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Predictors of Special Education Inequity in Rural Rocky Mountain West Schools

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PREDICTORS OF SPECIAL EDUCATION INEQUITY IN RURAL ROCKY MOUNTAIN WEST SCHOOLS

by

Jac'lyn Bera

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ABSTRACT

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by

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Utah State University, 2022

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PUBLIC ABSTRACT

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Current research focusing on disproportionality and equity in schools focuses on the urban environment, resulting in a significant gap in our understanding of the challenges of rural schools. For rural, racially and ethnically minoritized (R/EM) students who have disabilities, this research is largely unavailable or minimal, and negatively affects our understanding of rural needs, barriers, and successes for this historically underserved population. There is even less research focused specifically on rural students in the Rocky Mountain West (RMW) region of the United States. Understanding these factors serves as a critical area of research, and is the focus of this study. It is predicted that the results of this study will reflect that the percentages of minoritized students within rural schools of states located in the RMW region of the United States of America is predictive of the percentage of students receiving special education services.

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Jac'lyn Bera

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CHAPTER I

INTRODUCTION

Problem Statement

Current literature that examines disproportionality and equity in schools mostly focuses on the urban environment, which has led to a significant gap in our understanding of the challenges of rural schools (Safer-Lichtenstein et al., 2021). Furthermore, there is even more limited research on rural racially and ethnically minoritized (REM) students who have disabilities (e.g., in-school service utilization, Duong et al., 2020; epidemiologic studies with rural youth, Angold et al., 2002) which impedes our understanding of rural needs, barriers, and successes for this historically underserved population. There is even less research focused specifically on rural students in the Rocky Mountain West (RMW) region of the United States (US), which is largely rural. The variability of communities that are classified as rural is wide-spread, and challenges in some rural communities may be vastly different from those in other locations, but it is of value to most rural education settings to identify trends within specific regions that influence disproportionality and equity for students of marginalized backgrounds and disabilities.

Disproportionality refers to a general difference in the outcomes and treatment of a given group based on membership—such as race, gender, or disability—and when occurring in special education results in unequitable practices in referrals and identification that originates from a systematic history targeted towards REM students and families (Sullivan & Proctor, 2016; Hosp et al.., 2003; Cruz & Rodl, 2018; Sullivan et al., 2020). The negative outcomes associated with disproportionality within special

education have impacted long- and short-term outcomes for REM students and their families, and includes more restrictive classroom placements, continuation of racial bias, and further alienates students and families who may already feel out of place within their predominantly White and able-bodied schools (Georgiades et al., 2013; Skiba et al., 2014; Sullivan, 2017; Sullivan et al., 2020; Sullivan & Osher, 2019). The creation, evaluation, and revision of legislation and tools to help minimize and eliminate disproportionality have been prominent across the nation; but small, rural communities have the potential to be pushed to the wayside due to small populations and sample sizes that often are sought out for research and program evaluation, leaving a large gap in our understanding of geographical and regional influences on disproportionality.

As a result of the minimal literature regarding RMW rural schools, and furthermore their minoritized and disabled students, there is value in exploring the intersectionality of these factors of identity in regard to disproportionality within special education. Understanding these factors serves as a critical area of research as it may assist in crossing barriers related to including rural communities in research and contributing to the needed literature. It is predicted that the results of this study will reflect that—like many prior research has shown in special education generally—there will be a relation between the percentage of minoritized students and the percentage of children receiving special education services within rural schools of states located in the RMW region of the US.

CHAPTER II

LITERATURE REVIEW

Equity

Equity, equality, and uniformity are all aspects of the standardization of the system of special education identification within the United States; yet, even in the wake of legislation that aims to decrease the presence of disproportionality within REM students in special education programs, the loss of equity may be the cost of standardization that students from minoritized backgrounds are paying (Bollmer et al., 2007; Cramer et al., 2018; Sullivan & Osher, 2019). This can be accounted for in the record of continued segregation of REM students through placements in more restrictive learning environments and more time spent outside of the general education classroom (Tefera et al., 2020; Thorius, 2019 Zion et al., 2011). Even the current model of how schools operate—which is based on age, is teacher driven, and determined on compulsory attendance—is problematic by-design that hinders equity and creates more barriers for people with less privilege within our society (Zion et al., 2011). Because of these systematically placed barriers, the need for equity consciousness, the understanding and awareness of patterns and factors that may influence inequitable outcomes, is vitally important to understanding how to deconstruct factors that lead to disproportionality within special education programs (Pazey et al., 2012; Whitley et al., 2020). Given the changes across education delivery, service provision, and inclusivity in the classroom as a result of the COVID-19 pandemic, the impacts and importance of equity within programs such as special education remain a present and relevant topic (Sullivan et al., 2021), especially for students who receive special education services (Harris et al., 2021).

