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Investigating Educational Disparities in Belize: A Quantitative Study on the Impact of Student-Level Sociocultural Factors on Academic Achievement Among High School Seniors Across Belize

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INVESTIGATING EDUCATIONAL DISPARITIES IN BELIZE: A QUANTITATIVE STUDY ON THE IMPACT OF STUDENT-LEVEL SOCIOCULTURAL FACTORS ON ACADEMIC ACHIEVEMENT AMONG HIGH SCHOOL SENIORS ACROSS BELIZE

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Aisha R. Usher

2020

To: Dean Michael R. Heithaus
College of Arts, Sciences and Education

This dissertation, written by Aisha R. Usher, and entitled Investigating Educational Disparities in Belize: A Quantitative Study on the Impact of Student-Level Sociocultural Factors on Academic Achievement Among High School Seniors Across Belize, having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this dissertation and recommend that it be approved.

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The dissertation of Aisha R. Usher is approved.

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Vice President for Research and Economic Development
and Dean of the University Graduate School

Florida International University, 2020

DEDICATION

I dedicate this and all that I do to the memory of my mother, Marta Alicia; my brother, Dean Alexander; and, Granny Mags. I also dedicate this dissertation to the children of Belize. May you recognize that you are limitless in your potential to create an improved world in which we can freely experience bounties of love, joy, and peace – the truest expressions of a full life.

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ABSTRACT OF THE DISSERTATION

INVESTIGATING EDUCATIONAL DISPARITIES IN BELIZE:

A QUANTITATIVE STUDY ON THE IMPACT OF STUDENT-LEVEL SOCIOCULTURAL FACTORS ON ACADEMIC ACHIEVEMENT AMONG HIGH SCHOOL SENIORS ACROSS BELIZE

by

Aisha R. Usher

Florida International University, 2020

Miami, Florida

Professor Hilary Landorf, Major Professor

The idea that education is a fundamental human right is garnering increased support from the international community. Yet, there are children throughout the world who face impediments to access quality education, while others face no such hardships; this concept is described as "educational inequality" or "educational disparity."

In Belize – a sparsely populated, English-speaking Caribbean country located in Central America – there have been reports of disparities in educational attainment along gender and ethnic lines; however, there has been little research focused on potential gaps in academic achievement, especially at the secondary level. The purpose of the present study was to investigate whether there are significant educational disparities in relation to academic performance in secondary schools across Belize. More specifically, the study sought to determine whether student-level sociocultural factors—namely gender, ethnicity, language, location of residence, and commute time to school — significantly impact academic performance as measured by students' end-

of-year English/language arts grade, end-of-year mathematics grade, and cumulative grade point average (GPA).

Overall, study results revealed that, among the study population, there were statistically significant disparities in academic achievement associated with gender, ethnicity, and first/native language. However, location of residence (urban or rural) and commute time did not significantly influence overall academic achievement or math achievement, in but had small effects on English achievement. Also, there were no intersectional (interaction) effects between ethnicity and gender, but there were intersectional effects between language and high school of attendance.

Using a postcolonial framework analysis, desired implications of the findings on praxis include: an evaluation of patriarchal effects on curriculum and gender roles in the classroom; a meaningful infusion of Belizean curricula and/or pedagogic approaches with localized knowledge and practices; the addition of bilingual, multilingual, and ESL programs at the secondary level; and, the development of culturally-relevant learning metrics using more holistic, contextualized measures of learning.

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LIST OF ACRONYMS

ANOVA	Analysis of Variance
CSEC	Caribbean Secondary Education Certificate
CXC	Caribbean Examinations Council
EFA	Education for All
GOB	Government of Belize
GPA	Grade Point Average
IDB	Inter-American Development Bank
IRB	Institutional Review Board
LAC	Latin America and the Caribbean
MOE	Ministry of Education
MDG	Millennium Development Goal
NGO	Non-governmental organization
PSE	Primary School Exit Exam
SDG	Sustainable Development Goal
SIB	Statistical Institute of Belize
SPSS	Statistical Package for the Social Sciences
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund

CHAPTER I

INTRODUCTION

The purpose of the present study was to investigate whether there are significant educational disparities in relation to academic performance in secondary schools across the Caribbean country of Belize. More specifically, the study sought to determine whether student-level sociocultural factors - namely gender, ethnicity, language, location of residence, and commute time to school - significantly impact academic performance.

The idea of education as a fundamental human right is garnering increased support from the international community (Miller, 2014; Nussbaum, 1997; United Nations, 2015), as evidenced by the adoption of the United Nations Millennium Development Goal (MDG) to provide universal access to primary education as a global priority (United Nations, 2015). The goal of universal access to primary education later evolved into the more refined 2015 Sustainable Development Goal (SDG) to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2019, p. 30). The critical focus and urgency towards the establishment of universal quality education is understandable, especially given that "the range of inequality in schooling attainment across countries is much greater than the range of inequality in income or consumption" (Jacob & Holsinger, 2008, p. 4).

Researchers, academic institutions, international financial bodies, governments, and non-governmental organizations (NGOs) have all invested considerable time and resources towards developing and maintaining an inclusive and equitable global educational landscape in many countries. Yet, despite efforts to assess the nature, extent, causes of educational disparities, and to bring solutions to eliminate them. they persist.

One explanation for the pervasiveness is that educational disparities are highly variable within and across countries (Jacob & Holsinger, 2008). Overall, the concept of educational inequality is complex, nuanced, and multifaceted (Jacob & Holsinger, 2008; Tikly, 2011). The issue of educational inequality is more complicated and expansive than lack of access and attainment, or even quality. Other issues such as school retention, curricular relevance, safety, reliable infrastructure and facilities, academic achievement, social justice, and student treatment are demonstrative of relevant and intersecting factors that can create disparity. As complex as the issue of educational inequality is, researchers must caution against the overgeneralization of research findings and the implementation of generic approaches and policies toward eradicating educational inequalities (Jacob & Holsinger, 2008).

