	68.06%	-0.31%
School District 27J	51.69%	51.86%	0.17%
Sheridan 2	81.91%	86.20%	4.29%
St. Vrain Valley RE 1J	34.10%	35.70%	1.60%
Westminster 50	78.80%	82.61%	2.18%
Denver Metropolitan Area	52.87%	55.16%	2.18%

Source: Colorado Department of Education

Table 1 indicates that three districts, Adams County 14, Sheridan 2, and Westminster 50 all served a higher percentage of students of color than Denver County 1, the school district located in the principal city of Denver, by the 2014-2015 school year. Other districts served a lower percentage of students of color than Denver County 1, yet they have experienced an increase in the percentage of students of color from 2010 to 2015.

Figure 1 further shows where the percentages of students of color have changed the most from 2010 to 2015.



Source: Colorado Department of Education

Figure 1. Map of the Percent Change of Students of Color by District, 2010-2015

This map indicates that the city of Denver has decreased their percentage of students of color, while districts surrounding the city of Denver increased their percentage of students of color.

Theoretical Framework

Hogrebe and Tate's (2012; 2017) and Hogrebe's (2012) concept of geospatial perspective serves as the theoretical framework for this study. The geospatial perspective

is a research lens rooted in geography that focuses on place and space as contextual variables (Hogrebe & Tate, 2012). The geospatial perspective has four essential premises: 1) education data has a spatial component 2) relationships between variables will vary depending on geographic location, 3) local statistics for a geographic area must be understood before global statistics can be reliably used, and 4) there are additional methodological tools that should be utilized to examine spatial data (Hogrebe, 2012; Hogrebe & Tate, 2012; Hogrebe & Tate, 2017).

Educational data has a spatial component. Traditionally, data in education is thought of as non-spatial (Hogrebe, 2012; Lubienski & Lee, 2017). Non-spatial data can be defined as any data not associated with a geographic area or location, while spatial data can be defined as any data associated with a geographic area or location (Morrison & Garlick, 2017). For example, principal turnover data is typically thought of as non-spatial since it is data not associated with a specific location. However, Hogrebe (2012) states that data in education almost always have a location they can be associated with and variables typically occur in a physical, geographic location. Education data lend themselves to the geospatial perspective because schools and districts are located in neighborhoods, communities, and metropolitan regions (Hogrebe & Tate, 2012). Lubienski, Gulosino and Weitzel (2009) argue that data in education should be understood not as isolated variables without geographic context but as variables that occur within geographic contexts (). Under this premise of the geospatial perspective, data on principal turnover will have a spatial component since principals work in a

physical, geographic location (Hogrebe, 2012). Therefore, geographic context for principal turnover must be considered when examining the issue of principal turnover.

Relationships vary by location. Hogrebe (2012) further states that different geographic contexts influence schools and learning, which can cause relationships between variables to vary by location. Regional, community, or neighborhood context can potentially change the relationships between variables in education (Hogrebe & Tate, 2012; Hogrebe, 2012). This local context can interact with variables at an individual or school level, and cause relationships to differ across schools and location (Hogrebe, 2012). Locations that are closer together will be more similar than those farther apart in a geographic area (Hogrebe, 2012). For example, students in the same classroom are more similar to each other than students in different classrooms; classrooms in the same school are more similar than classrooms in different schools, and schools in the same district are more similar than schools in different districts (Hogrebe, 2012). Furthermore, each school district has its own context, which can consist of different demographic, cultural, political, financial, physical, and education factors (Hanushek & Yilmax, 2011; Hogrebe & Tate, 2017; Holme, Diem & Welton, 2014), which will cause further variation. Principal turnover would vary by geographic location due to unique local context of every principal's school.

Local statistics inform global statistics. Hogrebe (2012) also calls for the use of local statistics to inform global statistics (Hogrebe, 2012). Local statistics describe the data for one area (Fotheringham, 2002), such as one school district. Global statistics describe the data for an entire region, encompassing an aggregate of local statistics

(Fotheringham, 2002), such as all the school districts in a metropolitan area. Global statistics are assumed to apply equally across a region (Fotheringham, Brunsdon, & Charlton, 2011). However, the average relationship represented in the global statistics may not be an accurate representation of the data across a region (Fotheringham, Brundson, & Charlton, 2002). Additionally, as variation within local statistics increases, the reliability of global statistics decreases (Fotheringham, Brundson, & Charlton, 2002).

Fotheringham, Brundson, and Charlton (2002)state that only when there is little to no variation in local statistics will global statistics provide reliable information on areas within a study (). Since relationships between variables will vary by location, it is important to not use global statistics to describe data in an area without understanding the extent of local variation (Hogrebe, 2012). Understanding the extent of local variation within an area first helps to increase the reliability of the findings in a study (Hogrebe, 2012). This can then be used to determine if global statistics are an appropriate and reliable method of reporting findings. Educational researchers often use state-wide data sets to examine issues of principal turnover without first considering the extent of variation within cities or school districts first (DeAngelis & White, 2011; Gates, Ringel, Santibañez, Guarino, Ghosh-Dastidar, & Brown, 2006; Podgursky, Ehlert, Lindsay, & Wan, 2016).In examining principal turnover in a metropolitan area, local statistics for school districts should be examined first before claims regarding principal turnover in an aggregate metropolitan area can be made.

Additional methodological tools are needed. Hogrebe and Tate (2012) require identifying the physical location of a variable to determine geographic context, which has

methodological implications.. Under the geospatial perspective, geospatial analysis is the methodological tool for conducting the research, through the use of geographic information systems (Hogrebe, 2012). Researchers can use geospatial analysis to transform the variables and data into a physical dimension which helps visualize variation by geographic location (Hogrebe, 2012). Researchers can also use geospatial analysis to show local variations and effects of research issues and policies (Hogrebe, 2012). Hobrebe (2012) states that quantitative methods typically focus on the aggregate view, while qualitative methods focus on smaller individual or group views. The visualization of geospatial analysis uncovers relationships that may be overlooked in traditional data files for both quantitative and qualitative research (Hogrebe, 2012). Hogrebe (2012) suggests specific methodology for uncovering spatial relationships that can be applied to principal turnover and local variables in a metropolitan area.

Together these four premises provide a framework for examining principal turnover in a metropolitan area. I used the geospatial perspective to conceptualize and visualize how a geographic area may interact with principal turnover. Principals work in a school geographically located in an individual school district that has its own community context (Hanushek & Yilmax, 2011; Hogrebe & Tate, 2017; Holme, Diem & Welton, 2014). This community context can consist of different demographic, cultural, political, and financial factors that will vary by school district and location (Hanushek & Yilmax, 2011; Hogrebe & Tate, 2017; Holme, Diem & Welton, 2014). Therefore, the geographic location of a school can have an impact on the principal. By using the geospatial perspective when examining the relationships between school characteristics

aggregated to the district level and principal turnover, I explored the extent of local variation of principal turnover across districts in a metropolitan area. I used the geospatial perspective to explore principal turnover research, with the emphasis on understanding turnover patterns and geographic context across districts.

Research Question

The study is guided by the following research question:

1) What is the geospatial variation by district of the relationship between school characteristics, student achievement, and principal turnover in the Denver metropolitan area?

Definition of Terms

The following terms are used throughout this dissertation.

Geospatial analysis. This term is defined as the use of spatial data in research that allows a researcher to consider the influence of geographic context on the issue (Hogrebe, 2012). Geospatial analysis is conducted using geographic information systems.

Geographic information systems (GIS). Geographic information systems (GIS) is a digital mapping technology software (Vélez & Solórzano, 2017) that is used with geospatial analysis to generate maps to examine visual patterns within the data (Hogrebe, 2012).

Metropolitan area. This term is defined as the area comprising the county containing the primary city and any adjacent counties that have a total population above 50,000 (United States Census, 2016; United States Census, 2012). The U.S. Office of Management and Budget identified 336 metropolitan statistical areas in the United States

in 2008, based on population elements (Kneebone, Nadeau, & Berube, 2011). The Colorado Department of Local Affairs uses this classification system to classify metropolitan areas in Colorado, and identified the Denver metropolitan area (Colorado Department of Local Affairs, 2017).

Percentage of students of color. The percentage of students of color enrolled in a school. In Colorado, this is defined by the Colorado Department of Education as the combined percentages of Asian, American Indian or Alaskan Native, Black or African American, Hispanic or Latino, two or more races, and Native Hawaiian or Pacific Islander students.

Principal city. A place with the largest population in an urbanized area (U.S. Census, 2012). In the Denver metropolitan area the principal city is Denver.

Principal turnover. The number of principals that have been employed at a specific school within the specified period of time.

School characteristics. This term is defined as any school-level characteristics of an individual school, including student demographics and a school's geographic location.

School locale. The National Center for Education Statistics classification code, created from the U.S. urban and rural definitions. There are four large classifications with sub-classifications. Schools are classified into city, suburban, town, or rural. Schools are sub-classified into additional codes (National Center for Education Statistics, 2017b). The following are the definitions of each school locale code created by NCES:

City – Large: Territory inside an Urbanized Area and inside a Principal City with population of 250,000 or more.

City – Midsize: Territory inside an Urbanized Area and inside a Principal City with population less than 250,000 and greater than or equal to 100,000.

City – Small: Territory inside an Urbanized Area and inside a Principal City with population less than 100,000.

Suburban – Large: Territory outside a Principal City and inside an Urbanized Area with population of 250,000 or more.

Suburban – Midsize: Territory outside a Principal City and inside an Urbanized Area with population less than 250,000 and greater than or equal to 100,000.

Suburban – Small: Territory outside a Principal City and inside an Urbanized Area with population less than 100,000.

Town - Fringe: Territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area.

Town - Distant: Territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area.

Town - Remote: Territory inside an urban cluster that is more than 35 miles from an urbanized area.

Rural - Fringe: Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster.

Rural - Distant: Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10 miles from an urban cluster.

Rural - Remote: Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

(National Center for Education Statistics, 2017b, p.1).

Student achievement. This term is defined as the status of a student's content knowledge of state standards. In Colorado, there are additional subject specific definitions:

Reading achievement. The percentage of students that scored proficient or advanced in reading on the Colorado state end of year assessment at a school.

Math achievement. The percentage of students that scored proficient or advanced in mathematics on the Colorado state end of year assessment at a school.

Suburban. This term is defined as an area outside of a Principal City and inside an Urbanized Area (National Center for Education Statistics, 2017b).

Urbanized area. This term is defined as a geographic area with the total population above 50,000 (U.S. Census, 2016).

Limitations, Delimitations, and Assumptions

Limitations. This study has several limitations. Given that relationships between variables will vary depending on local context (Hogrebe, 2012), the results from this study may not be applicable to other metropolitan areas in the United States. There are also factors outside of my control that could impact geographic variation in student achievement scores used in this study including unique demographic, cultural, political, financial, physical, and other education factors (Hanushek & Yilmax, 2011; Holme, Diem & Welton, 2014). Furthermore, there may be other factors related to principal

turnover that I did not examine in this study, including individual life events such as relocation, retirement, or promotion, that may be related to a principal's decision to stay or leave their school. Since I did not examine principal mobility patterns, I was not able to determine why a principal has left their position.

Delimitations. This study also has several delimitations. The schools that participated in the study had all school level data from the 2010-2011 school year to the 2014-2015 school year available. Schools that did not have data for these five years were excluded from this study. Additionally, schools with missing data were excluded from this study. The schools that participated in this study only enrolled students in any subset of grades K-12. Schools that only educate early childhood students will not be included in the sample, since they do not have student achievement data. I only examined public schools, and I did not include private schools in the sample. Public schools are all held accountable to the same data reporting and accountability policies, whereas private schools may not report data in the same way. To keep the data consistent, only public schools were included in this study. Also, I only examined principal turnover in the Denver metropolitan area

Assumptions. There are also several assumptions within this study. I assumed that the data for school achievement were an accurate representation of student content knowledge on state end of year exams. I also made the assumption that tracking how many principals a school has had in the period of time from 2010-2011 to 2014-2015 accurately represented current principal turnover patterns in the Denver metropolitan area. I further assumed that the relationships between school level characteristics and

principal turnover varied by school district within a metropolitan region, and this warranted further examination.

Significance of the Study

Contribution to literature and theory. In this study, I examined principal turnover in a metropolitan area based on the call in existing research to conceptualize the definition of urban in education (Posey-Maddox, 2014). This study was a response to this call and includes both urban and suburban areas in its sample to examine the issue of principal turnover. While previous researchers have examined urbanicity related to principal turnover (DeAngelis & White, 2011; Gates, Ringel, Santibañez, Guarino, Ghosh-Dastidar, & Brown, 2006; Podgursky, Ehlert, Lindsay, & Wan, 2016) the studies have not been designed to examine the differences in factors related to principal turnover between urban and suburban school districts. I addressed this gap in the literature.

I also incorporated geospatial analysis, a methodological perspective that is frequently overlooked in education research (Hogrebe, 2012; Lubienski & Lee, 2017; Morrison & Garlick, 2017). My use of geospatial analysis added to the extant literature base through the integration of traditional quantitative methodology and spatial data (Hogrebe, 2012; Lubienski & Lee, 2017; Vélez & Solórzano, 2017). This combination of methods creates a transdisciplinary approach (Vélez & Solórzano, 2017), since it uses traditional quantitative methodology already found in education research and combines it with a methodological approach used primarily in economics, sociology, geology, and marketing (Lubienski & Lee, 2017; Vélez & Solórzano, 2017). Using these two approaches allowed me to examine principal turnover and its relationship to geographic

location, and this underutilized methodological approach has the potential to help researchers gain new understanding about how place relates to educational issues (Vélez & Solórzano, 2017).

Contribution to practice in the field. The findings from this study will help inform district principal retention practices in both urban and suburban school districts. Given the research that suggests that school improvement efforts require a principal to be at their school for extended periods of time (Fuller, Orr, &Young, 2008), it is paramount that districts retain their principals. There are many reasons why a principal may leave their school, and in this study, I examined the geospatial variation between several school level factors and principal turnover. This study helped provide information to districts on factors not related to principal turnover, so districts can prioritize their principal support efforts. Districts would be able to use the findings from this study to examine how they are currently supporting principals in schools that have the highest rates of turnover and be able to re-envision their current professional development practices based on research.