Disproportionality

Disproportionality refers to a general difference in the outcomes and treatment of a given group based on membership, such as race, gender, or disability (Sullivan & Proctor, 2016). Within special education, disproportionality results from unequal standardized referral and identification practices that stem from systematic inequalities targeted at minoritized communities (Cruz & Rodl, 2018; Hosp et al., 2003; Sullivan et al., 2020). Research has recently brought forth the complexity of disproportionality and has demonstrated that student gender, race, socioeconomic status, and suspension frequency are the best predictors of special education identification (Skiba et al., 2016; Sullivan & Artiles, 2011; Sullivan & Bal, 2013). There are variations to the experiences among REM individuals based a person's racial/ethnic background, such as the high levels of discrimination and socioeconomic disadvantage present in Black and Latinx communities, and the perpetual "foreigner" label and model minority myth placed upon Asian communities (Georgiades et al., 2013; Han, 2018; Sullivan et al., 2020).

Disproportionality in special education is harmful because it impacts students access to least restrictive learning environments, perpetuates of racial biases through certain classification and placements within special education, and results in under and over identification for special education services leading to suboptimal educational programming and services (Skiba et al., 2014; Sullivan, 2017; Sullivan & Osher, 2019). The history of disproportionality of REM students has remained a primary issue at the forefront of special education (Skiba et al., 2005; Skiba et al., 2006; Thorius, 2019) and the factors contributing to the disproportionate representation of minoritized students have been explored by various studies across the last few decades (Hosp et al., 2003; Skiba et

al., 2014; Kincaid & Sullivan, 2017). Factors that have been explored in previous research includes poverty, school resource availability, academic success, behavioral variables (Cruz & Rodl, 2018; Skiba et al., 2005, Skiba et al., 2016), referral rates (Hosp et al., 2003), English language learner (ELL) status (Barrio, 2017; Fish, 2017; Klinger et al., 2006), academic achievement (Hosp et al., 2004), and teacher perceptions of factors (Skiba et al., 2006; Sullivan et al., 2020). Across all variables, it has been noted that the relations with disproportionality in special education are complex and varying (Fiedler, 2008; Skiba et al., 2005; Sullivan & Artiles, 2011). Factors such as poverty have been suggested as catch-all causes, but have been debunked and is not an independent cause for disproportionality, rather one of many contributing elements (Kincaid & Sullivan, 2017; O'Connor & Fernandez, 2006; Skiba et al., 2016).

Experiences with disproportionality may vary across R/EM groups (Hosp et al., 2003). For example, Black students have historically been disproportionally placed in special education compared to their non-Black peers despite the ongoing work to address this inequity (Aston et al., 2020; Skiba et al., 2014; Zion et al., 2011). Previous studies have also highlighted that Black students are 2.5 times more likely to be identified for special education under the Intellectual Disability (ID) eligibility category and 1.5 times more likely to be identified with Emotional Disturbance (ED) than their White and non-Black peers, respectively (Hosp et al., 2003; Hosp et al., 2004; Skiba et al., 2005; Sullivan & Artiles, 2011). Similarly, Native American students have been overrepresented in the Learning Disability (LD), ED, and ID categories (Hosp et al., 2004; Skiba et al., 2006, Sullivan et al., 2013). When examining racial/ethnic groups for underrepresentation in special education, Pacific Islanders have been underrepresented in almost all special

education categories, as are Asian American and Latinx students (Hosp et al., 2004, Sullivan et al., 2013, Sullivan et al., 2020). These data reflect the varying experiences students have with disproportionality and demonstrate both the individualized and localized impacts within a given minoritized community.

Why Might Disproportionality Occur?