Responsible discourse on educational disparities should always account for contextual factors, which can either confound or elucidate matters (Tikly, 2011). In Latin America and the Caribbean (LAC), for instance, "Small states are not only faced with the challenge of overcoming educational deficits that are the postcolonial legacy, but also with the promise and peril of globalization" (Jules, 2008, p. 203). As such, LAC remains the most inequitable region in the world (Vega et al., 2012). The smaller developing LAC countries strain under the pressure to provide marginalized and disadvantaged groups with access to education, as outlined in the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Education for All (EFA) initiative (Jules, 2008). In fact, in the region, "3.6 million children are out of primary school, and the situation is more critical at the secondary level where 2.8 million children and adolescents are out of lower secondary school and 7.6 million in upper secondary" (UNICEF, 2020a, para. 2).

Unfortunately, it is the most disadvantaged children who are commonly denied opportunity and access (UNESCO, 2015).

Belize is a small country that struggles to ensure that the entirety of its mostly-rural population has access to quality education (Almendarez, 2013; Jules, 2008; Ministry of Economic Development, 2010; Policy and Planning Unit, 2013b; Statistical Institute of Belize, 2016; Vairez et al., 2017). For the purposes of the current paper, quality education will be defined as recommended by Tikly (2011) as:

> one that enables all learners to realise the capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance wellbeing. The learning outcomes that are required vary according to context but at the end of the basic education cycle must include threshold levels of literacy and numeracy and life skills including awareness and prevention of disease (pp. 10-11).

Introduction to Belize

Belize is a relatively young developing country, having gained its independence from the British in 1981. The country, formerly British Honduras, is a uniquely Caribbean nation located on the Central American mainland, bordered by Mexico to the north, Guatemala to the west and south, and the Caribbean Sea to the east. Belize itself is divided into six districts: Corozal, Orange Walk, Belize, Cayo, Stann Creek, and Toledo (from north to south; Figure 1).

Figure 1

Map of Belize

The people of Belize, estimated to number about 360,000, are diverse and comprise several main ethnic groups: the Mestizo (descendants of indigenous Mayans and Europeans), who now make up roughly 42.5% of the population; the Creole (descendants of enslaved Blacks and Europeans), who were once the majority, but now account for only about 28.8% of the population; the Mayan (the indigenous peoples of the region), whose numbers total approximately 12.4% of the people of Belize; and the Garifuna (African descendants who migrated from St. Vincent and the Grenadines, known collectively as Garinagu), who form the minority with 6.1% of the country's population. The population also includes East Indians, Mennonites, Chinese, Pakistanis,

as well as a host of international migrants who have made Belize their home (Statistical Institute of Belize, 2015).

As a young independent nation, Belize has struggled to transcend the vestiges of colonialism. The country is a member of the British Commonwealth of Nations, which is a political association of countries that became self-governing post British colonial rule and like many of these countries, Belize retains Britain's monarch as Head of State (Commonwealth Secretariat, 2019). Since independence the former colony has strived to establish an autonomous central government able to facilitate the continuous development of infrastructure and the public sector, including the education system (Alemandarez, 2013). However, despite Belize's lure for tourists, because of its stunning biodiversity and the fact that it boasts the largest living barrier reef in the western hemisphere, the country's economic outlook is worrisome. Belize was reported to have a gross domestic product (GDP) of $3.218 billion, in 2017; the estimated public debt was measured at 99% of GDP (Central Intelligence Agency, 2019).

Belize's Education System: Colonial Influence

The first institute of formal education in Belize was established in 1816 during the British colonial era and was managed by the Anglican church (Bennett, 2008). From that time until well into independence, churches held steadfast control over schooling. In fact, the Government of Belize constituted a formal "church/state system of education and thus church schools and schools run by various voluntary organizations receive public funding and are declared public schools" (UNESCO-IBE, 2012, p. 4). These public church-run schools account for over half of the primary schools in the country, while secondary

schools, which are much fewer in number, are typically government-funded and non-denominational (Policy and Planning Unit, 2013b; UNESCO-IBE, 2012).

Today, the Ministry of Education formally serves as the main authority of education in the country; it collectively "establishes and sets national education goals and policies; provides support systems for the effective delivery of appropriate and equitable educational services at all levels of the education system; and monitors the quality and effectiveness of education" (UNESCO-IBE, 2012, p. 2). However, colonial influences prevail. For example, Belize's education system has maintained its adoption of the British model of schooling, in which divides school levels into preschool, primary standards 1-6 (equivalent to elementary and middle school grades in the U.S.), secondary forms I-IV (equivalent to grades 9-12 in the U.S.), and tertiary (junior college and university). However Jennings (2017) argued that, Commonwealth Caribbean countries, such as Belize, have "sought to move away from the Eurocentric content of their education and examination system and ensure the cultural relevance of their education" (p. 820), as evidenced by the formation of the Caribbean Examination Council in 1972 and the development of the Caribbean Secondary Education Certificate (CSEC) to replace British standardized assessments.