Contribution to policy. In 2015, Congress enacted the Every Student Succeeds Act (ESSA) which replaced the No Child Left Behind Act of 2002 (United States Department of Education, 2017). Under ESSA, states are able to allocate a portion of federal funding to support principal leadership, including principal retention (Herman, Gates, Chavez-Herrerias, & Harris, 2016). Findings from this study will help inform policy efforts related to principal retention, through its investigation of factors related to principal turnover. Policymakers could use the results from this study to help determine how to allocate federal funding related to principal retention practices.

The use of the geospatial perspective in this study enhances policy research since it will show the extent of local variation in this issue (Hogrebe, 2012). Geospatial analysis is easily applied to policy research, since it enables that data to be examined in the larger context of neighborhood demographics and the context of other nearby schools (Lubienski, Gulosino, & Weitzel, 2009). This perspective enables researchers to determine patterns across context which can influence policy analysis (Lubienski, Gulosino, & Weitzel, 2009). Specifically, I provided evidence regarding the variation of principal turnover in urban and suburban areas, which can help policymakers understand principal retention in a large metropolitan area.

Chapter Conclusion

I began this chapter with a review on the state of education in the United States before discussing demographic shifts that have occurred in our nation's schools over the last decade. I introduced problems associated with the demographic shifts, and how principals are well positioned to address these issues. I then presented information on the importance of school principals, the current principal turnover rate, and the consequences of frequent principal turnover. I provided context regarding the Denver metropolitan area and demographic shifts before introducing the study's purpose, research questions, theoretical framework, definitions of terms, limitations, delimitations, and assumptions. I concluded with the significance of this study for literature, the field, and policy.

In the subsequent chapter, I will provide a review of the research related to the definition of urban, GIS, and principal turnover. This information helped inform the research methodology in Chapter 3.

Chapter II

REVIEW OF THE LITERATURE

In this chapter, I will first review the inclusion and exclusion criteria for the literature review, followed by how the literature review was bounded. Next, I will explain the specific search strategies I used for the review of the literature. Following this, I present the review of the literature and discuss the definitions of urban and suburban, the benefits and use of geographic information systems (GIS), and how GIS is used in education research. I used the next section of the literature review to focus on extant literature on principal turnover. Finally, I end the review of the literature with a discussion of the gaps and limitations in the extant literature followed by a critique of the methodology in the literature.

In this study, I used inclusion and exclusion criteria for the review of the literature. The inclusion criteria for my literature review was: 1) the study must be written in English, 2) the study must be conducted in the United States, and 3) the study must address urban or suburban definitions, GIS, or principal turnover or mobility in the field of education. My initial exclusion criteria was: 1) turnover or mobility literature not related to the field of education, 2) studies from 2007 to 2017 unless they are a seminal study cited in multiple current studies on principal turnover and 3) non-scholarly websites, blogs, or news articles. There were several guiding questions used for this review of the literature: 1) How does literature define urban and suburban?, 2) What are

the benefits of GIS and how is it used in research both in the field of education and outside of it?, and 3) What factors are associated with principal turnover?

To find potential studies to include in my literature review I used a variety of search strategies. First, I used the University of Denver's library search engine, Compass, to conduct a preliminary search. I also used SAGE Premier as a primary search database, which houses articles from over 600 journals. In addition to this database, I searched directly in peer-reviewed journals that publish education-related articles. Specifically, I searched in the *Educational Administrative Quarterly*, *Educational Policy Analysis*, the *American Educational Research Journa*l, the *Review of Educational Research*, *Educational Evaluation and Policy Analysis*, *Leadership and Policy in Schools*, *Educational Research Review*, and *Urban Education*. I also used Google Scholar to identify articles not previously found in the other databases or journals. I used ProQuest Central to specifically look for dissertations in the search results, since it is one of the databases that many universities use to house completed dissertations.

For this literature review I used both back-searching and forward-searching (Card, 2016). For each article found, I reviewed the article's references to identify additional articles on the topic. Additionally, I used forward searching once an article was found to find additional sources that have cited this article. Using both of these techniques helped me find more research on my topic to include in literature. In order to address biases that may be due to the file-drawer problem (Card, 2016), I did not exclude dissertations, conference presentations, or other unpublished works from my search results. Furthermore, when conducting back-searching, I specifically looked at the references for

dissertations or conference presentations. I used several different combinations of keywords to search for studies including variations of "definition of urban," "definition of suburban," "geographic information systems AND/OR GIS", "principal turnover," "principal attrition," and "principal mobility."

Defining Urban and Suburban

The United States Census Bureau began formally identifying urban areas with the 1870 census, but it was not until the 1950s that the Census Bureau created an official definition for urban areas (Ratcliffe, Burd, Holder, & Fields, 2016). As residential patterns have changed over the years, the Census Bureau has adapted its definition of urban (Ratcliffe et al., 2016). The current Census Bureau definition of urban identifies two types of urban areas: Urbanized Areas, which consist of 50,000 or more people and Urban Clusters, which consist of at least 2,500 and less than 50,000 people (United States Census, 2016). The Census Bureau's definition of urban is used to create geographic boundaries which allocate federal funds to local, state, and tribal governments and legislative districts and school district assignments (United States Census, 2017).

While the Census Bureau provides a clear definition for urban, it does not provide a definition for suburban (United States Census, 2016). The Census Bureau only recognizes two areas: urban and rural (United States Census, 2016). The Census Bureau defines rural areas as "all population, housing, and territory not included within an urban area" (United States Census, 2016, p. 1). This lack of a formalized definition led to the emergence of many competing definitions of suburban (Forsyth, 2012). To address this issue, the National Center for Education Statistics (NCES) has created a clear definition

for suburban that aligns with the Census Bureau's framework for classifying areas, which was used throughout this study. According to NCES, suburban can be defined as "an area outside of a Principal City and inside an Urbanized Area" (National Center for Education Statistics, 2017b, p. 1). This definition relies on the Census Bureau's definition of Urbanized Area, which means suburban areas must have 50,000 or more people, providing clear population and geographic parameters.

While the Census Bureau and NCES definitions are based on population size, the terms urban and suburban often have additional race and class connotations (Posey-Maddox, 2014). In the media and in popular culture, the term urban connotes a low income area with a majority of people of color (Posey-Maddox, 2016). In contrast, suburban connotes a middle class area with a majority of White families. Stereotypes of chocolate cities and vanilla suburbs (Frey, 2011) have emerged from these connotations and have remained ingrained in general culture even though demographic shifts have occurred in the last decade, rendering these stereotypes obsolete (Dreier, Mollenkopf, & Swanstrom, 2014; Frankenberg & Orfield, 2012; Orfield, 2002; Posey-Maddox, 2014; Posey-Maddox, 2016; Stuart Wells et al., 2009).

Given the still-present race and class connotations regarding the terms urban and suburban, it is therefore important for researchers to rely on official population based definitions to design studies. The definitions created by the Census Bureau and NCES are based solely on population size and not demographic characteristics or outdated stereotypes. If imprecise definitions are used in studies examining data with a spatial component, there is the potential to mask inequity in educational research (Posey-

Maddox, 2014). For example, if a study is concerned with inequitable disciplinary practices used with students of color, but only examines practices used in urban schools, there is the potential for students of color who also experience inequity in suburban schools to be ignored. Additionally, if researchers do not challenge these outdated stereotypes, there is the potential that education leaders and policy makers will continue to make assumptions that 'White middle class suburbs' do not have the same issues as urban areas and therefore are not in need of additional funding or resources (Forsyth, 2012).

To assist with accurate research design, there are several methodological tools that have emerged in the last several decades that can incorporate Census definitions and geographic boundaries. One of the most prominent tools is geographic information systems (GIS), which uses an objective, data based approach to explore spatial issues.

Geographic Information Systems (GIS)

In the last 30 years, the construction of maps has become digitalized, and the creation of computer software has enabled geographers to more accurately study issues of space (Vélez & Solórzano, 2017). GIS is an electronic database that constructs maps through layers of information, which helps to uncover relationships in data (Fombuena, 2016; Vélez & Solórzano, 2017). GIS has been adopted in many fields, including government, military, healthcare, housing, crime, environmental science, economic, city planning, sociology, and marketing (Lubienski & Lee, 2017; Vélez & Solórzano, 2017). Recently, GIS has become more accessible to non-government and community groups and they are using the technology to design their own maps (Vélez & Solórzano, 2017).

As the availability of digital data and computer usage has increased in recent decades, so has the use of GIS (Lubienski & Lee, 2017).

There are several benefits in using GIS to analyze data and create maps. GIS enables geospatial analysis which can help researchers find patterns in the data within and across different geographic contexts (Lubienski, Gulosino, & Weitzel, 2009). Furthermore, once the data has been transformed onto a map, it is easier to determine if there are spatial relationships in the data, since people's brains automatically recognize visual patterns (Morrison & Garlick, 2017). On a map, researchers can determine if data is clustered spatially along specific land features, such as mountains or roads, and if the data is randomly distributed (Morrison & Garlick, 2017). This data visualization allows researchers to then ask additional questions about their data, and further investigate why relationships are occurring (Morrison & Garlick, 2017). Finally, GIS is able to create maps based on findings. These maps can make findings more accessible and engaging to the general public than traditional data displays (Fombuena, 2016; Vélez & Solórzano, 2017), especially for people without advanced statistical backgrounds.

GIS is widely used in other fields and has several benefits, but its use in education research has been limited (Hogrebe, 2012; Lubienski & Lee, 2017; Morrison & Garlick, 2017; Vélez & Solórzano, 2017). While education research is well suited for the use of GIS, there have been several challenges to its adoption (Hogrebe, 2012; Morrison & Garlick, 2017; Lubienski & Lee, 2017). First, educational researchers have not been widely trained in the use of GIS to analyze data, nor has education data been considered to have a spatial component (Hogrebe, 2012; Morrison & Garlick, 2017). GIS is also a

complex tool to learn and gain proficiency in, and in the past GIS has been expensive (Morrison & Garlick, 2017). Furthermore, there is strong disciplinary divide between education research and research in other fields that has impeded the cross-over of GIS to education research (Lubienski & Lee, 2017).

Although there have been challenges associated with the widespread adoption of GIS in education research, education data is ideal for geospatial analysis. Researchers can use GIS to examine education data for policies in the context of geographic locations (Lubienski, Gulosino, & Weitzel, 2009). They can also use GIS to help examine the role of space and place in education, and uncover trends related to the social, cultural, political, and historic aspects of schools (Vélez & Solórzano, 2017). GIS can highlight how geographic or spatial features can maintain racial divides in education, or how it can limit access to educational opportunities (Vélez & Solórzano, 2017). Overall, the creation of maps enables researchers to understand how space impacts individual lives in education (Vélez & Solórzano, 2017).

Furthermore, even though the use of GIS in education is relatively new, there have been some studies that have adopted GIS as a methodological approach to examine issues in education. Lubienski, Gulosinoi, & Weitzel (2009) used GIS to examine school choice opportunities and equitable access for students in the Detroit, Washington, D.C., and New Orleans metropolitan areas. Misra, Grimes, & Rogers (2012) used GIS to examine school competition as part of the school choice process for schools in Missouri. Yoon and Lubienski (2017) conducted a mixed methods study incorporating GIS to examine the school choice patterns of urban families. Additionally, Hogrebe and Tate

(2017) used GIS to examine opportunity and access to advanced mathematics courses in school districts across Missouri. Finally, Hidalgo (2017) used qualitative methods and GIS to create maps that were visual representations of undocumented Latinx people's experiences in South Phoenix. Although GIS has been incorporated into education research relatively recently, it has been included in both quantitative and qualitative approaches, highlighting the ability of GIS to complement multiple types of research methodology.

Given the GIS's suitability for examining education data, and its ability to complement quantitative approaches, GIS could also be used in research studies on principal turnover. While studies on principal turnover have not typically included GIS as a methodological component in their research design, principal turnover does have a spatial component. A review of the extant literature on principal turnover indicates that studies have primarily focused on discovering relationships between a principal's demographics, school characteristics, student achievement and principal turnover while using quantitative methodology. In this next section of the review of the literature I will discuss prior studies on factors related to principal turnover.

History of Principal Turnover Literature

Before researchers turned their attention to principal turnover, researchers focused on teacher turnover and labor markets. Literature on teacher attrition began to emerge in the 1980s in response to concerns about teacher shortages as populations in the United States grew and the existing workforce began to retire (Borman & Dowling, 2008). Subsequent research on teacher turnover was created to address this issue and

inform practices that could help maintain the supply of teachers and retain existing professionals (Borman & Dowling, 2008). Studies examining teacher turnover increased in the 1990s following the administration of the nationwide National Center for Education Statistics (NCES) Schools and Staffing Survey and the Teacher Follow-Up Survey in 1988, which provided a national dataset on teacher demographics and mobility patterns that researchers could use (Borman & Dowling, 2008; National Center for Education Statistics, 2017a). Since its first administration, this survey has been administered an additional seven times and has resulted in over 100 publications on teacher attrition (National Center for Education Statistics, 2017a; National Center for Education Statistics, 2017c).

While studies on principal turnover were conducted in the 1980s, research on principal turnover did not emerge on a larger scale until the mid-1990s and 2000s. In recent decades a larger number of principals have been approaching the age of retirement at the same time, reform policies have changed the job of the principal, and research interest on principal effectiveness has increased (Mascall & Leithwood, 2010). These factors have led an increased interest in the study of principal retention and attrition. Additionally, large scale data sets have become more widely available which provides researchers additional sources of information on principal turnover and mobility. For instance, the nationwide NCES Principal Follow-Up Survey was first administered in 2008, with the second administration occurring in 2012 (National Center for Education Statistics, 2017a). In contrast to the numerous publications on teacher turnover, the data from these two survey administrations have only been used in

approximately 6 publications on principal turnover (National Center for Education Statistics, 2017c). Although teacher turnover has been a vastly researched issue, research on principal turnover is still an emerging field.