Teacher referrals make up a large majority of special education referrals, primarily for emotional and behavioral concerns (Raines et al., 2012). The attitudes and perspectives of teachers, especially in communities with high-turnover rates (Monk, 2007), play a role in the implementation of inclusive classrooms for students with disabilities (Ross-Hill, 2009). Current literature suggests that many teachers perceive that special education is the only resource available to help students who are struggling in school, which may include factors such as the students' socio-economic status, behaviors, and complex relations to race/ethnicity, differences between student ability and the expectations placed upon student population by state and federal standards, and ineffective policy (Albercht et al., 2012; ; Kim et al., 2021; Skiba et al., 2006; Sullivan et al., 2013; Sullivan & Osher, 2019). Because of these implicit biases, minoritized students are more likely to be placed in restrictive environments than their White peers, less likely of being placed in gifted programs, and experience negative social outcomes that increase the likelihood of dropping out of school (Ahram et al., 2011; Fish, 2017; Raines et al., 2012).

There have been a variety of approaches considered for reducing disproportionality such as the Checklist to Address Disproportionality in Special Education (CADSE) (Fiedler, 2008), implementation of multi-tiered systems of support or Response to Intervention (RtI), district level policy change, training professionals to engage in

culturally responsive practices (Ahram et al., 2011; Barrio, 2017; Sullivan & Proctor, 2016). All of which are supposed to be supported by the 15% of special education funding that is reserved for deconstructing disproportionality within school districts (Sullivan & Osher, 2019). However, these same policies and practices leave a large portion of interpretation open at the state level to what is defined as significant disproportionality, creating a loophole that contributes to the presence of disproportionality despite the Individuals with Disabilities Education Act (IDEA)'s efforts (Albercht et al., 2012; Sullivan & Osher, 2019).

One of the primary suspected reasons for disproportionality is the element of cultural differences between teachers and their students, and overall school demographics. Students who come from minoritized backgrounds that are largely different from that of their teachers are more likely to be referred for behavioral problems and may be removed from the classroom, likewise when there is more cultural match, behavioral referrals and removal from classrooms are significantly lower (Fish, 2017; Good et al., 2010; Hosp et al., 2003; Hoover et al., 2018; Skiba et al., 2014). An example of this is if there is a high-minoritized enrollment rate of students, there is a lower likelihood of identification of minoritized students than in schools with low-minoritized enrollment rates (Sullivan et al., 2013). Furthermore, the referral process and placement in special education services are often more complicated for students who are bilingual, which stems from factors such as school/district level referral practices (Klinger et al., 2006) and the bias of the intellectual assessment tests that may give students who are bilingual a disadvantage due to the cultural loading of the items (Aston et al., 2020). However, there is still limited research on language status and disproportionality in the public education system (Sullivan et al.,

2013), but the lasting impacts of disproportionality are being recognized in the notable, poor, post-school outcomes for these students, and is attributed to the lack of implementation of evidence-based practices within the classroom settings for ELL students (Fish, 2017; Gothberg et al., 2019).

Rurality

Rural communities are often characterized by their small populations, distance from large urban and suburban centers, low-resource availability, and limited economic prospects that often results in a greater likelihood of lower socio-economic status and poverty (Howley et al., 2009; Monk, 2007; Safer-Lichtenstein et al., 2021; Scarpa et al., 2020). Rurality has multiple definitions that can vary based on the context and purpose of classification, though it is often defined based upon measurements of county level data which can be largely variable based on county size and centers of population density (Probst et al., 2018; Tieken & Montgomery, 2021). For the purpose of this study, rurality is defined by combing the United Census Bureau (2010) definition of "any population, housing, or territory not in an urban area [more than 50,000 people]", and Probst and colleagues' (2018) definition which is county based and uses the terms "large" rural and "small" rural to refer to population size to account for the population range of "non-urban" of 10,000-50,000 as a large rural community, and a population of less than 10,000 as a small rural or frontier community.