Current Educational Landscape of Belize

The Government of Belize (GOB) has made several attempts at educational reform in recent years. In 2010, the GOB issued a National Development Framework for Belize 2010-2030, which included a necessary focus on education (Ministry of Economic Development, 2010). The framework specified three education goals for 2030: "to provide quality education that is free and compulsory," "to ensure delivery of quality and

relevance in the curriculum" and "to create an education system that is inclusive, reflecting Belize's multiethnic, multi-cultural, multilingual society" (Ministry of Economic Development, 2010, p. 20). Accordingly, the GOB outlined strategies to enhance management, monitoring, and accountability in the education system. At present, it is difficult to assess where the country stands in terms of progress toward these goals.

In 2017, Belize's public spending on education as a share of GDP was 7.4 %, an increase from 5.2 % in 2003 (Central Intelligence Agency, 2019). There were 610 schools in the country in 2017, consisting of 231 preschools, 306 primary schools, 59 secondary (high) schools, 11 junior colleges, and three universities. Altogether (save for universities), they served about, 102,000 students, of which nearly 68,000 were enrolled in primary schools and approximately 22,000 in secondary schools (Policy and Planning Unit, 2017).

Transition rates from primary to secondary school averaged at about 83.9% -- 81.9% for males and 85.8% for females (Ministry of Education, 2018) -- as schooling is compulsory only for children aged 5 to 14 years (Government of Belize, 2003). In 2017 secondary school dropout rates were at 8.3% for Form 1 (freshman) students alone (Ministry of Education, 2018).

At the time the National Development Framework was drafted in 2010, the net enrollment ratio, which is the number of school aged students enrolled in school in Belize measured against the total number of school aged children in the population, was 98.3% for primary schools but only 52.4% for secondary schools (Policy and Planning Unit, 2013b). During the 2017-2018 academic year, the total secondary school net enrollment rate of the country was 50.0% (Ministry of Education, 2018); according to UNICEF

(2019) statistics, global upper secondary school net enrollment rates were averaged at about 65% for that same year.

Table 1

Belize Secondary School Net Enrollment Rate 2013/2014 to 2017/2018

Year	Male	Female	Total
2013/14	48.4	54.8	51.6
2014/15	48.5	55.7	52.1
2015/16	49.1	56.4	52.7
2016/17	48.0	54.7	51.3
2017/18	46.5	53.5	50.0

Note. Reprinted from Abstract of Education Statistics, by Ministry of Education of Belize (2018), p. 65.

Statement of the Problem

In global measures, Belize ranks 10 in education expenditures with a value of 7.4, in 2017, as aforementioned, placing Belize at the same level of expenditures as Costa Rica (Central Intelligence Agency, 2019). However, a 2013 report published by the Inter-American Development Bank (IDB) on the challenges and opportunities in the Belize education sector report serious issues with education. According to the report despite high levels of public spending on education, glaring inequalities in access and quality persist at all levels. Coverage and access at all levels of education are insufficient and inequitable. Many of those enrolled in the schools will repeat or drop out before graduating. Many children are still not achieving satisfactory levels of performance on exams. There is a serious shortage of trained and qualified teachers at all levels of the system, and there is limited enforcement of accountability. Spending in the sector is inefficient (Inter-American Development Bank, 2013, p. 5).

These issues are reflected in and supported by national statistics. Results from analyses of aggregated data indicate that there are disparities in educational attainment; inequalities have been identified along gender lines, as well as between rural and urban dwellers (Inter-American Development Bank, 2013; Policy and Planning Unit, 2013b). Disparities in attendance have also been found along ethnic lines, where attendance by Mayan children is disproportionately lower than children of all other ethnicities in Belize; the gap is especially notable at the secondary school level (Inter-American Development Bank, 2013). In a mixed-methods study on academic achievement amongst Garifuna students, Palacio (2013) also indicated that there were worrisome gaps in academic achievement between the ethnic minority and indigenous populations—the Garinagu and Maya—and all other ethnic groups in Belize. Study results showed that Garifuna and Maya students underperformed their peers across all educational levels. Garifuna males, in particular, were found to have had the lowest overall grade point averages (GPAs) amongst students in southern Belize (Palacio, 2013).

Further analyses of primary school level standardized testing scores revealed alarming district-based trends of disparities in educational attainment. Specifically, one study found that "the two southern districts (Stann Creek and Toledo) have consistently performed below the national mean and below other districts' means by 5-10 percent" (Vairez et al., 2017, p. 84). The widest gap between male and female repetition rates (rates at which students must repeat a grade level because of a cumulative GPA lower than 2.0, or a failing grade in English or Mathematics at the end of the school year) were also observed in the Toledo and Stann Creek districts, where the repetition rates for males were about twice that for females. National data showed that Stann Creek District had the

highest secondary level dropout rate (11.9%); males had higher dropout rates than females (Policy and Planning Unit, 2013b).

These statistics using aggregate level data provide only a general layout of the educational landscape of Belize. According to Clark and Levy (1976), "Probably the most serious disadvantage of using aggregate data is the inherent difficulty of making valid multilevel inferences based on a single level of analysis" (p. 429). Unfortunately, there is a dearth of research and analysis on individual level data in any field. Specifically, to date, no studies have been conducted to investigate educational inequalities at the secondary school level, based on student-level factors using individual-level data in Belize. Yet, it is critical to pinpoint, as accurately and definitively as possible, the nature of any academic achievement gaps that might exist among high school students across the country. It is especially important if Belize is to take heed of the IDB's warning that "Action is needed if Belize is not to lose a whole generation of youth" (Inter-American Development Bank, 2013, p. 3).

Purpose of the Study

The overall purpose of the dissertation was to investigate whether there are significant educational disparities in relation to academic performance in secondary schools across Belize. More specifically, the study sought to determine whether student-level sociocultural factors—namely gender, ethnicity, language, location of residence, and commute time to school — significantly impact academic performance as measured by students' end-of-year English/language arts grade, end-of-year mathematics grade, and cumulative grade point average (GPA).