While many of the studies on principal turnover have used the data from the NCES School and Staffing Survey and the Principal Follow-Up Survey (Berry, 2014; Miller, 2014; Ni, Sun, & Rorrer, 2016; Tekleselassie & Villarreal, 2011), research on principal turnover has also been conducted at the state and local levels (Akiba & Reichardt, 2004; Anthony, 2016; Baker, Punswick & Belt, 2010; Beckett, 2016; Beckett, 2017; Blazer, 2010; DeAngelis & White, 2011; Fuller, Young, & Orr, 2007; Gates et al., 2006; Loeb, Kalogrides & Horng, 2010;; Young & Fuller, 2009). Extant literature on principal turnover has focused primarily on variables related to a principal's personal demographics and school characteristics.

Demographic Characteristics

Researchers have examined the relationship between a principal's race, gender, educational history and principal turnover. Many researchers found that there was no relationship between principal turnover and a principal's race/ethnicity (Berry, 2014; Blazer, 2010; Fuller, Young, & Orr, 2007; Tekleselassie & Villarreal, 2011; Yan, 2016; Young & Fuller, 2009). Furthermore, Gates et al. (2006) examined the probabilities of a principal leaving their position if the principal was the same race as that of the majority of students in the school, and found that there was no effect if a principal's race was the same as the majority of the students in the school on the probability of a principal leaving their position in North Carolina. In Illinois, Gates et al. (2006) found

that in a primarily black school with 100% students of color the turnover rate is 18% of White principals will leave their school compared to 15% of Black principals. However, this is a predictive model, and the likelihood of a school having all students of color and a Black principal is low, given that in 2000, the year Gates et al.'s (2006) data set is from, only 38% of all students in North Carolina schools were students of color, compared to 61% White students (Public Schools of North Carolina, 2000). Furthermore, Gates et al. (2006) also state that only 15.5% of principals in their data set were Black. Therefore, the results from Gates et al. (2006) study that Black principals in Illinois leave their school at lower rates than White principals should be interpreted with caution.

Researchers have also examined the relationship between a principal's gender and retention. The results from one group of studies found that male principals are more likely to leave their schools than female principals (Baker, Punswick, & Belt, 2010; Berry, 2014; Blazer 2010; Gates et al., 2006; Tekleselassie & Villarreal, 2011). However, the results from another group of studies found that the gender of a principal has no relationship with principal turnover (Anthony, 2016; Fuller, Young, & Orr, 2007; Ni, Sun, & Rorrer, 2015; Young & Fuller, 2009). The results for the relationship between a principal's gender and turnover have been mixed.

Additionally, researchers have examined the relationship between a principal's educational history and principal turnover. They found that the highest degree a principal obtained, the type of principal preparation program the principal attended, and the certification scores of a principal were not related to principal turnover (Baker,

Punswick, & Belt, 2010; Berry, 2014; Blazer, 2010; Papa, 2007; Young & Fuller, 2009). Based on the results from these studies, it can be concluded that there is limited evidence that supports a significant relationship between then educational history of a principal and principal turnover.

Overall, the demographic characteristics of a principal do not appear to have a significant relationship with principal turnover. The only characteristic that some studies have found to be associated with principal turnover is a principal's gender. However, there have also been a group of studies that have suggested that a principal's gender is not related to principal turnover. The results from these studies have varied depending on the state the study was conducted in. The geographic context for these studies may help to explain why there has been a variation in significance across the United States, and the geospatial perspective would be useful in determining this geographic variation.

School Characteristics

In addition to research on a principal's demographic characteristics, research has been conducted examining the relationship between school-level characteristics and principal turnover. Researchers found that the school-level variables of urbanicity, grade levels, school size, racial composition, and poverty index are related to principal turnover (Akiba & Reichardt, 2004; Baker, Punswick, & Belt, 2010; Battle, 2010; Berry, 2014; DeAngelis & White, 2011; Gates et. al, 2006; Fuller, Young, & Orr, 2007; Papa, 2007; Partlow, 2007; Partlow & Ridenour, 2008; Tekleselassie & Villarreal, 2011; Yan, 2016; Young & Fuller, 2009).

Urbanicity. Researchers have found that principals in urban schools tend to leave their schools at higher rates than principals in suburban schools in Illinois, Ohio, Wisconsin and Texas (DeAngelis & White, 2011; Partlow & Ridenour, 2008; Podgursky, Ehlert, Lindsay, & Wan, 2016; Young & Fuller, 2009). Using data from the 2012-2013 NCES Principal Follow Up Survey, Goldring, Taie & Owens (2014) and Yan (2016) found that nationwide, principals leave their schools more frequently at schools located in the city than schools located in suburbs, towns, or rural areas. In Goldring, Taie, & Owens' (2014) report, 26% of principals in the study left their position in cities, 22% of principals left their position in the suburbs, 21% of principals left their positions in towns, and 22% left their positions in rural areas. Yan (2016) also arrived at the conclusion that principals in city have a higher probability of leaving their position than principals in rural areas.

However, while Goldring, Taie, & Owens (2014) and Yan (2016) used the NCES classification for school locale that provides a specific definition for location based on population size and Census Bureau definitions, the other studies that examined urbanicity do not provide clear definitions or rational regarding their geographic classifications systems. For example, Podgursky et al. (2016) used a categorical variable of urban versus non-urban in their study, but it is unclear what the non-urban category included. Without specific information regarding classification systems, it is difficult to determine the validity of the findings in this study, since it is possible schools are misclassified according to Census Bureau and NCES definitions. A categorical classification of urban

vs. non-urban also oversimplifies the geographic location of a school, and may lead to an overstatement of results.

Furthermore, with the exception of Goldring, Taie, & Owens (2016) and Yan (2016), researchers that have examined urbanicity and its relationship to principal turnover have used outdated longitudinal data sets. Podgursky et al. (2016) used a dataset that examined mobility from 2006 to 2011, Partlow and Ridenour (2008) used a data set from 1996 to 2003, DeAngelis and White (2011) used a dataset from 2001-2008, and Young and Fuller (2009) used a dataset from 1996 to 2008. Given the amount of demographic change that has occurred within the last ten years (Dreier, Mollenkopf, & Swanstrom, 2014; Frankenberg & Orfield, 2012; Howell & Timberlake, 2013; Orfield, 2002; Posey-Maddox, 2014; Posey-Maddox, 2016; Stuart Wells et al., 2012; Stuart Wells et al., 2009), there is a need to examine principal turnover patterns using current datasets. Current datasets would more accurately represent the demographic patterns of urban and suburban schools and would help determine principal turnover patterns in these geographic contexts.

Grade levels and school size. Researchers have indicated that elementary school principals have longer tenures at their school than secondary principals in Missouri, Florida, Illinois, Texas, and North Carolina (Baker, Punswick, and Belt, 2010; DeAngelis & White, 2011; Fuller, Young & Orr, 2007; Gates et al., 2006; Golding, Taie, & Owens, 2014; Yan, 2016). Goldring, Taie, and Owens (2014) and Yan (2016) also found that in a nationwide sample elementary school principals were more likely to stay at their schools than high school principals. Yan (2016) found that principals in secondary schools were

45% times more likely to move to another school, 42% times more likely to leave the education system, and 78% more likely to leave their position due to a promotion to a district central office position. Yan's (2016) study provides some insight into the why high school principals may be more likely to leave their positions, due to the high probability that they will be selected for a position at their district's central office.

Several studies have also been conducted on the size of a school and its relationship to principal turnover, however, the results have been mixed. A group of studies found that principal turnover is more likely to occur in schools with a large student enrollment (Akiba & Reichardt, 2004; Blazer, 2010; Papa, 2007). However, another group of studies found that principals are more likely to leave schools with a small student enrollment (Berry, 2014; DeAngelis & White, 2011; Podgursky et al., 2016). The results from these studies have also varied depending on geographic area without a consistent pattern. For example, large schools have predicted turnover in Colorado, Florida, and New York, states that do not have geographic similarities.

While studies have been conducted regarding grade levels, school size, and principal turnover at both state-level and national level, it is unclear how the results may vary depending on an urban or suburban context. In these cases, the researchers used global statistics to make claims regarding principal turnover patterns without knowing the variation of the local statistics (Hogrebe, 2012). Using the geospatial perspective, it is therefore unclear if the findings presented in these studies are reliable (Fotheringham, Brundson, & Charlton, 2002). Additional research is needed to examine the relationship between the grade level of a school, school size, and principal turnover to truly

understand the difference between turnover patterns in urban and suburban schools before claims about an aggregate area can be made.

Student demographics. Many researchers have found that schools with higher percentages of students of color experience more principal turnover than schools with lower percentages of students of color (Beckett, 2016; Béteille, Kalogrides, & Loeb, 2012; Gates et al., 2006; Papa, 2007; Yan, 2016). Principal turnover also occurs more frequently in schools serving more students living in poverty (Béteille, Kalogrides, & Loeb, 2012; Fuller, Young, & Orr, 2007; Goldring, Taie, & Owens 2014; Superville, 2014; Young & Fuller, 2009). In one urban school district in Florida, 26% of principals in high poverty schools left each year compared to 17% of principals in low poverty schools (Béteille, Kalogrides, & Loeb, 2012). Superville (2014) has also stated that principal turnover is a greater problem at high poverty schools, where 27% of principals leave each year, compared to 20% of principals at higher income schools.

However, from these studies, it is unclear how principal turnover patterns vary depending on geographic location. Extant literature indicated that student demographic characteristics of a school are predictive of principal turnover, yet the previous literature did not consider the spatial component of the data (Hogrebe, 2012). In metropolitan areas high poverty students of color are usually clustered in specific areas (Orfield, 2002) and there may be a spatial reason for locations of the data (Morrison & Garlick, 2017). Therefore, the relationships between student demographic characteristics and principal turnover may vary across an area, and student demographic characteristics may only predict principal turnover in one part of an area instead of an entire region. The existing

studies on principal turnover have not considered these factors, and additional research is needed to address these issues.

Student Achievement

While student achievement used to only be measured by state end of year exams, alternate measures of student achievement have emerged in the last decade (Betebenner, 2009). Measures of student achievement can be classified as belonging to one of two categories: status model scores or growth model scores. Status model scores are the traditional measure of student achievement (Amrein-Beardsley, 2008) and they examine student performance at one point in time, such as on a state end of year assessment (Betebenner, 2009). Researchers and policymakers use the status model scores as an indicator for school performance (Goldschmidt & Choi, 2008). The standard method of determining school performance has been status model scores, where student performance is evaluated based on the percentage of students that meet or exceed proficiency standards (U.S. Department of Education, 2011).

School performance. Researchers have suggested that a school's performance has a relationship with principal turnover (Blazer, 2010; Loeb, Kalogrides, & Horng, 2010; Podgursky et al., 2016; Young & Fuller, 2009). Young and Fuller (2009) examined principal tenure in Texas related to school performance. They found that in elementary schools principal tenure was longer in the highest performing schools compared to the lowest performing schools. The principals at the highest performing elementary schools were almost 40% more likely to stay at the same school compared to principals at the lowest performing elementary schools (Young & Fuller, 2009). DeAngelis and White

(2011) also found that a school's Adequate Yearly Progress (AYP) score was also related to whether a principal stayed at or left their school. Principals in schools that made AYP targets had significant lower odds of leaving their schools compared to principals that fail to make AYP targets. Additionally, 75.1% of principals in schools that did not make AYP stayed at their school compared to 79.1% of principals that did make AYP. Burkhauser et al. (2012) also found in six districts across the United States that principals in schools who met their AYP targets in the years prior to starting their position in the school were less likely to leave after one or two years compared to principals that started positions in schools that did not meet AYP targets. In a recent study Yan (2016) found that principals in schools that met their AYP targets were 28% less likely to move to another school.

Status model scores. Additionally, several researchers have found that status models scores are associated with principal turnover. Loeb, Kalogrides, and Horng (2010) found that in Florida principals prefer to work in schools with fewer low-achieving students, as measured by status model scores. In their study, they found that few principals in low-achieving schools were still working at their original school after 10 years compared to 40% of principals in high-achieving schools (Loeb, Kalogrides, & Horng, 2010). DeAngelis and White (2011) used multivariate analysis to examine principal turnover in the Illinois public school system from 2001 to 2008. They found that 73.5% of principals working in low achieving schools as measured by status model scores remained at their schools compared to 80.3% of principals in high achieving schools. Béteille, Kalogrides and Loeb (2012) found in their examination of schools in

Florida that 30% of principals in schools with high percentages of low-achieving students would leave their school each year, compared to 15% of principals with low percentages of low-achieving students. Finally, Podgursky et al. (2016) found that principals in Minnesota and Wisconsin were significantly less likely to leave their schools if their school had a higher average academic performance based on status model scores. Overall, the findings indicate that principals leave lower performing schools at higher rates compared to principals at higher performing schools (Blazer, 2010; Podgursky et al., 2016).

Researchers have also found that subject specific achievement scores are associated with principal turnover (Beckett, 2017; Ni, Sun, & Rorrer, 2015; Partlow, 2007). Partlow (2007) used stepwise regression with a dataset in Ohio from 1997 to 2003 to examine predictors of principal turnover. In her model the only variable that was predictive of principal turnover was the percentages of students that passed the state end of year mathematics achievement test. She found that when there is a .01 increase in the percentage of students who passed 4th grade math achievement tests, there is a decrease in principal turnover. Ni, Sun, and Rorrer (2015) also found that in Utah math student achievement was negatively associated with principal turnover; the increase of one standard deviation of math scores lowered the odds of principals leaving their school by 35%, and leaving the principalship by 44%.

In an effort to explain why principals leave low-achieving schools Combs, Edmondson, & Jackson (2009) conducted a survey of 4,206 elementary school principals and found that testing and accountability pressures were related to job burnout, which is

linked to principal attrition. McVay (2007) and Stoelinga, Hart, and Schalliol (2008) also found in interviews with principals that contributing to improvements in school achievement, such as raising test scores, created job satisfaction, which promotes principal retention. Subsequently, principals in low-achieving schools may be more likely to leave due to the increased difficulty of raising test scores, and the increased pressures from the state or district to raise student achievement scores.