Approximately 12 million children live in the rural communities of the United States of America, with approximately 30% of all public schools in rural settings (Hott et al., 2021; Probst et al., 2018); and because of the defining factors of rurality, these components impact the availability of resources in public schools and communities (e.g.,

limited access to specialists and professional development trainings, funding for schools; Hott et al., 2021; Howley et al., 2009), and are barriers for the inclusivity of students with disabilities (Belion et al., 2000; Farmer et al., 2011). Rural stressors also impact the quality of teacher mental health, burnout in rural communities, and state and federal policies that aim to help but end up harming in the process, which further contribute to the difficulties of hiring teachers, special education teachers, and school mental health and psychology personnel (Hott et al., 2021; Howley et al., 2009).

Additionally, community perspectives, traditions, and cultures can be contributing factors to disparities in rural communities (Rural Health Information Hub, 2021; Scarpa et al., 2020; Wilger, n.d.). Limited resources and funding often result in the need for innovative and efficient solutions to challenges faced within public schools and their communities at large, including the demand for teachers to take on more roles, and for the community to come together in support of local schools (Monk, 2007). The resource shortage within rural communities at large is also an element of community make-up, as rural areas often have long histories of resilience and self-sufficiency, there can be resistance to utilizing existing resources or new resources being introduced even if it they are in great need (i.e., physicians, dentists, mental health professionals, and social workers; Probst et al., 2018; Safer-Lichtenstein et al., 2021).

Within the Rocky Mountain West (RMW)—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming—there is limited research regarding special education literature in the rural communities of these states. This is largely due to the risk of identifying information due to small cell sizes of data, as well as the large geographic areas which many of the RMW states cover. This means that often times communities are

spread out across expansive areas of land, and host additional limitations to access of resources to remote regions. Furthermore, most of these states have a large rural population, many of which are considered to reside in underserved communities both for primary and mental health care (Singh et al., 2019). This further impacts the barriers of rural living and are typically the only focus of research related to physical and psychological health. By increasing the school-based equity research we do with rural communities, more of these barriers may lead to solutions, and the lens of rural struggle in education may begin to shift to one of rural successes, both of which are ever present within these spaces.

Rurality and Disproportionality

Across locations and communities, rural or urban, the predicting elements and patterns of disproportionality may vary, but as Sullivan and Artiles (2011) suggest, "the root causes are the same". Rural and non-rural areas are similar in the number of overall students present in special education, but the higher rates of poverty in rural areas increase the likelihood of a student being evaluated for a disability (Sutton et al., 2003). Additionally, rural states like Wyoming, have been noted as having high risk ratios which could suggest that the resources for disproportionality are not being utilized in these communities (Barrio, 2017). There is a notable difference between rural and suburban schools when it comes to the prevalence of ID, specifically in poor rural areas where more students were identified as being in a lower economic status (Knight et al., 2014), further highlighting the notion that students are more likely to be identified with ED in school with a high proportion of free/reduced price lunch. (Sullivan et al., 2013). Furthermore, rural schools are over representative of students with ID, and students with autism (AU) are

underrepresented when compared to non-rural communities (Kim et al., 2021; Singh et al., 2019). Due to the small sizes of many rural communities, they are often considered to have fewer minoritized students and are often excluded from research, which has led to a significant gap in the literature and understanding of how disproportionality may impact students in rural settings (Hosp et al., 2004). Despite this historical trend in population demographics, there has been an increasing presence of diverse student population in rural communities (Hoover et al., 2018), and this increase is significantly prominent in rural communities with high degrees of poverty (Farmer et al., 2011). While disproportionality has remained an important topic, and the presence of discrepancies has been well noted at the state and federal levels, these studies lose a large majority of smaller, local distinctions in the data, and make it harder for inequality to be addressed and changed in these smaller settings (Safer-Lichtenstein et al., 2021; Sullivan & Artiles, 2011).

The Current Study

Due to the sparse literature surrounding the role rurality may play in special education disproportionality, this study seeks to contribute research on the impact of rurality by examining special education populations within the regional states of the RMW, a largely rural portion of the US. Because of the limited research on rurality and disproportionality , and the absence of regionally specific research for the RMW, one of the goals of this study is to assist in opening the scope of research within these communities despite their historically small cell sizes of data. The primary questions I seek to answer are: (1) Does rural status of school districts in the RMW region of the US predict the percentage of students in special education, while taking into account the percentage of REM students and district-level socio-economic information? and (2) Within rural school

districts in the RMW region of the US, do district variables related to minoritized student populations and socio-economic information predict the percent of students in special education? It was hypothesized for research question 1, that the significant predictor for the percentage of students in special education would be district location. It was hypothesized that for research question 2, that specifically within rural schools, district-level variables such as REM, non-English language use , and socioeconomic status would be significant predictors of percentages of students receiving special education services.