Research Questions

This research was guided by three preliminary research questions and three main questions.

Preliminary Research Questions

1. Is there a significant interaction between first language and high school on students': overall achievement, English achievement, and mathematics achievement?

2. Is there a significant interaction between ethnicity and gender on high school students': overall achievement, English achievement, and mathematics achievement?

3. Is there a significant interaction between ethnicity and high school on high school students': overall achievement, English achievement, and mathematics achievement?

Main Research Questions:

4. Is there a significant effect on high school students' overall academic achievement from gender, ethnicity, language, location of residence, and commute time to school?

5. Is there a significant effect on high school students' English achievement from: gender, ethnicity, language, location of residence, and commute time to school?

6. Is there a significant effect on high school students' mathematics achievement from: gender, ethnicity, language, location of residence, and commute time to school?

Conceptual Framework

The current economic, political, and cultural state of Belize, including its educational system, is a direct consequence of its previous British colonial rule. It is impossible to examine the borders that define the country, the languages spoken there,

and the very makeup of the people who populate and have come to define the landscape of what is known as Belize without reference to colonialism.

Colonialism has been described as "a political act where one party cedes power (usually under threat) to another" (Boisselle, 2016, p. 1). Crossley and Tikly (2004) added that it should be viewed as "a violent event central to the developing new relationships of globalization and global capitalism" (p. 148). Indeed, several scholars have argued that colonialism has not ended but has simply evolved and thrives under the guise of globalization (Boisselle, 2016; Crossley & Tikly, 2004; Lunga, 2008). This concept of colonialism-turned-globalization is commonly referred to as neo-colonialism, and it is commonly linked to technological and economic rather than imperial domination (Lunga, 2008).

Decolonization was born out of the oppression and subjugation of the colonized. As Frantz Fanon (1963) affirmed in his seminal work, *The Wretched of the Earth*, decolonization is "a historical process…which….sets out to change the order of the world" (p. 36) and necessitates "a complete calling in question of the colonial situation" (p. 37). In today's language, what Fanon espoused as decolonization is now commonly termed postcolonialism.

According to Lunga (2008), the term postcolonial can be used in three distinct ways: as a descriptor of formerly colonized lands and geographical spaces; as a reference to a specific time period; and as a "a critique or textual approach to realities of oppression and subjugation" (p. 192). Postcolonial theory, an offshoot of the critical perspective, "represents a complex field of study, encompassing an array of matters that include issues such as identity, gender, race, racism, and ethnicity" (p. 193). It also offers "a critique of

imperial knowledge systems and languages and how they are circulated and legitimated and how they serve imperial interests" (p.193).

An effective overview of postcolonial theory in relation to education has been offered by Tikly (2011):

> Broadly speaking postcolonial theory is concerned with recognising the ongoing implications of the colonial encounter and of the 'postcolonial condition' for education. From this perspective, the continuing gap in the quality of education experienced by postcolonial elites on the one hand and the majority of the population on the other can be seen as having its roots in the highly unequal forms of provision that existed during colonial times. Key issues here include the continuing Eurocentric and irrelevant nature of many curricula and of text books, the authoritarian and teacher centered forms of pedagogy including the wide-spread use of corporal punishment, the highly gendered nature of schooling and the complexity of the language issue (p. 4).

Tikly (2011) also emphasized the significance of context. He stressed that, at the micro level, a postcolonial approach encourages policymakers to consider the educational needs of different types of learners as well as the forms of educational disadvantages or disparities experienced by diverse groups of student learners. At the macro level, Tikly (2011) argued that countries "differ in the way that they are positioned in relation to global flows and networks and this has implications for the kinds of skills and other outcomes from a good quality education that are required to promote 'successful globalisation" and that "there are significant differences both in terms of income, levels of poverty and inequality as well as in the prospects for growth" (p. 4). An example of

the ways in which the emphases on education differ across countries by income level is provided below in Table 2. In response to national and regional variations, postcolonial analysis must also be highly contextual and, preferably, region-specific.

Table 2

Priorities in education quality by level of national development

State	Emphasis within the quality debate
Post-conflict; newly found states	Subsistence, security, trust – school system, curriculum
Low-income countries	Access, livelihoods (coping; lasting; flexibility) – primary schools
Middle-income countries	Continuation – secondary schools, disadvantaged groups
OECD countries	Competencies, responsibility, lifelong learning

Note. Reprinted from Towards a framework for researching the quality of education in low-income countries, by Leon Tikly (2011), p. 3.

The current research study design was premised on two major concepts: (a) the influences of colonialism are current and ubiquitous; and (b) the effects of colonialism are multiple, complex, and distinct (according to the contextual factors of each country, region, or population). As Jacob and Holsinger (2008) explained, "No single factor can ultimately explain the local, regional, or national disparities associated with education in a given country and, in most cases, a multivariate explanation is required to portray the complexities associated with the inequalities of education" (p. 5). The current study is an attempt at a holistic, student-centered analysis, borrowing from Tikly's (2011) concept that:

> A postcolonial analysis also draws attention to the implications of multiple forms of disadvantage. There are differences in the way that the quality of education is

> experienced and the kinds of barriers encountered by different groups of disadvantaged learners and it is through understanding the interaction between these and other forms of disadvantage that a more holistic understanding of the barriers facing different groups in accessing a good quality education begins to emerge (p. 4).

Quantitative Research Design and Postcolonial Thought.