Summary and Gaps in the Literature

Based on the literature I reviewed, I determined that school-level characteristics and locational context are important in understanding principal turnover. Several researchers examined individual characteristics of principals, however, overall most of these characteristics are not associated with principal turnover. The studies I reviewed indicate that several school characteristics are predictive of principal turnover. The extant literature indicates that in particular the student demographics of race and poverty consistently predict principal turnover in different locational contexts, while other school characteristics such as grade level and school size may be associated with principal turnover, depending on the geographic location. Overall, school level characteristics have a stronger relationship with principal turnover than individual principal characteristics.

However, there are several gaps in the literature. As previously mentioned, many extant studies used longitudinal datasets that are outdated. Most studies on principal turnover have used datasets that are more than ten years old (Akiba & Reichardt, 2004; Baker, Punswick, & Belt, 2010; Berry, 2014; DeAngelis & White, 2011; Gates et al., 2006; Papa, 2007; Partlow, 2007; Partlow & Ridenour, 2008; Loeb, Kalogrides & Horn,

2010; Podgursky et al., 2016; Tekleselassie & Villareal, 2011; Young & Fuller, 2009) and a nationwide survey on principal mobility has not been conducted since 2012-2013 (Goldring, Taie, & Owens, 2014). Given the changes in educational policy throughout the last decade and the dramatic demographic shifts, the findings from the previous studies may no longer be valid. However, without recent data is it difficult to assess if principal turnover patterns have remained constant with the implementation of new educational policies that have drastically changed the U.S. education system and the increased movement of students of color to suburban areas.

Furthermore, extant studies on principal turnover have indicated that urbanicity is a predictive factor of principal attrition (DeAngelis & White, 2011; Gates et al., 2006; Podgursky et al., 2016), but researchers did not examine local statistics before making claims regarding global statistics. Researchers have used large state-wide longitudinal data sets that included urbanicity as a variable within their study (DeAngelis & White, 2011; Gates et al., 2006; Podgursky et al., 2016), but they did examine the extent of local variation in urban or suburban districts within a metropolitan area. It is important to consider the interaction between a school's location and the school's characteristics in educational research (Hanushek & Yilmaz, 2011) and the composite findings from the extant literature on principal turnover highlight the importance of local variation in understanding principal turnover. While several researchers have used similar data sources and examined the same variables, the results have varied based on geographic location which is consistent with Tekleselassie and Villarreal's (2011) findings that principal departure and mobility intentions depend on the geographic areas where

principals work. In order to better understand this variation in the extant literature, it is important to use the geospatial perspective to help frame the geographic effect on principal turnover. The extant literature also reinforces Hogrebe (2012) and Hogrebe and Tate's (2012; 2017) argument for using the geospatial perspective in research, since relationships between variables will vary depending on geographic location.

Extant literature has also not been consistent in classifying regions based on Census Bureau definitions and NCES sub-classification. It is important to use consistent definitions based on population size to avoid racial and class connotations factoring into urban or suburban classifications. Given the amount of demographic change that has occurred in the last ten years in urban and suburban areas, using consistent definitions in research is paramount in order to facilitate study comparisons. Furthermore, using definitions consistent with the Census Bureau allows for greater implications to be made outside the field of education since the same measurement system is being used.

The main methodologies used in the extant literature were quantitative approaches. A variety of quantitative methodology has been employed, but the majority of studies have used associational techniques ranging from multilevel modeling to multinomial logistic regression, with the purpose of uncovering relationships between individual and school level factors and principal turnover. One main advantage of this methodology is it is able to powerfully estimate the effects of the independent variables on the dependent variable (Keith, 2015). However, quantitative approaches on their own do not consider the spatial component of education data, and do not consider how local context may interact with the variables.

To address some of the gaps in literature and methodologies, geospatial analysis and GIS could be used to help determine the geographic variations of principal turnover. However, few studies have integrated geospatial analysis into educational research (Hogrebe, 2012; Lubienski & Lee, 2017). Educational research is well positioned to incorporate multiple methodologies that would address many of the current gaps in literature on principal turnover, but educational research is often characterized by disciplinary divides that prevent it from consulting methodological approaches used outside of educational research (Lubienski & Lee, 2016). GIS can create powerful displays of spatial data for diverse audiences (Vélez & Solórzano, 2017), which adds a new dimension of understanding phenomenon (Morrison & Garlick, 2017).

Chapter Conclusion

In this study, I incorporated definitions and methodology from disciplines outside of education and utilizes a transdisciplinary perspective. I used the same definitions for urban and suburban as the Census Bureau and NCES to determine the geographic classification for each school. I addressed the inconsistencies in previous literature on how urbanicity was determined for a school. Next, I also used GIS as a complement to traditional quantitative methods, which enhanced the research study. GIS allowed me to determine the locational variation of data, and see if patterns relating to principal turnover are the same in both urban and suburban areas in a metropolitan area.

I reviewed literature related to definitions of urban and suburban, a history of GIS and the benefits of this approach, principal demographics, school characteristics, and student achievement in understand the current gaps in the literature. In the next chapter, I

will further explain the research methodology used in this study, including the research design, data sources, sample, estimation strategy, and ethical considerations.

Chapter III

METHODOLOGY

I will begin this chapter with a description of the research design used in this study followed by the data sources. I will then describe the sample used in this study and the estimation strategy used in this study. Finally, I will review the ethical considerations of this study.

Research Design

I used a quantitative approach to examine the geospatial variation between school characteristics, student achievement, and principal turnover, and how the relationships vary by geographic location. Quantitative research is focused on examining relationships between variables (Creswell, 2014), which aligns with this study's theoretical framework. Quantitative methodology also allowed the researcher the opportunity to use a large-scale data set that includes multiple districts in the metropolitan area of Denver to address the existing gaps in the literature.

I used the geospatial perspective as the theoretical framework for this study, which suggests additional methodological approaches. Specifically, Hogrebe (2012) suggests the use of GIS as a methodological tool. GIS is an electronic database that creates maps for geospatial analysis. This approach enabled me to analyze the data in a variety of contexts in a metropolitan area and determine how principal turnover varies by geographic location.

Research Question

This study was guided by the following research question:

1) What is the geospatial variation by district of the relationship between school characteristics, student achievement, and principal turnover in the Denver metropolitan area?

Data Sources

I used publicly available data from the Colorado Department of Education (CDE). To determine the districts classified as Denver Metro for participation, I used a publically available downloadable excel file from CDE called School Codes, available on the Data Pipeline Frequently Requested Codes section of the website. I used the 2015 School Building Codes file to sort the excel spreadsheet by district setting, and used this resulting list to identify all of the districts classified as Denver Metro.

Data were obtained from CDE. A data request form was submitted to CDE to obtain a list of each participating school's principal by district for the years 2010-2015. All data on district characteristics and student achievement were publically available in downloadable Excel files on the CDE's website. These files were downloaded, and merged into one master dataset.

For geospatial analysis, I downloaded a publically available shapefile from ArcGIS Online that was created by the Colorado Department of Public Health and Environment to serve as the baselayer for mapping. This shapefile contains the school district boundaries for all Colorado school districts from the U.S. Census 2015 TIGER

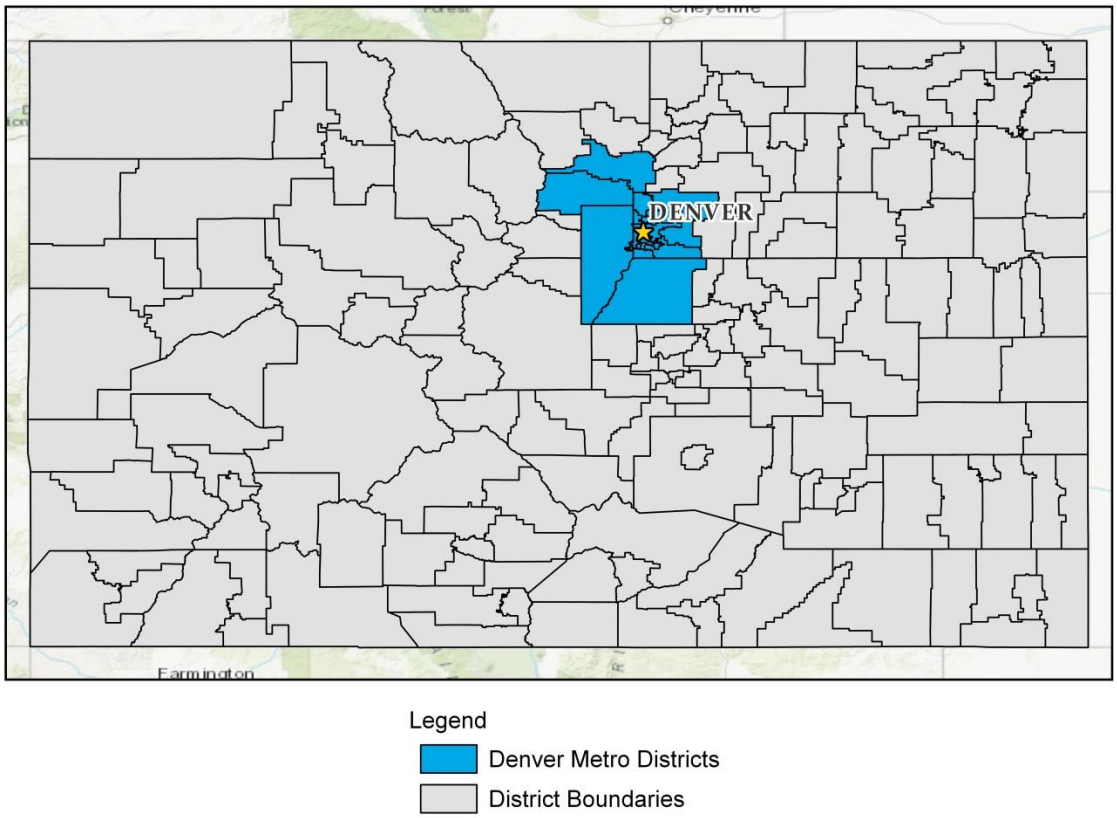
shapefile. The data from the Colorado Department of Education were spatially joined to the baselayer in order to create maps for geospatial analysis. The U.S. Census' Geocoder tool was used to get the latitude and longitude coordinates for each school location.

Sample

CDE classifies school districts based on their geographic location. Schools are assigned one of the following codes for the school's geographic location: Colorado BOCES, Denver Metro, Outlying City, Outlying Town, Remote, and Urban-Suburban. CDE provides the additional definitions for the following codes:

> Urban-suburban: Population center over 30,000 residents, but outside the Denver metropolitan area.
>
> Outlying City: Population center of 7,000 to 30,000.
>
> Outlying Town: Population center of 1,000 to 7,000.
>
> Remote: Population center of less than 1,000 (Colorado Department of Education, 2017a, p.1)

For school districts located in the Denver metropolitan area, CDE uses the classification code of Denver Metro. The participants for this study were all school districts classified as "Denver Metro Area," totaling 15 school districts: Adams 12 Five Star Schools, Adams County 14, Adams-Arapahoe 28J, Boulder Valley RE 2, Cherry Creek 5, Denver County 1, Douglas County RE 1, Englewood 1, Jefferson County R-1, Littleton 6, Mapleton 1, School District 27J, Sheridan 2, St. Vrain Valley RE 1J, and Westminster 50. Figure 2 shows the location of the Denver metropolitan area school districts in the state of Colorado.



Source: Colorado Department of Education

Figure 2. Map of Denver Metropolitan Area School Districts in the State of Colorado

Within these 15 school districts there are 865 schools. From these 865 schools, participating schools for this study were selected based on the following inclusion criteria: 1) the school must have all school level data from the 2010-2011 school year to the 2014-2015 school year available 2) the school must enroll students in any subset of grades K-12 and 3) the school must be classified as public school by CDE.

Based on the inclusion criteria, 724 schools were selected for participation in this study. The 141 schools that were not included in this study were due to missing data. If a school did not have data for every school year from 2010 to 2015 they were excluded

from participation. There were many schools that were not open for the full five years, and therefore did not have data for all five years available. Additionally, there were some schools that closed during this time period, and did not have data available for all five years.

Estimation Strategies and Procedures

To create a master data set, I used IBM SPSS Statistics software package to clean, code, and analyze the data. To answer my research question, descriptive statistics were used along with spatial mapping to visualize the relationship between school characteristics, student achievement, and principal turnover. Five maps were created to illustrate this relationship: a map of school locale codes, a map of the percentage of students of color and principal turnover, a map of the percentage of students eligible for FRL and principal turnover, a map of the district's mean math achievement score and principal turnover, and a map of the district's mean reading achievement score and principal turnover.

Validity and reliability. Since this is a non-experimental study, traditional threats to internal quantitative validity, such as selection bias and attrition or threats to external validity, such as population validity (Gliner, Morgan, & Leech, 2016), do not apply.

Ethical Considerations

In order to preserve the ethics of this study, several ethical considerations were taken while collecting data, analyzing the data, and reporting the data. First, I avoided collecting harmful information about the participants (Creswell, 2014). Specifically, I did not collect any personal information about the principals other than their names. I did not

collect employment information including termination, promotion, or other employment statuses. While analyzing the data, I avoided disclosing only results that may be perceived positive (Creswell, 2014). The master data file was stored in a secured password protected location. I reported multiple perspectives and contrary findings (Creswell, 2014). Finally, when reporting the data, I did not disclose any principal or school names that would lead to identification of the principal or school. The data from this study will not be shared with any other parties (Creswell, 2014). All of these strategies were used to prevent ethical issues from arising during the study.

Chapter Conclusion

In this chapter I reviewed the research design, data sources, sample, estimation strategy, and ethical considerations. I used geospatial analysis through the use of GIS to determine the geospatial variance between school characteristics, student achievement, and principal turnover and its geospatial variation.