CHAPTER III

METHOD

Procedures

I collected school district data reflecting states in the RMW[1] region of the US. All data were collected from the National Center for Education Statistics (NCES; Institute of Education Science, 2021) website.

Data Extraction and Entry

District data obtained from NCES for district rurality was inputted into REDCap (see Appendix A), a secure, web-based software platform designed to support data capture for research studies (Harris et al., 2009; Harris et al., 2019). The following district level data were also collected: SES (as determined by percent of students whose family's income is below the federal poverty line level and by the percentage of students whose families use food stamps/SNAP benefits), median family household income, percentage of primary languages spoken at home (English, Spanish, Indo-European, Asian), the percentage REM students (Black or African American, Hispanic/Latinx, Native American, Asian, Pacific Islander/Hawaiian, other, and two or more) NSCE district locale status (12 categories: City (Large. Midsize, Small), Suburban (Large, Midsize, Small), Town (Fringe, Distant, Remote), Rural (Fringe, Distant, Remote) (NCES, 2022), and the percentage of students receiving special education services (the percentage of students with disabilities. The county population was also entered into the Redcap file per district and was categorized based on geographic/population

[1] Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming

classification (defined as urban, large rural, small rural/frontier; Probst et al., 2018; US Census Bureau, 2010). All NCES reported data were from the 2015-2019 school years.

Dataset

A total of 1220 RMW-region school districts were represented in the dataset. For minimal requitement for data entry in the study, district data had to include student population and demographic percentages for the school district community. This resulted in 1098 districts included in the dataset. School district locales variables were further collapsed into four groups: City/Urban (n=87), Suburban (n =61), Town (n=226), Rural (n=724). Data entry was completed primarily by myself, with minor assistance from an undergraduate research assistant. The undergraduate research assistant completed training under my supervision and direction on how to enter and catalogue the dataset before beginning the data entry process.

Variables Used

The following variables from the compiled dataset were used in the current study: percentage of students in the district with disabilities, percentage of students race/ethnicity, percentages of primary languages spoken in the home, percentage of families below the national poverty level, and the percentage of families eligible for food stamps/SNAP benefits. Two variables were created after data entry: the percentages of all REM students in the district were collapsed into a variable that captured all non-white REM data labeled “REM”. The second new variable created was the collapsed percentages of students whose primary language is not English at home, wherein all non-English language data was condensed and labeled “non-English”. Both new variables

were created due to the small representation each race/ethnicity, and language had per district.

A total of 733 districts had valid data for percentage of students with disabilities (n=733, M = 5.23, SD = 5.73), 734 districts had valid data on primary languages spoken at home (English (84.71%), Spanish (11.93%), Indo-European languages (0.75%), Asian Pacifica languages (0.42%), and other languages (2.17%)), and 1079 districts had valid data for race and ethnicity (White (73.78%), Black (1.12%), Latine (15.93%), Asian (0.77%), Native/Indigenous (6.44%), Pacific Islander (0.07%), Other (0.08%), Two or more (1.90%). A MANOVA was conducted to determine if there was significant variability of these demographic factors across school district locales. Results from the MANOVA indicated there were significant variability of these variables across the data set, $F(48, 716) = 8.695$, $p < .001$). Table 1 displays descriptive statistics of variables used.