Quantitative research design has its roots in postpositivism (Creswell, 2014) or, more broadly, Western epistemology; thus, its very nature is contrary to postcolonial thought. Smith (2012) contended that:

> Theories about research are underpinned by a cultural system of classification and representation, by views about human nature, human mortality and virtue, by conceptions of space and time, by conceptions of gender and race. Ideas about these things help determine what counts as real. Systems of classification and representation enable different traditions or fragments of traditions to be retrieved and reformulated in different contexts as discourses, and then to be played out in systems of power and domination, with real material consequences for colonized people (p. 46).

Smith (2012) further argued that even research conducted by native or indigenous intellectuals can be used to legitimate (neo) colonial thought and practices.

However, in *Wretched of the Earth,* Franz Fanon, a revolutionary intellectual himself, outlined a series of phases through which "native intellectuals" potentially journey. The first phase is that of assimilation into Western culture and thought; the second being that of discomfort or questioning, which leads to a remembering of the past

and native origins; and, the third and final phase includes a realignment of the native intellectual with his or her own people, as well as other oppressed peoples, and a desire to awaken them (Smith, 2012). Meanwhile, Santos (2012) claimed that researchers can "keep distance" from Eurocentric approaches by "placing oneself simultaneously inside and outside what one critiques" (p. 47).

As argued by Tikly (2013), one is able to use research to counter the hegemonic effects of scientific knowledge by granting or providing access to the knowledge garnered to the majority of the population and to use the knowledge in "counter-hegemonic ways" (p 426). There is also the understanding that, ultimately, a researcher or native intellectual can be able successfully apply a postcolonial perspective to Western research; the requirement is that one has "a critical understanding of self in relation to the research process" (Tikly, 2013, p. 436).

Significance of the Study

Education is critical for development and growth. At the individual level, secondary education is a known predictor of earnings (Bing, 2008; Cohen, 2008; Ferreira & Gignoux, 2011; McDaniel & Kuehn, 2013). McDaniel and Kuehn found that in the United States, for example, "the employment and earnings gaps between workers with and without a high school diploma was larger than the employment and earnings gaps separating workers with a high school diploma and an associate degree" (p. 372). High school education has also been found to correlate with political participation in the democratic process, suggesting a more informed and civically engaged citizenry (Cohen, 2008). Additionally, education has been linked with health status and, in some developing countries, with an "increase in people's capacity and motivation to reduce

their own fertility, improve the survival of their children, and care for their own and their families' health" (Cohen, 2008, p. 572). Cumulatively, these factors translate to individual, societal, national, and global benefits (Bing, 2008; Ferreira & Gignoux, 2011; Jacob & Holsinger, 2008).

Secondary enrollment rates are particularly low in Latin America and the Caribbean (Delprato et al., 2017; Lopez, 2007). According to authors of the Global Monitoring Report, "the region is still one of the most unequal of the world" in terms of those who are enrolled in school and those who are not. (Delprato et al., 2017, p. 3) Delprato and colleagues explained that "factors such as poverty, gender, ethnicity, and where a child is born weigh heavily on whether children learn once in school. In several Latin American countries, differences in learning outcomes of students from different backgrounds remain wide" (p. 3).

The current study was designed in acknowledgement of the potential impact of secondary education on individual, societal, national, and global levels. As such, the study investigates educational disparities of students in select high schools across Belize. While the study makes no attempts at assigning or determining causation, it attempts the following: (a) to address the scarcity of literature on education in Belize by contributing data on educational disparities; (b) to provide a foundation for future research endeavors; (c) to identify significant patterns and trends in academic performance, as well as compile data for various stakeholders that can be utilized in the assessment or reform of education policies, practices, or resource allocation at the high school; and (d) to serve as a potential advocacy resource for marginalized student groups, whether associated with gender, location, language, or ethnicity. The stakeholders to whom this research will be

significant include students (especially marginalized student groups), teachers, administrators, assessment experts, and policymakers in Belize.

Assumptions

The current study assumes: (a) there are educational disparities in Belize associated with student-level sociocultural factors; (b) the current economic, political, and cultural state of Belize, including its educational system, is a direct consequence of its British colonial history; and (c) contextual factors are significant, and so matters of educational disparities are not wholly generalizable.

Although this study is guided by a postcolonial framework, myriad ideas and theories may influence the final interpretation of the study results. The aim is to remain transparent throughout this work and elucidate the concepts and ideas that shape the interpretation of study findings throughout.

Delimitations

The main purpose of the present study is to investigate educational disparities using student-level sociocultural factors amongst students in select high schools across Belize. Because of the limited scope of the current study, it may not be possible to generalize study findings to other schools throughout the country. One of the primary concerns related to GPAs (in terms of grading itself) is validity. According to Allen (2005):

> Validity addresses the accuracy of the assessment and grading procedures used by teachers. Do the assessment procedures and assignment of grades accurately reflect and communicate the academic achievement of the student? Validity is important because the sole purpose of grades is to accurately communicate to

> others the level of academic achievement that a student has obtained. If the grades are not accurate measures of the student's achievement, then they do not communicate the truth about the level of the student's academic achievement (p. 218).

Another issue is that grading can be highly subjective (Bowers, 2011; Pollio & Hochbein, 2015), and there is added inconsistency with grading criteria and assessments varying from teacher to teacher (Allen, 2005; Pollio & Hochbein, 2015).

Definition of Key Terms

Academic achievement gap: disparities in academic achievement or performance between or among student groups (along ethnic, socioeconomic, gender, et cetera lines).

Colonialism: "a political act where one party cedes power (usually under threat) to another" (Boisselle, 2016, p. 1).

Creole: both the people of Belize who are descendants of a mix of enslaved Blacks and Europeans, or the English dialect (and lingua franca) spoken in Belize.