In the subsequent chapter, I will provide the findings from the study explained in the methodology. The results from the descriptive statistics will be presented first, followed by the geospatial analysis.

Chapter 4

RESULTS

In this chapter, I discuss the geospatial variation of school characteristics, student achievement, and principal turnover using descriptive statistics and GIS mapping.

Denver Metropolitan Characteristics by District

In Table 2, school characteristics for this sample are reported by district, for 2010-2015. The total number of schools in this sample was 724, with districts ranging in size from 3 schools to 158 schools. The average percent of students of color in the Denver metropolitan area was 54.78%, with districts ranging from 20.83% to 86.69% students of color. The average percent of students eligible for FRL was 50.57%, with districts serving an average of 8.99% to 86.35% students eligible for FRL. The mean math achievement score based on a scale from 150-950 in the Denver metropolitan area was 518.38, with the mean math achievement scores for districts ranging from 466.09 to 549.65.The mean reading achievement score based on a scale from 150-999 in the Denver metropolitan area was 608.33, with the mean reading achievement score for districts ranging from 565.30 to 631.60.

Table 2

School Characteristics by District, 2010-2015

District Name	Number of Schools	% Students of Color	% FRL	Mean Math Achievement Score	Mean Reading Achievement Score
Adams 12 Five Star Schools	47	46.63	42.74	510.91	594.01
Adams County 14	11	86.69	81.69	466.09	573.05
Adams-Arapahoe 28J	52	80.73	69.74	476.62	571.27
Boulder Valley RE 2	52	31.38	22.90	547.24	631.60
Cherry Creek 5	57	43.55	27.17	537.26	618.70
Denver County 1	139	79.12	73.25	493.39	587.07
Douglas County RE 1	76	20.83	8.99	549.65	630.86
Englewood 1	8	44.01	56.78	507.19	605.78
Jefferson County R-1	158	32.56	35.40	530.87	623.62
Littleton 6	22	27.24	24.73	545.66	630.96
Mapleton 1	15	74.97	73.44	497.18	594.93
School District 27J	22	53.25	38.01	512.30	605.78
Sheridan 2	3	83.82	86.35	501.12	592.56
St. Vrain Valley RE 1J	45	34.59	33.58	529.03	620.99
Westminster 50	17	82.39	83.80	468.93	565.30
Denver Metropolitan Area	724	54.78	50.57	518.38	608.33

Source: Colorado Department of Education.

Geographic Location

Hogrebe (2012) states in the geospatial perspective that locations that are closer together are often more similar than locations that are farther apart. In order to determine if this aspect of the geospatial perspective is true within the Denver metropolitan area, I created a map of the school locale codes.

While all districts within this sample are geographically classified as Denver metro by the Colorado Department of Education, each school within this sample also had a specific geographic locale code. Table 3 shows the NCES locale codes by district. The NCES locale code was created from the U.S. urban and rural definitions and provides a specific classification based on where a school is located. There are four large classifications: city, suburban, town, or rural with additional sub-classifications codes:

city-large, city-midsize, city-small, suburban-large, suburban-midsize, suburban-small, town-fringe, town-distant, town-remote, rural-fringe, rural-distant, and rural-remote. The NCES locale code provides a more detailed sub-classification based on population size and proximity to an urban area (Geverdt, 2015) than the dichotomous classification of urban or suburban, and it allows researchers to explore the nuances of geographic areas more precisely.

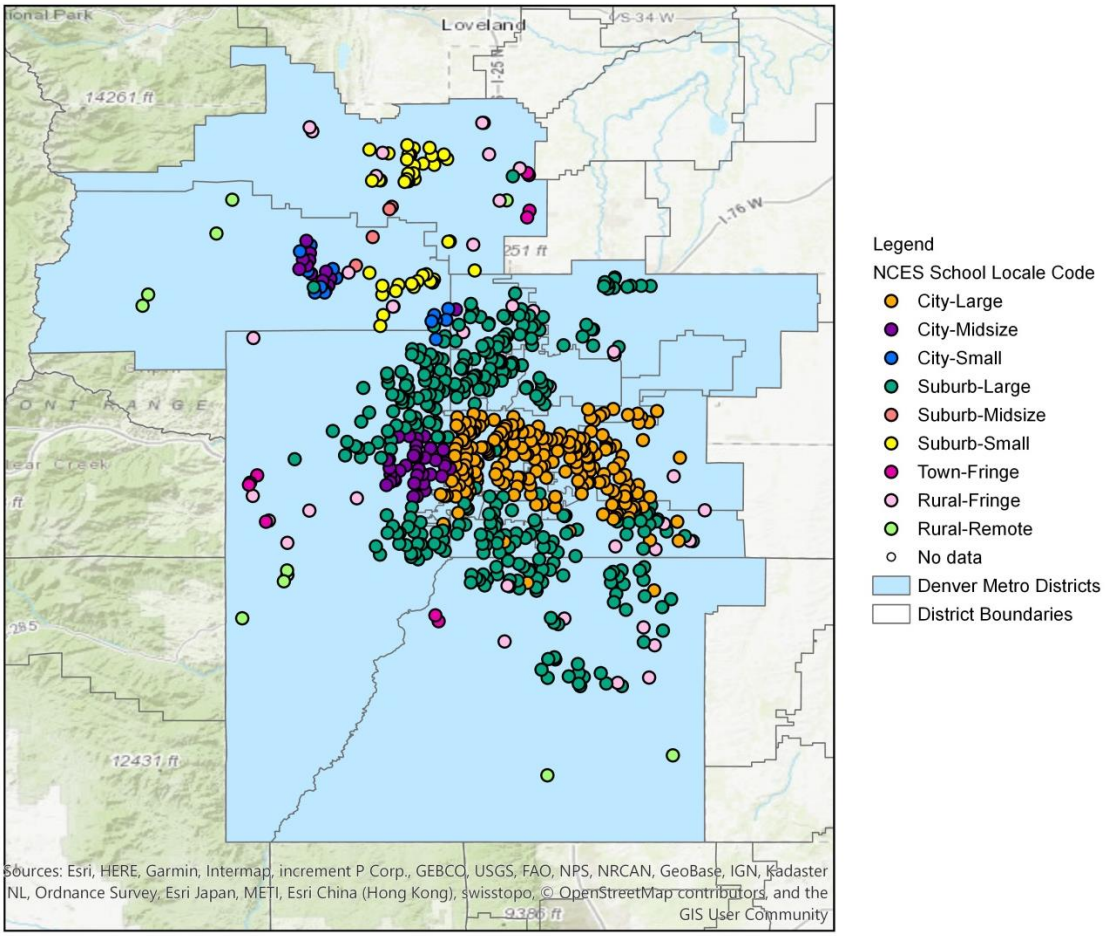
Table 3

NCES School Locale Codes by District

District Name	City-Large	City-Midsize	City-Small	Suburb-Large	Suburb-Midsize	Suburb-Small	Town-Fringe	Rural-Fringe	Rural-Distant
Adams 12 Five Star Schools	0	1	1	42	0	0	0	3	0
Adams County 14	0	0	0	10	0	0	0	1	0
Adams-Arapahoe 28J	51	0	0	0	0	0	0	1	0
Boulder Valley RE 2	0	13	14	2	2	14	0	3	4
Cherry Creek 5	23	0	0	29	0	0	0	5	0
Denver County 1	137	0	0	1	0	0	0	1	0
Douglas County RE 1	2	0	0	63	0	0	2	7	2
Englewood 1	0	0	0	8	0	0	0	0	0
Jefferson County R-1	0	39	2	103	0	0	4	6	4
Littleton 6	1	0	0	21	0	0	0	0	0
Mapleton 1	0	0	0	15	0	0	0	0	0
School District 27J	0	0	0	20	0	0	0	2	0
Sheridan 2	0	0	0	3	0	0	0	0	0
St. Vrain Valley RE 1J	0	0	0	1	2	27	4	10	1
Westminster Public Schools	0	0	0	17	0	0	0	0	0
Total	214	53	17	335	4	41	10	39	11

Source: National Center for Education Statistics.

The most frequent locale code was suburb-large, followed by the locale code of city-large. This table indicates that there are more schools that are classified as suburb than there are schools classified as city. Additionally, there are 10 schools classified as being located in a town, and 50 schools classified as being located in a rural area. Even though the district classification is the Denver metro area, there is still significant variation in the specific school location within each district. Figure 3 below illustrates variation in locale codes within the Denver metropolitan area.



Source: National Center for Education Statistics

Figure 3. Map of NCES School Locale Codes for the Denver Metropolitan Area

This map shows that there are several districts classified as part of the Denver metropolitan area, yet there are schools classified as rural based on their location. This map indicates that schools that are closer together often have similar locale codes, while schools that are farther away from each other often have different locale codes. This map confirms one of the premises of the theoretical framework, that locations that are closer together are more similar than those that are farther apart.

Geospatial Variation

Table 4 shows the number and percentage of schools that did and did not have principal turnover by district from 2010-2015.

Table 4

Principal Turnover by District, 2010-2015

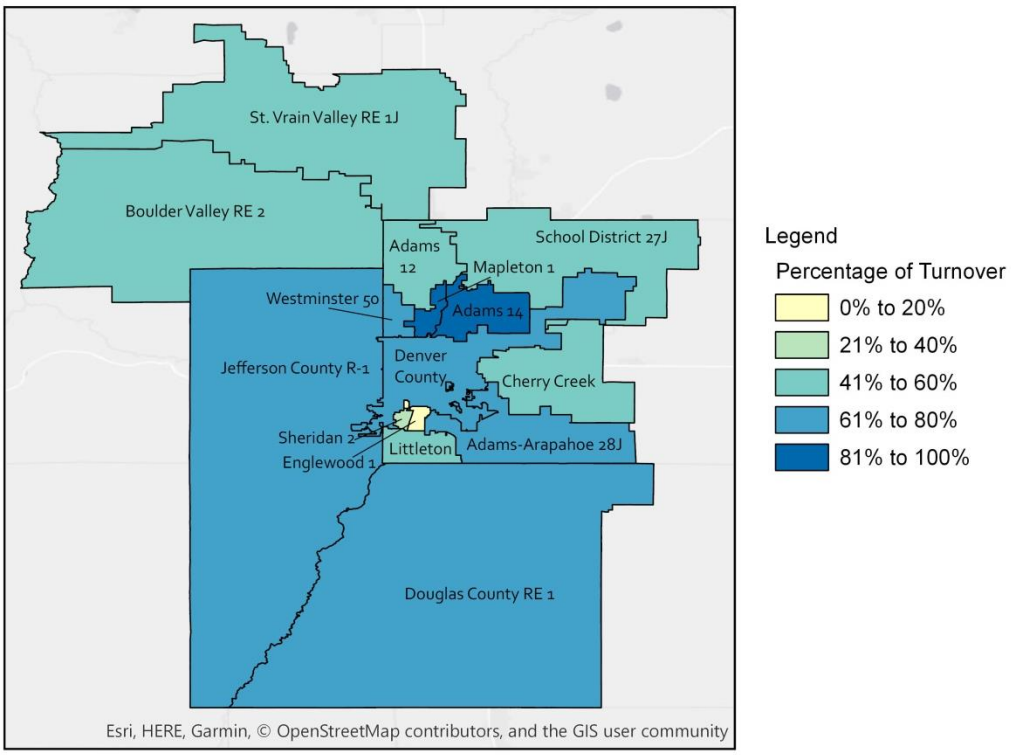
	Schools with Turnover		Schools without Turnover	
District Name	N	%	N	%
Adams 12 Five Star Schools	26	55%	21	45%
Adams County 14	9	82%	2	18%
Adams-Arapahoe 28J	31	60%	21	40%
Boulder Valley RE 2	28	54%	24	46%
Cherry Creek 5	36	63%	21	37%
Denver County 1	105	76%	34	24%
Douglas County RE 1	49	64%	27	36%
Englewood 1	0	0%	8	100%
Jefferson County R-1	102	65%	56	35%
Littleton 6	11	50%	11	50%
Mapleton 1	13	87%	2	13%
School District 27J	11	50%	11	50%
Sheridan 2	1	33%	2	67%
St. Vrain Valley RE 1J	21	47%	24	53%
Westminster 50	12	71%	5	29%
Denver Metropolitan Area	455	63%	269	37%

Source: Colorado Department of Education.

Table 4 indicates that from 2010-2015, 63% of schools in the Denver metropolitan area experienced principal turnover, while 37% of schools in the Denver metropolitan area

had the same principal for five years. Hogrebe (2012) states that school districts have their own context, and variables can change depending on the location (Hogrebe & Tate, 2012; Hogrebe, 2012). This is evident in Table 4, which shows that the percentage of schools that had turnover varied across districts, with a range of 0% to 87%.

Figure 4 below illustrates the spatial distribution of the percentage of principals that left their schools by district as shown in Table 4.



Source: Colorado Department of Education

Figure 4. Map of the Percentage of Schools with Principal Turnover from 2010-2015, by District

As shown in Figure 4, the districts that had the highest percentage of principal turnover are located directly to the north of the city of Denver. The districts that had the

lowest percentage of principal turnover are located directly to the south of the city of Denver. The school district in the city of Denver had a similar percentage of principal turnover as suburban districts located to the north, west, and south of the city of Denver. The school locale codes in the city of Denver were primarily city-large, while the locale codes for Jefferson County, Douglas County, and Westminster 50 were primarily suburban-large. The areas directly to the east of the city of Denver and the far north had lower average number of principals than the city of Denver itself. These areas had some schools coded as suburban-large, but they also had schools coded as suburban-small, town-fringe, rural-fringe and rural-distant. The percentages of principal that left their school varies across districts, and changes by location.

Table 5 illustrates the schools that had principal turnover by district and by year.