Table 1
Descriptive Continuous Variables

Variable	Total	Urban/City	Suburban	Town	Rural	
		M (SD)				*p*
Percent SPED	5.23 (5.73)	5.64 (3.44)	4.98 (2.27)	5.53 (4.42)	5.01 (7.06)	.734
Race/Ethnicity						
White	73.78 (25.92)	56.66 (24.87)	68.53 (20.67)	66.87 (26.32)	78.38 (24.94)	<.001
Black	1.12 (3.89)	4.48 (4.65)	2.58 (3.14)	0.91 (1.51)	0.67 (4.14)	<.001
Latine	15.93 (19.67)	31.44 (22.68)	22.68 (17.24)	20.65 (20.59	12.07 (17.71)	<.001
Native/Indigenous	6.44 (18.20)	2.71 (2.32)	2.37 (1.55)	0.72 (0.89)	0.42 (1.04)	<.001
Pacific Islander	0.08 (0.35)	2.20 (3.41)	1.18 (4.13)	8.85 (21.28)	6.63 (18.75)	.052
Asian	0.77 (1.40)	2.71 (2.32)	2.37 (1.55)	0.72 (0.89)	0.42 (1.04)	<.001
Other	0.07 (0.35)	0.04 (0.19)	0.07 (0.31)	0.07 (0.34)	0.08 (0.37)	.271
Two or More	1.99 (1.98)	2.72 (1.02)	2.41 (1.04)	1.95 (1.26)	1.93 (2.27)	.017
Language						
English	84.71 (17.64)	72.37 (20.23)	83.18 (14.43)	85.12 (16.83)	87.48 (16.83)	<.001

Spanish	11.93 (16.27)	24.18 (20.32)	13.52 (13.05)	12 (16.12)	8.89 (14.46)	<.001
Indo-European	0.75 (2.61)	0.93 (0.96)	1.16 (1.09)	0.48 (0.94)	0.80 (3.53)	.257
Asian / Pacific Islander	0.42 (1.03)	1.12 (1.18)	1.08 (1.02)	0.37 (0.96)	0.18 (0.90)	<.001
Other	2.17 (7.93)	1.36 (2.01)	1.10 (4.47)	2.18 (8.27)	2.52 (8.93)	.481
Percentage of families utilizing Food stamps / SNAP benefits	19.05 (13.59)	22.03 (11.30)	15.01 (10.79)	20.67 (13.77)	18.07 (14.13)	.003

Data Analysis Plan

I first ran the descriptive statistics of the data in the program JASP (JASP Team, 2022). Locale of the school districts was used as a primary factor during analysis, as it reflects direct location classification of each independent school district, and is not reliant only on county-based classification.

To answer research question 1, I conducted a multiple linear regression that examined the rural status of school districts in the RMW region of the US as a predict predictor of the percentage of students in special education, while taking into account the percentage of REM students and district-level socio-economic information. To answer research question 2, I conducted a second multiple linear regression which removed rural school districts in the RMW region of the US from the dataset and examined if district variables related to minoritized student populations and socio-economic information were predictive of the percent of students in special education.

For the first multiple linear regression, the dependent variable were the percentage of students in the district who receive special education services. The independent variables will include: rurality classification of the district, REM , Non-English, and the percentage of families using food stamps/SNAP benefits at the district level. Rural classification of the school districts was selected as the primary variable of interest; however, we controlled for the other variables as they have historically been associated with disproportionality in special education (Cruz & Rodl, 2018; Skiba et al., 2005, Skiba et al., 2016; Sullivan & Artiles, 2011; Sullivan & Bal, 2013).

For the second multiple linear regression, he dependent variable were the percentage of students in the district who receive special education services. The

independent variables will include: percent REM students in the district (all non-white REM data was condensed into one variable), percent of students whose primary language is not English at home (all non-English language data was condensed into one variable) and percentage of families using food stamps/SNAP benefits at the district level. Rurally classified school districts were excluded from this regression.

Bivariate correlations were conducted at the start of the analysis process to explore intial relations between the variables of interest. Two sets of variables were found to be significantly and highly correlated–the first being the percentage of Latine students and the percentage of Spanish as the primary language at home, $r(734) = 0.82$, $p < .001$; and the second being the percentage of families below the poverty level and the percentage of families using food stamps/SNAP benefits, $r(731) = 0.758$, $p < .001$). To avoid multicollinearity issues, only one of these pairs of variables was selected—the percentage of families receiving food stamps/SNAP benefits and the percentage of families whose home language is not English (Non-English). A third and final correlation was conducted to examine the possibility of any other collinearity among the variables of interest (Table 2).

Table 2

Correlation Matrix

	SPED	Location	Food Stamps	REM	Language
SPED	--	-.032	.049	-.036	-.073*
Location	--	--	-.062	-.253**	-.251**
Food Stamps	--	--	--	.649**	.411**

REM	--	--	--	--	.642**
Non-English	--	--	--	.642**	--

*p<05, **p<.001

SPED = percent of student receiving special education services; Location = district location (urban, rural, suburban); Food Stamps = percent of families in the district receiving food stamps or SNAP benefits; REM = percent of students in the district who are from a racially or ethnically minoritized background; Language = percent of students in the district whose primary home language is not English.