Education for All: the initiative by United Nations Educational, Scientific and Cultural Organization's (UNESCO) to provide all children, including those belonging to marginalized and disadvantaged groups, with access to education (Jules, 2008).

Educational inequality or Educational disparity: These terms refer to the concept that some children face impediments to access quality education while others face no such hardships (Jacob & Holsinger, 2008).

Garifuna: African descendants who migrated from St. Vincent and the Greater Antilles, known collectively as Garinagu (Statistical Institute of Belize, 2015).

Garinagu: the collective term for Garifuna (Statistical Institute of Belize, 2015).

Grade point average: a grading method using a 1.0 to 4.0 range. Generally, a 4.0 GPA represents an A or mastery of a subject; 3.0 represents a B; 2.0 a C (basic proficiency in a subject); 1.0 a D; and 0 an F, with anything below a 2.0 demarcating the failure of a student to show sufficient evidence of proficiency or the ability to apply the necessary information or skills expected for that subject.

Mayan: one of the indigenous peoples of the Central American region.

Mestizo: people of Belize who are descendants of a mix of indigenous Mayans and Europeans (Statistical Institute of Belize, 2015).

Millennium Development Goals: the eight global goals, which range from eradicating extreme poverty rates to providing universal primary education, established by the United Nations in 2000 (United Nations, 2015).

Neo-colonialism: the idea that colonialism has not ended but has simply evolved and thrives under the guise of globalization (Boiselle, 2016; Crossley & Tikly, 2004; Lunga, 2008).

Postcolonial: This term can be used in three distinct ways: as a descriptor of formerly colonized lands and geographical spaces; a reference to a specific time period; and "a critique or textual approach to realities of oppression and subjugation" (Lunga, 2008, p. 192).

Postcolonialism or Postcolonial theory: an offshoot of the critical perspective that offers "a critique of imperial knowledge systems and languages and how they are circulated and legitimated and how they serve imperial interests" (Lunga, 2008, p. 193).

Quality education: education "that enables all learners to realise the capabilities they require to become economically productive, develop sustainable livelihoods,

contribute to peaceful and democratic societies and enhance wellbeing" (Tikly, 2011, pp. 10-11).

Repetition rate: rates at which students must repeat a grade level as a result of a cumulative grade point average (GPA) lower than 2.0, or a failing grade in English or mathematics at the end of the school year.

Transition rate: the rate at which students complete primary school and continue on to secondary school.

Chapter Summary

The first chapter of this dissertation presented an introduction to global educational inequalities, as well as and introduction to Belize, including the colonial foundation of Belize's education system and the current educational landscape of Belize. The chapter also discussed the statement of the problem, the purpose of the study and the corresponding preliminary and main research questions, the conceptual framework, significance of the study, assumptions, and delimitations. Finally, the chapter concludes with a list of the definitions of terms, chapter summary, and organization of the subsequent chapters.

Organization of the Chapters

This dissertation is divided into five chapters. This section concludes Chapter I, which included a general introduction to the topic of educational inequality, an introduction to Belize, including the colonial foundation of Belize's education system and the current educational landscape of the country, a statement of the problem, purpose of the study, and corresponding research questions. The conceptual framework, significance

of the study, definition of key terms, assumptions and delimitations, and organization of the chapters conclude this chapter.

Chapter II presents a review of pertinent literature related to the following topics: academic performance measures, ethnicity and ethnicity in Belize, language, gender, location, commute time to school. The chapter concludes with a summary and overview of the subsequent chapter.

Chapter III presents an overview of the study purpose and research questions, including the preliminary and main research questions. The third chapter also outlines the data and methodology, including the research design, study population, data sources, dependent variables, independent variables, analytical methods and techniques. Additionally, Chapter 3 covers the study limitations and ends with a chapter summary.

Chapter IV concentrates on the results of quantitative data analysis. It begins with an introduction, then a section on descriptive statistics, and results from exploratory data analyses. Following are the presentation and analyses of data for the study's preliminary research questions and main research questions. The chapter concludes with a summary.

Chapter V first restates the study purpose and research questions. A summary of findings, findings in relation to previous research, and a theoretical analysis follow. Finally, sections on implications for practice, recommendations for future research, and a brief conclusion end this chapter and dissertation.

CHAPTER II

LITERATURE REVIEW

Education, especially in low-income countries, is considered a cornerstone of development. Unfortunately, the data reveal that extensive educational disparities endure across countries of all socioeconomic spectrums and levels of development (World Bank, 2018). The World Bank (2018) affirmed that, in 2018, "[educational] exclusions based on poverty, location, gender, and ethnicity persist" (p. 60). While these inequalities might vary because of context or location, the crux of the matter is that children across the world continue to be denied the right to equitable and meaningful education (World Bank, 2018). Evidently, no single unified effort can eliminate these educational disparities; instead, they must be confronted one region, nation, city, school, and/or variable at a time.

First, it is critical to gain perspective on both the historical and the current educational trends in attainment and achievement; it is further imperative to identify the gaps in knowledge, which will help direct future research (Creswell, 2014). The purpose of this chapter is to present literature and research findings relevant to this study to serve as a foundation or compass for data analysis and the interpretation of the current study's findings. In order to research relevant literature, electronic peer-reviewed articles were searched from Florida International University's online library, using search terms related to educational disparities or inequality, academic achievement gap, gender inequality in education, influence of primary language on academic performance, and relationship between location of residence and academic attainment or academic performance.

Graduate level textbooks and books on the history of Belize's education system, ethnic groups of Belize, and postcolonialism were also used for research.