Table 5

Schools with Principal Turnover by District and Year, 2010-2015

	Schools with Principal Turnover							
	2011-12		2012-13		2013-14		2014-15	
District Name	N	%	N	%	N	%	N	%
Adams 12 Five Star Schools	8	17%	4	9%	13	28%	6	13%
Adams County 14	3	27%	7	64%	2	18%	3	27%
Adams-Arapahoe 28J	8	15%	7	13%	11	21%	7	13%
Boulder Valley RE 2	10	19%	7	13%	6	12%	10	19%
Cherry Creek 5	11	19%	4	7%	16	28%	7	12%
Denver County 1	37	27%	34	24%	27	19%	35	25%
Douglas County RE 1	18	24%	9	12%	15	20%	19	25%
Englewood 1	0	0%	0	0%	0	0%	0	0%
Jefferson County R-1	42	27%	25	16%	33	21%	24	15%
Littleton 6	5	23%	3	14%	1	5%	2	9%
Mapleton 1	3	20%	1	7%	10	67%	3	20%
School District 27J	3	14%	4	18%	0	0%	4	18%
Sheridan 2	0	0%	0	0%	0	0%	1	33%
St. Vrain Valley RE 1J	4	9%	5	11%	7	16%	5	11%
Westminster 50	5	29%	3	18%	4	24%	3	18%
Denver Metropolitan Area	157	22%	113	16%	145	20%	129	18%

Source: Colorado Department of Education.

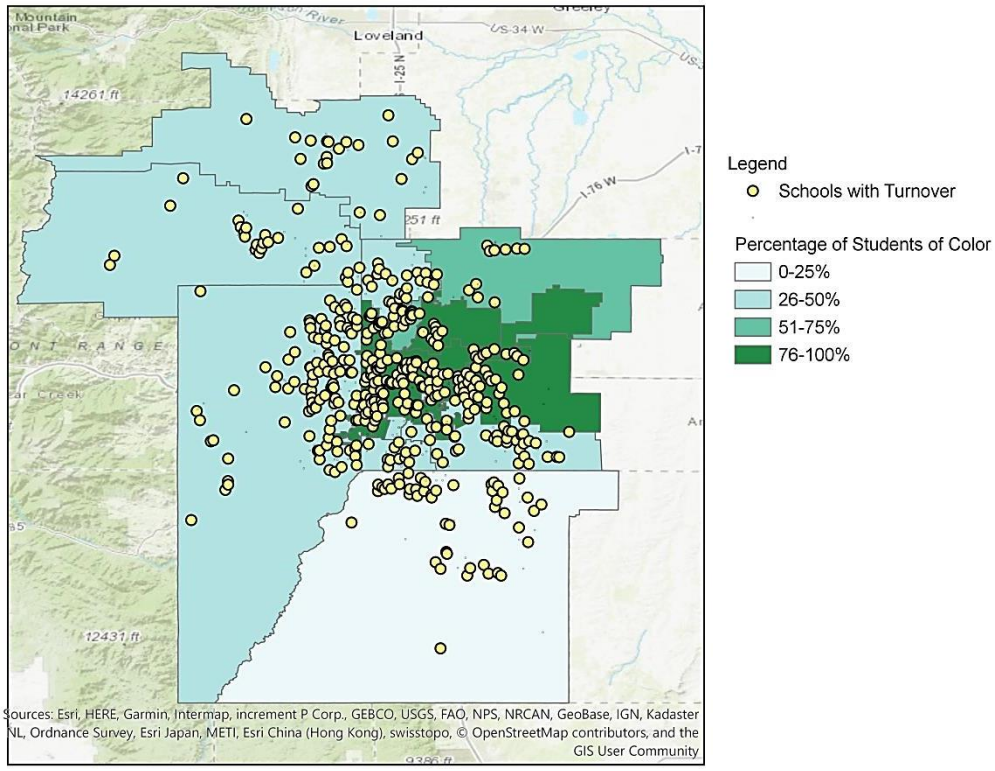
Table 5 shows that the percentage of principals that left their schools in the Denver metropolitan area by year ranged from 16% to 22%. The most principal turnover occurred in 2011-2012, and the least principal turnover occurred in the subsequent year 2012-2013. It is possible that 2012-2013 had a smaller percentage of principals leave their schools since many of those principals would have just started their position the year prior. Additional research is needed to determine why more principal turnover occurred in 2011-2012 than subsequent years, and if there are additional contextual factors impacting principal turnover during this time frame.

The percentage of principals that left their school varied also across districts and across years, with ranges from 0% to 29% in 2011-12, 0% to 64% in 2012-13, 0% to 67% in 2013-14, and 0% to 33% in 2014-15. Adams 14 and Mapleton 1 had the highest percentage of principals that left their schools. . In 2012-13, Adams 14 had 64% of its principals leave their schools, and in 2013-2014, Mapleton 1 had 67% of their principals leave their schools. Both of these districts are located in areas coded suburban-large, and have lower student achievement scores in reading and math than many other suburban districts in the Denver metropolitan area. These two districts were also small districts with less than 20 schools. Only one district, Englewood 1, did not have any principal turnover during 2010-2015. 100% of their principals stayed in their schools for five years. Englewood 1 is also a small district with less than 10 schools.

Spatial Component of Education Data

Hogrebe (2012) states that education data has a spatial component and a geographic location it can be associated with. The next series of maps show how principal turnover occurred in a specific geographic location within the Denver metropolitan area The maps also illustrate the relationship between different descriptive statistics in Table 2, and schools that had principal turnover from 2010-2015.

Figure 5 illustrates the relationship between the percentage of students of color in a district and schools that had principal turnover from 2010-2015.

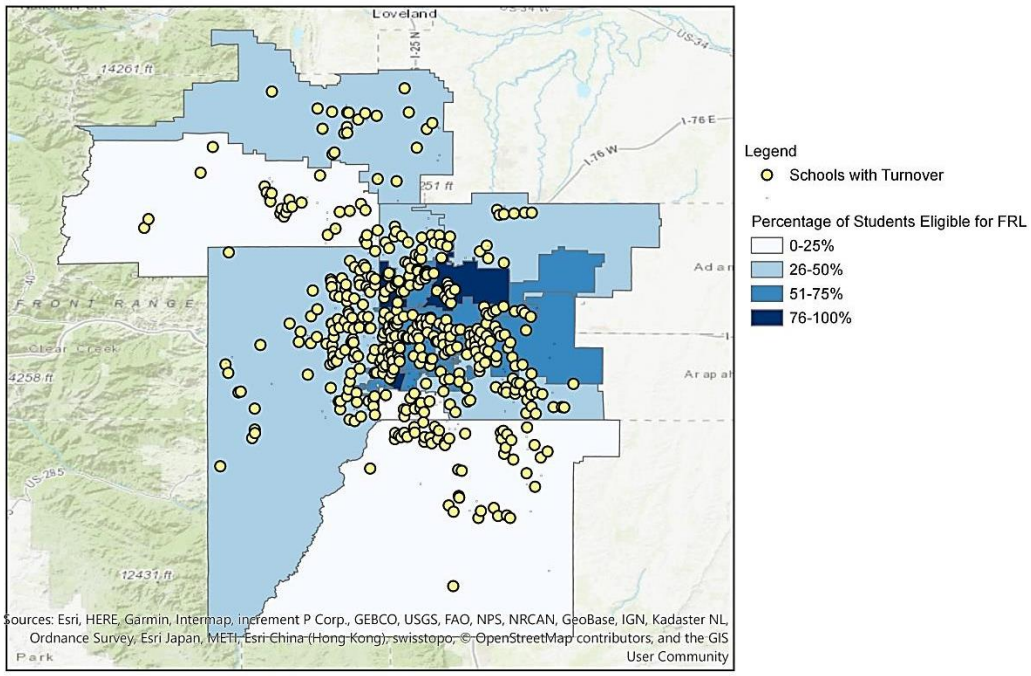


Source: Colorado Department of Education

Figure 5. Map of the Percentage of Students of Color and Principal Turnover from 2010-2015

The spatial distribution of principal turnover against the district-level percentage of students of color indicates that principal turnover occurred in areas that had both high and low percentages of students of color. The spatial clustering near the center of the Denver metropolitan area is not representative of more turnover, but the fact that there are more schools located near the city of Denver due to population density. If there was a strong relationship between the percentage of students of color and schools with principal turnover, there would not be as many observations of principal turnover occurring in districts with low percentages of students of color. Instead, the map would show principal turnover clustering only in districts with high percentages of students of color. Based on this map, there does not appear to be a strong relationship between the percentage of students of color and principal turnover.

Figure 6 shows the relationship between the percentage of students eligible for FRL in a district and schools that had principal turnover from 2010-2015.

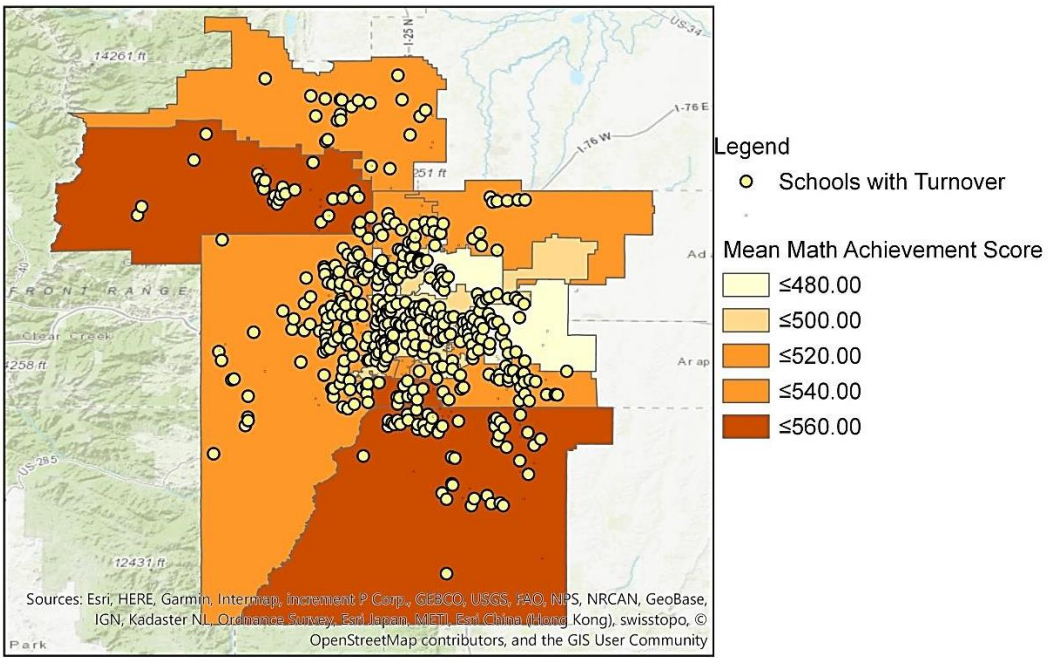


Source: Colorado Department of Education

Figure 6. Map of the Percentage of Students Eligible for FRL and Principal Turnover from 2010-2015

The spatial distribution of principal turnover against the district-level percentage of students eligible for FRL also indicates that principal turnover occurred in areas that had both high and low percentages of students eligible for FRL. Similar to the spatial distribution of the percentage of students of color, there is no clear relationship between the percentage of students eligible for FRL and principal turnover. If a relationship was present, the map would show principal turnover clustering only in districts with high or low percentages of students eligible for FRL. Based on this map, there does not appear to be a strong relationship between the percentage of students eligible for FRL and principal turnover.

Figure 7 shows the relationship between the district's mean math achievement score and schools that had principal turnover from 2010-2015.

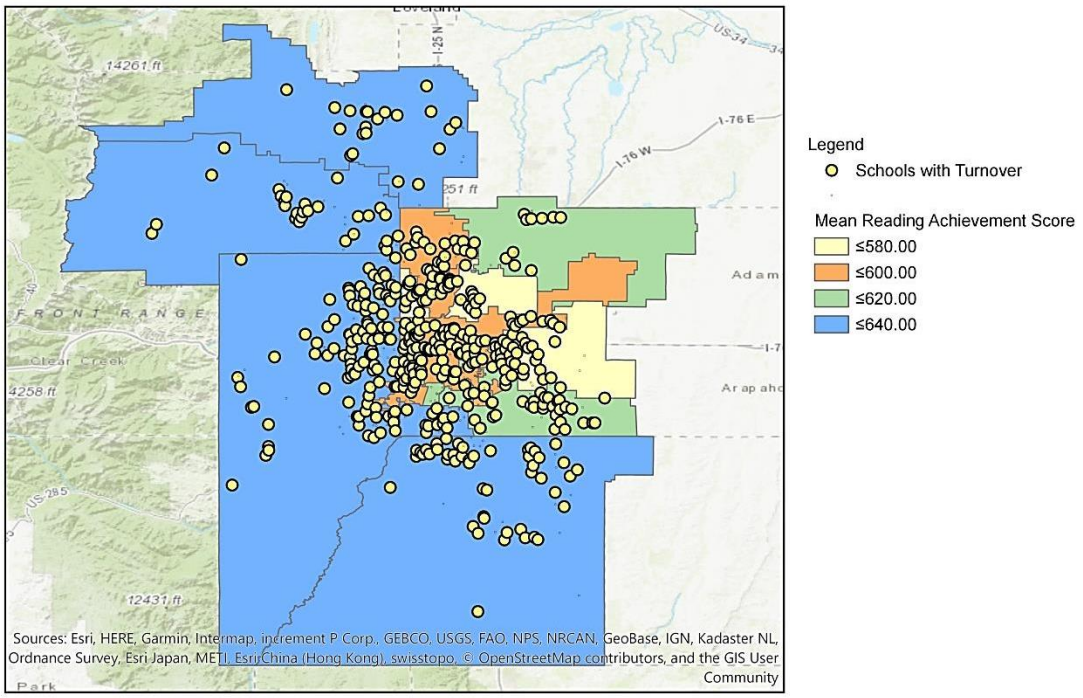


Source: Colorado Department of Education

Figure 7. Map of the Mean Math Achievement Scores and Principal Turnover from 2010-2015

The spatial distribution of schools that had principal turnover against the district's math achievement score also indicates that principal turnover occurred in areas that had both high and low math achievement scores. Based on this map, there does not appear to be a strong relationship between a district's math achievement score and principal turnover due to the absence of spatial clustering in districts with high or low math achievement scores.