CHAPTER IV

RESULTS

Results from the first regression resulted in a significant model with variables accounting for <1% of the variance, $F(4, 722) = 2.989$, $p = .018$, $R^2 = .016$. Within the model, district location ($p = .131$) and the percentage of REM students in the district ($p = .296$) were not significant predictors of the percentage of students. However, the percentage of families in the district utilizing food stamps/SNAP benefits ($B = .120$, $p = .014$) and the percentage of students whose primary language at home is not English ($B = -.098$, $p = .046$) did significantly predict the percentage of students receiving special education services (see Table 3). Specifically, there was a positive relation between the percentage of students receiving food stamps/SNAP benefits and the percentage of students receiving special education services. Conversely, there was a negative relation between the percentage of students whose primary home language at home is not English and the percentage of students receiving special education services.

Table 3

Multiple Linear Regression Coefficients for Predicting Percentage of students in Special Education by Locale

	β	*t*	*p*
Locale (Collapsed)	-.058	-1.511	.131
Percentage of Food stamp / SNAP benefit usage	.120	2.475	.014
Percentage of REM	-.060	-1.045	.296
Percentage of Non-English Primary language	-.098	-2.00	.046

Results from the second regression resulted in a significant model but with variables accounting for 5% of the variance, $F(3, 356) = 7.145$, $p < .001$, $R^2 = .057$. The percentage of students whose primary language at home is not English ($B = -.064$, $p = .394$) was not a significant predictor of the percentage of students receiving special education. However, the percentage of families in the district utilizing food stamps/SNAP benefits ($B = .290$, $p < .001$) and the percentage of REM students in the district ($B = -.207$, $p = .019$) did significantly predict the percentage of student receiving special education services (Table 4). Specifically, there was a positive relation between the percentage of students receiving food stamps/SNAP benefits and the percentage of students receiving special education services. Conversely, there was a negative relation between the percentage of REM students, and the percentage of students receiving special education services.

Table 4

Multiple Linear Regression: Coefficients for Predicting Percentage of students in Special Education with Locale Excluded (Rural Data Deselected)

Variable	*β*	*t*	*p*
Percentage of Food stamp / SNAP benefit usage	.290	4.308	<.001
Percentage of REM	-.207	-2.358	.019
Percentage of Non-English Primary language	-.064	-.853	.394

CHAPTER V

DISCUSSION

School district location and the percentage of REM students did not significantly predict the percentage of students receiving special education services, however, of the additional variables used, the percentage of families utilizing food stamps/SNAP benefits, and the percentage of families whose primary language at home was not English were significant predictors in this model. For districts with a higher percentage of students where English was not the primary language spoken at home, there was a smaller percentage of students receiving special education services. Additionally, the results of this first regression examine all school district locales within the model and does not predict if rurality itself is the primary cause.

The analysis of the second multiple linear regression aides in clarifying these results, by removing locale as a covariate, and by filtering out rurally located school districts from the data set. The results of this second regression suggested that the model is also statistically significant, but the covariates of significance were slightly different. This second regression sheds light on possible system-level factors. In this regression, the percentage of families receiving food stamps/SNAP benefits, and the percentage of students who were REM were significant predictors in this model; the percentage of primary non-English languages spoken at home was not statistically significant in this model.

When looking at rural school districts, these factors are unique at the system-level, which impacts the percentage of students who are engaging with special education services. Since this regression is only looking at non-rural districts (City/Urban,

Suburban, and Town) it is of interest to note that the percentage of students receiving food stamps/SNAP benefits was still linked to an increase in special education, however, by removing rural school districts the percentage of REM students also emerged as significant. This finding is inverse to the language and REM findings of the first regression. This could be due to greater REM diversity in more urbanized school districts, which may have greater access to language resources in schools than rural districts, hence the inverse outcomes of these two regressions (Fish, 2017; Gothberg et al., 2019; Sullivan et al., 2013).