This chapter is divided into five major sections. The first section briefly discusses academic performance measures. The second section highlights the academic achievement gaps related to ethnicity or race and summarizes past explorations of the relationship between ethnicity and academic achievement amongst Latin American and Caribbean students. The focus of the third section is language; that is, how dialects and indigenous languages are perceived in parts of the Caribbean and how students' primary language might affect their academic performance. The fourth section outlines educational trends related to gender in Latin America and the Caribbean, such as disproportionately low educational attainment among females in certain areas and male academic underachievement in others. Following that is an overview of research on how the location of residence (urban versus rural) impacts educational attainment and academic performance. The final section of this chapter discusses the effects of commute time on educational variables. The chapter concludes with a summary and overview of the following chapter.

Academic Performance Measures

There are multiple approaches to researching inequalities in education; it is important to distinguish educational attainment from educational achievement or performance as a measure of educational progress. After all, "Schooling is not the same as learning" (World Bank, 2018, p. 3). This particular study measures academic performance; however, this chapter includes a literature review of studies that have

measured both attainment and achievement. The author has found that both measures are important in presenting a contextual overview of educational disparities in various forms.

The three main measures of academic performance used in this study are cumulative GPA, English/Language Arts achievement as measured by end-of-year classroom grade average, and mathematics achievement as measured by end-of-year classroom grade average. The rationale for using GPA and classroom grades is supported by existing literature, which posits that high school grades are better predictors of success than standardized test scores (Hoffman, 2002; Hoffman & Lowitzki, 2005).

The use of GPA has disadvantages, one critique is that grading can be highly subjective (Bowers, 2011; Pollio & Hochbein, 2015), and there is added inconsistency with grading criteria and assessments varying from teacher to teacher (Allen, 2005; Pollio & Hochbein, 2015). On the other hand, there can be reluctance to use standardized tests because they are not thoroughly objective; in fact, they have a historical, and arguably current, footprint of cultural bias and ethnocentricity (Fleming, 2000).

According to Duckworth and Seligman (2005):

> insofar as GPA reflects performance on hundreds of exams, papers, class discussions, and homework assignments assessed by multiple teachers over the course of a school year, GPA is a more valid indicator of academic achievement than a standardized test that samples a student's knowledge and skills over the course of a few hours (p. 944).

Additionally, Belizean secondary students do not sit a single, general-knowledge based standardized test, such as the Scholastic Aptitude Test (SAT) or American College Testing (ACT); rather, they sit Caribbean Secondary Education Certificate (CSEC)

examinations. The CSEC exams are regional examinations that were introduced by the Caribbean Examinations Council (CXC), which was established and became effective in April 1972. The CXC serves 16 participating Caribbean countries and territories and offers a total of 33 subject options—28 subjects at General Proficiency and five at Technical Proficiency (Caribbean Examinations Council, n.d.). Student performance is categorized into scores of Grades I-VI with Grade I being the highest level of attainment; in Belize, Grades I-III are considered passing or satisfactory. However, secondary students in Belize are under no obligation to sit any CSEC subject exams, as the scores are not weighted towards graduation.

Gender

The term gender is often conflated with sex, although the former is a social and behavioral construct and the latter describes a biological trait. For the purposes of this paper and the scope of this research, the term gender will be used to describe students' sex. This usage is according to Belizean cultural norms, as well as the prevalence of the use of the term "gender" in previous literature. However, the author acknowledges the difference in the two terms and is aware of the severe limitations of the use of the term gender in regard to those who self-identify in ways that are gender non-confirming or non-binary.

Inequalities along the gender divide have seemingly endured since time began. Females have been disadvantaged in most populations throughout the world as shown in numerous metrics when compared to their male counterparts. In education, for example, historically females were found to severely lag behind males in terms of educational attainment (Chisamya, Dejaeghere, Kendall, & Khan, 2012). In response to this pattern,

gender parity in educational access and attainment was established as one of the eight United Nations Millennium Development Goals in 2000. Yet in 2007, a mere third of the 181 countries with data available for analysis were found to have achieved gender parity goals in both primary and secondary schooling (Creighton & Park, 2010; Duryea et al., 2007). In 2018, "across 44 countries, boys in the poorer half of the population were almost 75% more likely to complete grade 5 than girls; by contrast, in the richer half of the population the boys' advantage was less than 20 percent" (World Bank, 2018, p. 63). Lastly, according to a 2015 United Nations report, "almost half of out-of-school girls (48%) are unlikely to ever go to school, compared to 37% of boys. On the other hand, boys are more likely to leave school early" (p. 25).

In Latin America and the Caribbean a study in 2007 on educational attainment by Duryea, Galiani, Nopo, and Piras indicated that the overall gender gap for individuals born at the end of the 1960s had closed, and the gap for those born in 1980 had actually reversed, with females completing slightly more schooling than males. However, specific country analyses showed that gender gaps in favor of males have persisted in Bolivia, Guatemala, Peru, and some parts of Mexico; these gaps were more prominent amongst older children in low-income indigenous communities. In Bolivia, Guatemala, and Peru, school attainment was highest among non-indigenous groups (with similar rates between males and females), followed by indigenous males, and with indigenous females attaining the lowest rates of schooling (Duryea et al., 2007). Ethnicity was cited as being least impactful in Mexico. A study by Creighton and Park (2010), however, emphasized that "barriers do persist for girls in certain subpopulations. An estimated 99 percent of Latin

American girls not in school come from excluded groups of indigenous and Afro-Latino groups" (p. 514).