Figure 8 shows the relationship between the district's mean reading achievement score and schools that had principal turnover from 2010-2015.



Source: Colorado Department of Education

Figure 8. Map of the Mean Reading Achievement Scores and Principal Turnover from 2010-2015

The spatial distribution of schools that had principal turnover against the district's reading achievement score also indicates that principal turnover occurred in areas that had both high and low reading achievement scores. Based on this map, there does not appear to be a strong relationship between a district's reading achievement score and principal turnover, due to the absence of spatial clustering in districts with high or low reading achievement scores.

Chapter Conclusion

In this chapter I reviewed the geospatial variation between school characteristics, student achievement, and principal turnover.

In the subsequent chapter, I will provide a discussion of the results, recommendations based on the results from this study, and suggestions for future research.

Chapter 5

DISCUSSION

The purpose of this study was to explore the geospatial variation between school characteristics, student achievement, and principal turnover in the Denver metropolitan area using multiple methodological perspectives (Lubienski & Lee, 2017). I focused on exploring the geospatial variation of the relationship between school characteristics, student achievement, and principal turnover in the Denver metropolitan area. I will begin this chapter with a discussion of the results and the implications. Next, I will explore the significance of the results, followed by recommendations for the field and policy. Finally, I will suggest future research based on the results of this study.

Principal Turnover

I found that principal turnover occurs across districts in the Denver metropolitan area, regardless of the area's classification of urban or suburban. Principal turnover occurred in both urban and suburban areas, and the districts that experienced the most principal turnover were located in the suburbs north of the city of Denver. Overall, 63% of schools in the Denver metropolitan area had principal turnover from 2010-2015, and on average, 19% of all schools in the Denver metropolitan area had principal turnover each year. The percentage of schools that had principal turnover ranged significantly by district, with one district not having any turnover, and another district having 87% of its principals leave their schools during the five years.

In this study, I did not examine principal mobility within or across districts, which may help explain the length of principal tenure in a school. During this study's time frame additional schools were opened, which may be related to a principal decision to leave their school. As new schools open, additional career opportunities are created, and principals may leave their school for an opportunity at a new school either within their district or in a different district. Additional research is needed to determine how the creation of new schools may be related to a principal's decision to leave their school, both within and across districts in the Denver metropolitan area.

Implications

Boundaries. School district boundaries are often used as a way to categorize and report education data in both government and education activities. In this study I used school district boundaries to examine principal turnover since schools within a district are unified under one governance structure that impacts all the schools in that district. However, school districts boundaries may but they may not be the only way to examine principal turnover in Colorado. In Colorado, statue C.R.S. 22-36-101, also known as the Public Schools of Choice law, allows any student to enroll in any school in Colorado, whether the school is in their zoned residential district or not (Colorado Department of Education, 2017b). As a result of this law, students may not necessarily attend school in the district where they reside. This study assumes that the students within the school district boundaries are primarily from surrounding communities, but there may be schools within this sample that are comprised primarily of students that reside out-of-district. Therefore, using school district boundaries may not be the only way to understand

principal turnover. The results from this study may change if other geographic boundaries, such as county or census tracts, were used in place of school district boundaries. Additional research is needed to further understand the implications of using school district boundaries to examine principal turnover, and if examining turnover by school district boundaries yields the most reliable results.

Methodology. This study only examined principal turnover within a five year period, which may be too short of a window to accurately identify turnover patterns. The variability of principal tenure in a school across districts was minimal, and indicates that the time frame used in this study may not be long enough. Future research on principal turnover may want to consider using a longer time frame, such as ten years, in order to have higher variability in principal tenure and more accurately capture principal turnover patterns.

Definitions. I used NCES's school locale classification codes to categorize the geographic context in my study, which are based on the population size of an area, but there are many other ways of defining and classifying geographic areas. Geographic contexts could also be defined by district characteristics, size, community factors, or economics. Given the complexity of principal turnover, and the variety of factors that may be related to it, it is possible that NCES school locale classification codes are not most appropriate way to classify principal turnover data. Additional research should be conducted on principal turnover that uses different geographic definitions to determine how the results may vary based on the definition and classification system within the study.

Theoretical framework. I used Hogrebe and Tate's (2012) geospatial perspective as the theoretical framework for this study, which has additional assumptions and implications. One of the strengths of this theoretical framework is that it connects educational issues to their geographic location, which may be impacting relationships between variables. This perspective also highlights the importance of understanding local context before understanding educational issues in a larger global area. It is important to understand how place may be related to educational issues, and the geospatial perspective provides a lens to help examine this interaction.

However, the geospatial perspective is also limited by its assumption of defined boundaries. Education data may not be appropriate to examine within defined boundaries such as school districts, or counties lines, especially since local policies may cause the data to not adhere to these distinct boundaries. For example, since Colorado has a policy that allows open enrollment for students, the assumption that students attend school within their defined school district boundaries is not accurate. In other geographic contexts there may be additional policies that similarly impact the data within defined boundaries. When conducting research using the geospatial perspective it is important to understand how education data may not be confined to the discrete boundaries of an area, and how additional policy, demographic and community factors may influence the geospatial variance of the data.

Significance

Extant literature has not been consistent in classifying regions based on Census Bureau definitions and NCES sub-classifications. This study uses Census Bureau and NCES definitions, and the results disprove the assumption that suburban areas do not have the same issues as urban areas (Forsyth, 2014). The results from this study challenge the use of antiquated stereotype related to urban and suburban areas. Furthermore, the similarity of the data across the classifications of urban and suburban indicate there is a need for research at the local level.

Finally, few studies have integrated geospatial analysis into educational research (Hogrebe, 2012; Lubienski & Lee, 2017), and this study used GIS to help determine the geographic variations of principal turnover. This study used GIS to find patterns in the data across districts (Lubienski, Gulosino, & Weitzel, 2009). This study was able to use this additional methodological approach to further analyze the data and determine how it varies across districts. This study was also able to create spatial displays of data that can be used for diverse audiences and make the information accessible (Vélez & Solórzano, 2017).

Recommendations for Practitioners and Policymakers

Based on the results from this study there are several recommendations for practitioners and policymakers. This study highlights the differences between different districts. In order to better understand principal turnover at a local level, districts can examine their own practices of principal retention and support. This examination would allow districts to determine if their current principal rotation or promotion practices are

responsible for creating high rates of principal turnover in their district (Béteille, Kalogrides, & Loeb, 2012; Farley-Ripple, 2012; Fink & Brayman, 2006; Weinstein et al., 2009). Furthermore, this examination at the district level would allow districts to determine what other factors in their local context may be related to principal turnover in their district, such as unique demographic, cultural, political, financial, physical, and other education factors (Hanushek & Yilmax, 2011; Hogrebe & Tate, 2017; Holme, Diem & Welton, 2014).

There are also several implications for policymakers. Policymakers can often make the assumption that 'White middle class suburbs' do not have the same issues as urban areas and therefore are not in need of additional funding or resources (Forsyth, 2012). The results of this study highlight that districts in both urban and suburban areas are struggling with principal retention in the Denver metropolitan area and may be in need of the same level of funding or resources. Additionally, policymakers should stop using antiquated stereotypes to describe urban and suburban areas and they should not make assumptions about the challenges in geographic areas when creating policies. Instead, they should use current demographic data to inform their decision-making.

Recommendations for Future Research

This study does not provide conclusive evidence on why principal turnover is occurring in each of these districts, or how local context influences principal turnover in each district. Qualitative research would be able to examine the practices of the school districts with principal turnover to better understand why principal turnover is occurring in these areas. Future research should also consider the use of geospatial analysis to

further understand spatial patterns related to principal turnover. This study only examined principal turnover in the Denver metropolitan area, but additional research could use this methodology in other metropolitan areas to determine if the results from this study are comparable to another metropolitan area, or if the relationships will vary from metropolitan area to metropolitan area and are not generalizable. This methodology could also be used to examine the entire state of Colorado to determine principal turnover patterns in all geographic locations, and the extent of local variation in additional school districts.

Conclusion

The purpose of this study was to explore the relationship between school characteristics, student achievement, and principal turnover. I found that the relationship between reading growth and school locale varies across district. Additionally, I found that principal turnover is an issue in both urban and suburban areas in the Denver metropolitan area, with higher rates of principal turnover occurring in suburban areas. Overall, this study highlights the importance of local context in connection with principal turnover patterns and emphasizes that location matters.

REFERENCES

Akiba, M., & Reichardt, R. (2004). What predicts the mobility of elementary school leaders? an analysis of longitudinal data in Colorado. *Education Policy Analysis Archives, 12*(18). Retrieved from http://epaa.asu.edu/epaa/v12n18/

Amrein-Beardsley, A. (2008). Methodological concerns about the education value-added assessment system. *Educational Researcher, 37*(2), 65-75.

Anthony, D. (2016). *An analysis of principal attrition in a large urban school district*. (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. AAI10128595).

Baker, B. D., Punswick, E., & Belt, C. (2010). School leadership stability, principal moves, and departures: Evidence from Missouri. *Educational Administration Quarterly, 46*(4), 523-557. doi: 10.1177/0013161X10383832

Battle, D., & National Center for Education Statistics (ED). (2010). *Principal attrition and mobility: Results from the 2008-09 principal follow-up survey. first look. NCES 2010-337*. National Center for Education Statistics. Retrieved from http://nces.ed.gov/pubs2010/2010337.pdf

Beckett, L.O. (2017, November). The need to achieve: Student achievement, student growth, and urban principal turnover. Paper presented at the annual meeting of the University Council for Education Administration. Denver, CO.

Beckett, L.O. (2016, November). Predictors of urban principal turnover. Paper presented at the annual meeting of the University Council for Education Administration. Detroit, MI.

Berry, P.C. (2014). *Where are all the principals going? An analysis of public school principal attrition, mobility, and turnover.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. 3636397).

Béteille, T., Kalogrides, D., & Loeb, S. (2012). Stepping stones: Principal career paths and school outcomes. *Social Science Research, 41(*4), 904-919.

Blazer, C. (2010). *Principal turnover*. Miami, FL: Information Capsule Research Services.

Borman, G.D. & Dowling, N.M. (2008). Teacher attrition and retention: A meta-analytic and narrative review of the research. *Review of Educational Research, 78*(3), 367-409.

Brown, K., & R. Wynn, S. (2009). Finding, supporting, and keeping: The role of the principal in teacher retention issues. *Leadership and Policy in Schools, 8*(1), 37-63. doi: 10.1080/15700760701817371

Burkhauser, S., Gates, S.M., Hamilton, L.S., & Ikemoto, G.S. (2012). *First year principals in urban school districts: How actions and working conditions relate to outcomes.* Santa Monica, CA: RAND Corporation.

Card, N.A. (2012). *Applied meta-analysis for social science research.* New York, NY: The Guilford Press.

Colorado Department of Education (2017a). Data pipeline frequently requested codes. Retrieved from https://www.cde.state.co.us/datapipeline/org_orgcodes

Colorado Department of Education (2017b). Public schools of choice. Retrieved from https://www.cde.state.co.us/choice/openenrollment

Colorado Department of Local Affairs. (2017). Housing and households: Definition of sub-state regions. Retrieved from https://demography.dola.colorado.gov/housing-and-households/

Creswell, J.W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches.* Thousand Oaks, CA: Sage Publications, Inc.

DeAngelis, K. J., & White, B. R. (2011). Principal turnover in Illinois public schools, 2001-2008. *Illinois Education Research Council*, 1-28.

Denver Public Schools. (2017). Strategic regional analysis. Retrieved from https://www.boarddocs.com/co/dpsk12/Board.nsf/files/ATTS7Y69E1F5/$file/SRA_Fall2017_120717.pdf

Denver Office of Economic Development. (2017). About affordable housing. Retrieved from https://www.denvergov.org/content/denvergov/en/denver-office-of-economic-development/housing-neighborhoods/about-affordable-housing.html

Denver Office of Economic Development. (2016). *Gentrification study: Mitigating involuntary displacement.* Denver, CO: Denver Office of Economic Development. Retrieved from

https://www.denvergov.org/content/denvergov/en/denver-office-of-economic-development/housing-neighborhoods/about-affordable-housing.html

Dreier, P., Mollenkopf, J., & Swanstrom, T. (2014). *Place matters: Metropolitics for the twenty-first century.* Lawrence, KS: University Press of Kansas.

Fink, D., & Brayman, C. (2006). School leadership succession and the challenges of change. *Educational Administration Quarterly, 42*(1), 62-89. Doi: 10.1177/0013161X05278186

Fombuena, A. (2016). Emergence of geo-enabled research in social sciences: The case of societal higher education issues. *Social Science Information, 55*(4), 555-567.

Forsyth, A. (2012). Defining suburbs. *Journal of Planning Literature, 27*(3), 270-281.

Fotheringham, A.S., Brunsdon, C. & Charlton, M. (2002). *Geographically weighted regression: The analysis of spatially varying relationships*. Hoboken, NJ: Wiley.

Frankenberg, E., & Orfield, G. (2012). *The resegregation of suburban schools: A hidden crisis in American education.* Cambridge, MA: Harvard Education Press.

Frey, W.H. (2011). *Melting pot cities and suburbs: Racial and ethnic change in metro America in the 2000s.* Washington DC: The Brookings Institution.

Fuller, E., Orr, M. T., Young, M. D. (2008, March). The revolving door of the principalship. *Implications from UCEA*, 1-2.

Fuller, E., & Young, M. D. (2008, April). Principal attrition: Where do principals go after they leave the principalship? Paper presented at the annual meeting of the American Educational Research Association. San Diego, CA.

Fuller, E., Young, M. D., & Orr, M. T. (2007, April). Career pathways of principals in Texas. Paper presented at the annual meeting of the American Educational Research Association. *C*hicago, IL.