These findings also suggest that across school district locales, socio-economic variables, such as the percentage of families utilizing food stamps/SNAP benefits, are important elements of determining the root causes of disproportionality and have been noted as being relevant factors to consider given the high poverty rates of rural communities (Sullivan & Artiles, 2011; Farmer et al., 2011). Additionally, the difference in impact of locale included vs locale removed (rural excluded) in relation to the percentage of REM students, and the percentage of non-English languages spoken at home is important to consider, and may serve as a starting point to further expand research on how these demographic factors can vary from location to location, especially in the RMW (Sullivan et al., 2013).

Taking this point into consideration, after the analysis of the results of the multiple linear regressions, an exploratory analysis was conducted to compare the differences between City/Urban, Suburban, Town, and Rural locations independent of each other, and contained the same covariates as the linear regressions. The results from this exploratory analysis revealed that when disaggregated into district locale, City/Urban

and Suburban school districts within the RMW had significant predictive relationships between locale and percentage of students in special education services; whereas Town and Rural school districts did not. It is recommended that future research should continue to be explore more elements of this relation. Because this area of research is newly emerging, it requires more attention to understand the intersection of variables such as race/ethnicity, language, socioeconomic status, and rurality, both within the RMW and across the United States. Future research should continue to work towards engaging with rural school districts and communities, especially when it comes to exploring and developing understandings of the factors that influence the lives of students and their families.

Limitations

One of the primary limitations of this study is the available and accessible data. The data at is often available for rural settings tends to be suppressed in publicly accessible datasets due to the possibility of being identifiable due to their size. Concepts such as data cell size is most often associated with logistic regression, and is typically recommended as having a minimum of 10 observed data points per variable (Bollmer et al., 2007; Sullivan et al., 2020). Because of this practice of not reporting data publicly unless it has 10 or more for the sample size, we lose insight into small communities where there may not be more than 10 data points, and getting access to this data is particularly hard to do. However, it is not an excuse to avoid working with data from these communities, especially when examining issues of disproportionality (Sullivan et al., 2020). In particular, within the data available from NCES, there were many accounts of missing data for school districts for language, family income, poverty level, and food

stamp/SNAP benefit usage in the majority of rurally located school districts in the RMW. Additionally, Multiple linear regression is not the most advanced statistical analysis that could be run with this data, but due to my own level of experiences with statistical analysis, this research creates a beginning foundation for future research.

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APPENDIX

Current instrument: **NCES District Data** Return to edit view

NOTE: Please be aware that branching logic and calculated fields will not function on this page. They only work on the survey pages and data entry forms.

District Name_State	
County Level Demographics	
State Location of Distict	○ Arizona ○ Colorado ○ Idaho ○ Montana ○ Nevada ○ New Mexico ○ Utah ○ Wyoming
District County Location	
County population (total population)	
Population Classification	○ Urban (50,000+ population) ○ Large Rural (10,000-50,000 population) ○ Small Rural (less than 10,000 population)
District Level Demographics	
District Name	
Number of Schools in District	
District Student population (Total students)	
NCES Locale Designation	○ City - Large ○ City - Midsize ○ City - Small ○ Suburban - Large ○ Suburban - Midsize ○ Suburban - Small ○ Town - Fringe ○ Town - Distant ○ Town - Remote ○ Rural - Fringe ○ Rural - Distant ○ Rural - Remote
Languages Spoken in Homes (data from ACS-ED table collection)	
Percentage of English spoken in homes	
Percentage of Spanish spoken in home	
Percentage of other Indo-European language spoken in home	
Percentage of Asian and Pacific Islander languages spoken in home	
Percentage of Other languages spoken in home	
Disability and IEP Data	
Number of Students with IEPs	
Percentage of students with a disability	
Race and Ethnicity Data	
Race and ethnicity percentage: White	
Race and ethnicity percentage: Black	
Race and ethnicity percentage: Hispanic/Latino	
Race and ethnicity percentage: Asian	
Race and ethnicity percentage: American Indian/Native American/Alaskan Native	
Race and ethnicity percentage: Hawaiian and Pacific Islander	
Race and ethnicity percentage: Some other race alone	
Race and ethnicity percentage: two or more races	
Poverty and Free and Reduced Lunch	
Median Family Income	
Families with income below the poverty level	
Families with Food Stamp/SNAP benefits	