Gates, S. M., Ringel, J. S., Santibañez, L., Guarino, C., Ghosh-Dastidar, B., & Brown, A. (2006). Mobility and turnover among school principals. *Economics of Education Review*, *25*(3), 289-302. doi: 10.1016/j.econedurev.2005.01.008

Geverdt, D. (2015). *Geographic estimates programe (EDGE): Locale boundaries user's manual*. Washington, DC: National Center for Education Statistics.

Goldring, R., Taie, W., & Owens, C. (2014). Principal attrition and mobility: Results from the 2012-13 Principal follow-up survey. National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014064rev

Groen, M. (2012). NCLB--the educational accountability paradigm in historical perspective. *American Educational History Journal, 39*(1), 1-14.

Hallinger, P. & Heck, R.H. (2010). Collaborative leadership and school improvement: understanding the impact on school capacity and student learning. *School Leadership and Management, 30*(2), 95-110.

Hanushek, E.A. (2014). Is location fate? Distributional aspects of schooling. In G.K. Ingram and D.A. Kenyon (Eds.), *Education, Land, and Location* (pp. 25-61). Cambridge, MA: Lincoln Institute of Land Policy.

Hanushek, E.A., Peterson, P.E., & Woessman, L. (2014). *Not just the problems of other people's children: U.S. student performance in global perspective.* Cambridge, MA: PEPG Program on Education Policy and Governance and *Education Next.*

Hanushek, E.A. & Woessman, L. (2015). *The knowledge capital of nations: Education and the economics of growth.* Cambridge, MA: The MIT Press.

Hanushek, E.A. & Yilmaz, K. (2011). Urban education, location, and opportunity in the United States. In N. Brooks, K. Donaghy, and G. Knaap (Eds.), *Oxford Handbook of Urban Economics and Planning,* (pp. 583-615). Oxford: Oxford University Press.

Harris-Russell, C. (2014). *Understanding change in instructional practices to meet the needs of a diverse population: A study of teachers in a suburban school undergoing demographic shift.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. 3581643).

Heck, R.H. & Hallinger, P. (2009). Assessing the contribution of distributed leadership to school improvement and growth in math achievement. *American Educational Research Journal, 46*(3), 659-689.

Herman, R., Gates, S.M., Chavez-Herrerias, E.R., & Harris, M. (2016). *School leadership interventions under the every student succeeds act: Volume I – a review of the evidence base, initial findings.* Santa Monica, CA: RAND Corporation.

Hidalgo, L.A. (2017). Predatory landscapes: Pedagogical and social justice tools to uncover the racist nativism in the spatial dimensions of economic exclusion. In D. Morrison, S. Annamma, and D. Jackson (Eds.), *Critical Race Spatial Analysis* (pp. 101-125). Sterling, VA: Stylus Publishing, LLC.

Hitt, D., & Tucker, P. (2016). Systematic review of key leader practices found to influence student achievement. *Review of Educational Research, 86*(2), 531-569.

Hogrebe, M.C. (2012). Adding geospatial perspective to research on schools, communities, and neighborhoods. In W. Tate (Ed.), *Research on Schools, Neighborhoods, and Communities: Toward Civic Responsibility* (pp. 151-169). Lanham, MD: The American Educational Research Association.

Hogrebe, M.C. & Tate, W.F. (2017). Exploring educational opportunity with geospatial patterns in high school algebra 1 and advanced mathematics courses. In D. Morrison, S. Annamma, and D. Jackson (Eds.), *Critical Race Spatial Analysis* (pp. 154-178). Sterling, VA: Stylus Publishing, LLC.

Hogrebe, M.C. & Tate, W.F. (2012). Geospatial perspective: Toward a visual political literacy project in education, health, and human services. *Review of Research in Education, 36*, 67-94.

Holme, J.J., Diem, S., & Welton, A. (2014). Suburban school districts and demographic change: The technical, normative, and political dimensions of response. *Educational Administration Quarterly, 50*(1), 34-66.

Holme, J. J., & Rangel, V. S. (2012). Putting school reform in its place. *American Educational Research Journal, 49*(2), 257-283. doi:10.3102/0002831211423316

Howell, A.J. & Timberlake, J.M. (2013). Racial and ethnic trends in the suburbanization of poverty in U.S. metropolitan areas, 1980-2010. *Journal of Urban Affairs, 36*(1), 79-98.

Ishimaru, A. (2013). From heroes to organizers: Principals and education organizing in urban school reform. *Educational Administration Quarterly, 49*(1), 3-51. doi:10.1177/0013161X12448250

Jeynes, W. H. (2016a). A meta-analysis: The relationship between parental involvement and latino student outcomes *Education and Urban Society*, 1-25.

Jeynes, W. H. (2016b). A meta-analysis: The relationship between parental involvement and african american school outcomes. *Journal of Black Studies, 47*(3), 195-216.

Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record, 114*(10), 1-39.

Kneebone, E., Nadeau, C., & Berube, A. (2011). The re-emergence of concentrated poverty: Metropolitan trends in the 2000s. Washington, DC: The Brookings Institution.

Lee, J. (2016). *The anatomy of achievement gaps: Why and how American education is losing (but can still win) the war on underachievement.* Oxford: Oxford University Press.

Leithwood, K. & Jantzi, D. (2008). Linking leadership to student learning: The contributions of leader efficacy. *Educational Administration Quarterly, 44*(4), 496-528.

Leithwood, K., & Mascall, B. (2008). Collective leadership effects on student achievement. *Educational Administration Quarterly, 44*(4), 529-561. doi:10.1177/0013161X083212

Leithwood, K. & Seashore Louis, K. (2012). *Linking leadership to student learning.* San Francisco, CA: Jossey-Bass.

Li, Y.Y. (2017). Processes and dynamics behind whole-school reform: Nine-year journeys of four primary schools. *American Educational Research Journal, 54*(2), 279-324.

Loeb, S., Kalogrides, D., & Horng, E. L. (2010). Principal preferences and the uneven distribution of principals across schools. *Educational Evaluation and Policy Analysis, 32*(2), 205-229.

Lubienski, C., Gulosino, C., & Weitzel, P. (2009). School choice and competitive incentives: Mapping the distribution of educational opportunities across local education markets. *American Journal of Education, 115*(4), 601-647.

Lubienski, C. & Lee, J. (2017). Geo-spatial analyses in education research: The critical challenge and the methodological possibilities. *Geographical Research, 55*(1), 89-99.

MacNeil, A., Prater, D., & Busch, S. (2009). The effects of school culture and climate on student achievement. *International Journal of Leadership in Education, 12*(1), 73-84.

Mancuso, S. V., Roberts, L., & White, G. P. (2010). Teacher retention in international schools: The key role of school leadership. *Journal of Research in International Education, 9*(3), 306-323. doi:10.1177/1475240910388928

Mascall, B. & Leithwood, B. (2012). A coordinated approach to leadership distribution. In K. Leithwood & K. Seashore Louis (Eds.) *Linking leadership to student learning* (pp. 142-158). San Francisco, CA: Jossey-Bass.

Mascall, B., & Leithwood, K. (2010). Investing in leadership: The district's role in managing principal turnover. *Leadership and Policy in Schools, 9*(4), 367-383. doi:10.1080/15700763.2010.493633

McVay, C. (2007). *Job satisfaction of elementary school principals using herzberg's motivation /hygiene theory.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. 3290083).

Miller, A. (2013). Principal turnover and student achievement. *Economics of Education Review, 36,* 60-72. doi: 10.1016/j.econedurev.2013.05.004

Misra, K., Grimes, P.W., & Rogers, K.E. (2012). Does competition improve public school efficiency? A spatial analysis. *Economics of Education Review, 31*(6), 1177-1190.

Mitra, D.L. (2008). Amplifying student voice. *Educational Leadership, 66*(3), 1-7.

Morrison, D. & Garlick, G.S. (2017). Reframing traditional geospatial methods and tools for use in educational inequity research and praxis. In D. Morrison, S. Annamma, and D. Jackson (Eds.), *Critical Race Spatial Analysis* (pp. 87-100). Sterling, VA: Stylus Publishing, LLC.

National Center for Education Statistics (2017a). Schools and staffing survey. Retrieved from https://nces.ed.gov/surveys/sass/overview.asp

National Center for Education Statistics (2017b). NCES locale classifications and criteria. Retrieved from https://nces.ed.gov/programs/edge/docs/LOCALE_CLASSIFICATIONS.pdf

National Center for Education Statistics (2017c). Bibliography search tool. Retrieved from https://nces.ed.gov/bibliography/

Ni, Y., Sun, M., & Rorrer, A. (2015). Principal turnover: Upheaval and uncertainty in charter schools? *Educational Administration Quarterly, 51*(3), 409-437.

Noguera, P. A. (2008). *The trouble with black boys and other reflections on race, equity, and the future of public education.* San Francisco, CA: Jossey-Bass Publishers.

Orfield, M. (2002). *American metropolitics: The new suburban reality.* Washington, DC: Brookings Institution Press.

Papa, F. (2007). Why do principals change schools? A multivariate analysis of principal retention. *Leadership and Policy in Schools, 6*(3), 267-290. doi:10.1080/15700760701263725

Partlow, M. C. (2007). Contextual factors related to elementary principal turnover. *Planning and Changing, 38*(1&2), 60-76.

Podgursky, M., Ehlert, M., Lindsay, J., & Wan, Y. (2016) *An examination of the movement of educators within and across three Midwest Region states*. (REL 2017–185), Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Midwest. Retrieved from http://ies.ed.gov/ncee/edlabs.

Posey-Maddox, L. (2016). Challenging the dichotomy between "urban" and "suburban" in educational discourse and policy. *The Educational Forum, 80*(2), 225-241.

Posey-Maddox, L. (2014). *When middle-class parents choose urban schools.* Chicago, IL: University of Chicago Press.

Postell, L.M. (2012). *Job satisfaction of principals and assistant principals in traditional public high schools and charter schools in los angeles county, california.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. 3535774).

Public Schools of North Carolina. (2000). Data & Reports. Retrieved from http://www.ncpublicschools.org/fbs/resources/data/

Ratcliffe, M., Burd, C., Holder, K., & Fields, A. (2016*). Defining rural at the U.S. census bureau*. Washington, DC: U.S. Census Bureau. Retrieved from https://www.census.gov/geo/reference/urban-rural.html

Rippner, J.A. (2016). *The American education policy landscape.* New York, NY: Routledge.

Robinson, V.M., Lloyd, C.A., & Rowe, K.J. (2008). The impact of leadership on student outcomes: An analysis of the differential effects of leadership types. *Educational Administration Quarterly, 44*(5), 635-674.

Seashore Louis, K., Leithwood, K., Wahlstrom, K.L., & Anderson, S.E. (2010). *Investigating the links to improved student learning: Final report of research findings.* Minneapolis, MN: Center for Applied Research and Educational Improvement, University of Minnesota.

Shatzer, R.H., Caldarella, P., Hallam, P.R., & Brown, B.L. (2014). Comparing the effects of instructional and transformational leadership on student achievement: Implications for practice. *Educational Management Administration & Leadership, 42*(2), 445-459.

Simon, N. S., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. *Teachers College Record, 117*(3), 1-36.

Stoelinga, S.R., Hart, H., & Schalliol, D. (2008). *The work of Chicago public schools' principals: Leading in a complex context with high stakes.* Chicago, IL:

Consortium on Chicago School Research at the University of Chicago Urban Education Institute.

Stuart Wells, A., Ready, D. Duran, J., Grzesikowski, C., Hill, K., Roda, A., Warner, M., & White, T. (2012). Still separate, still unequal, but not always so "suburban": The changing nature of suburban school districts in the New York metropolitan area. In W.F. (Ed.), *Research on Schools, Neighborhoods, and Communities: Toward Civic Responsibility*. (pp. 125-149). Lanham, MD: Rowman & Littlefield.

Stuart Wells, A., Duran, J., Lofton, R., Roda, A., Warner, M., White, T., & Grzesikowski, C (2009). *Why boundaries matter: A study of five separate and unequal long island school districts*. New York, NY: Teachers College.

Superville, D. R. (2014). Churn: The high cost of principal turnover. *Education Week, 34*(12), 1-21.

Tekleselassie, A. A., & Villarreal, P. (2011). Career mobility and departure intentions among school principals in the united states: Incentives and disincentives. *Leadership and Policy in Schools, 10*(3), 251-293. doi:10.1080/15700763.2011.585536

United States Census (2017). About the Bureau. Retrieved from https://www.census.gov/about/what.html

United States Census. (2016). Urban and rural classification. Retrieved from https://www.census.gov/geo/reference/urban-rural.html

United States Census. (2012). Geographic terms and concepts – core based statistical areas and related statistical areas. Retrieved from https://www.census.gov/geo/reference/gtc/gtc_cbsa.html

United States Department of Education (2017). Every student succeeds act. Retrieved from https://www.ed.gov/esea

United States Department of Housing and Urban Development (March 2015). A comprehensive housing market analysis: Denver-Aurora-Lakewood, Colorado. Washington, DC: Office of Policy Development and Research, U.S. Department of Housing and Urban Development.

Valentine, J.W. & Prater, M. (2011). Instructional, transformational, and managerial leadership and student achievement: High school principals make a difference. *NASSP Bulletin, 95*(1), 5-30.

Vélez, V.N. & Solórzano, D.G. (2017). Conceptualizing GIS as a tool for critical race research in education. In D. Morrison, S. Annamma, and D. Jackson (Eds.), *Critical Race Spatial Analysis* (pp. 126-146). Sterling, VA: Stylus Publishing, LLC.

Wagner, T. (2010). *The global achievement gap.* New York: Basic Books.

Yan, R. (2016). *Principal instructional leadership, working conditions, and principal turnover in K-12 public schools.* (Doctoral dissertation). Available from ProQuest Dissertations and Theses (UMI No. 10242582).

Yoon, E. & Lubienski, C. (2017). How to marginalized families engage in school choice in inequitable urban landscapes? A critical geographic approach. *Educational Policy Analysis Archives, 25*(42), 2-26.

Young, M. D., & Fuller, E. J., (2009, April). Tenure and retention of newly hired principals in Texas. Paper presented at the annual meeting of the American Educational Research Association. San Diego, CA.