Income, on the other hand, had a significant impact on schooling for females across all four countries, with males completing more years of schooling than females among low-income families; conversely, among high-income families, females completed more years of schooling than their male peers (Duryea et al., 2007). Financial resources are commonly interrelated with educational attainment. For instance, in Mexico, the greatest period of education expansion occurred during the 11-Year Plan (1959-1975). This initiative included two major government subsidies—e.g., the provision of meals in schools and textbooks—that were particularly beneficial to girls (Creighton & Park, 2010). According to Creighton and Park (2010), these two components reduced the costs associated with school attendance and may have served as the catalyst to help close the gender gap for primary level education in Mexico. As such, existing literature has exhorted future research to "consider the issues of social class and ethnicity as well as gender in any explanatory framework of gender differentials, and to integrate school-based, cultural and home factors in the analysis" (Younger & Cobbett, 2014, p. 3).

Similar to Latin America, the Caribbean has recently made great strides in closing the gender gap for females, making these regions among the first to do so in the developing world (Anderson-Fye, 2010). In fact, females soon began to outperform their male counterparts (Anderson-Fye, 2010; Cobbett & Younger, 2012; Parry, 1996; Younger & Cobbett, 2014) to the point where the issue of male underachievement began to take prominence in the educational landscape (Cobbett & Younger, 2012). As Cobbett

and Younger (2012) asserted, since the 1990s the gender debate "has been preoccupied with concerns about boys, their levels of achievement, their disengagement with schooling, their vulnerability exacerbated by 'at risk' behavior, and their lack of critical life skills for meaningful participation in post-industrial countries" (p. 1).Several qualitative studies have been dedicated to exploring some of the gender dynamics associated with and implications of male underachievement in the Caribbean.

In Antigua and Barbuda, researchers found that teachers held gendered assumptions, which translated to males receiving more positive and negative attention from teachers in the classroom; that is, male students were selected more often to participate in class, via random selection or from raised hands, and also received more disciplinary actions against them (Younger & Cobbett, 2014). Meanwhile, outside the classroom, it appeared that both males and females were under pressure "to perform gender along normative lines" (p. 1). Per Younger and Cobbett (2014):

> Low achieving boys, in particular, across all schools, made a show of their lack of interest, enacting resistance to the teacher either passively—e.g. by frequently acting as though asleep during lessons, or adopting exaggerated body postures designed to attract attention—or more overtly, by walking around or leaving the class while the teacher was talking, knocking over desks or papers or having loud conversations with friends during the class (pp. 9-10).

Furthermore, student interviews revealed that both male and female students viewed girls as smarter and more inclined to do well in school. Additionally, the girls generally admitted to the idea that "boys needed and deserved more punishments, because of their misbehavior and because of their innate 'tough maleness.' Girls also

agreed that they can get away with things, some things that the boys don't get away with" (Younger & Cobbett, 2014, p. 9).

An earlier study, by Parry (1996), on gender in classrooms in Jamaica, Barbados, and St. Vincent and the Grenadines similarly reported that primary- and secondary-level female students outperformed their male peers. Parry also noted a gender divide in subject selection and subject performance; specifically, females students tended to move into and excel in arts tracks, while male students majored and excelled in the sciences. It was found that "teachers clearly differentiate subject areas along gender lines, and in some cases curriculums still channel males and females into distinctive subject choices" and that "certain skills were described by respondents as more feminine than others. English language and literature in particular clearly fell into this category" (p. 9).

Parry (1996) argued that the gendered pedagogical interactions that were observed in the classroom were secondary to cultural expectations and notions of masculinity. Similar to the idea of gender regime, school policies and teacher practices generally reinforce those gendered norms. However, Parry also introduced the concept of symbolic interactionism, which suggests that classroom interactions are not isolated to internal classroom influences, but are influenced by external social, historical, biological, and environmental factors. Unfortunately, as Odih (2002) mentioned, analyses of gender disparities tend to focus either on structural or individual determinants.

Consistent with previous analyses, Cobbett and Younger (2012) found that one study, which attempted to interpret the issue of male underachievement throughout the whole of the Caribbean, suggested that the underachievement of some male students "is linked to particular performances of masculinity" (p. 613). Cobbett and Younger's

analysis of existing data provided additional support for the claim that there is a regional gender disparity, regardless of the cause of male underachievement. Their analysis also highlighted that academic achievement gaps appeared more striking when viewed on a country-by-country basis. In fact, of the 11 countries analyzed, only Grenada had an educational disparity at the secondary level that was in favor of males (Cobbett & Younger, 2012).

In Belize, overall, female students also outperform male students at the secondary level (Policy and Planning Unit, 2013b). Females also tend to complete more schooling than their male peers, if only by a minimal amount. Yet, when investigating these variables at the district level, interesting trends reveal themselves; for instance, the widest gap between male and female repetition rates were observed in the Toledo and Stann Creek districts, where the repetition rates for males were about twice that for females(Policy and Planning Unit, 2013b). Overall, females complete an average of 10.5 years of schooling, whereas males complete about 10.4 years. Although patterns in Belize have revealed that females attain more years of schooling, gender disparities might play out differently across subjects or disciplines, such as science, technology engineering, and mathematics (STEM). To date there has been insufficient analyses of data comparing subject-specific academic performance between the genders.

Ethnicity

Educational disparities associated with race and/or ethnicity are an inescapable reality. By the common measures of academic achievement in the United States— GPA and standardized aptitude test scores—Black students have unequivocally underperformed all other ethnic groups (Dotterer et al., 2009; Irving & Hudley, 2005;

Whaley & Noël, 2012). An analysis of longitudinal data for over 14,500 students in the United Kingdom showed similar results. “The mean attainment gap in national tests at age 14 between White British and several ethnic minority groups was large, more than three times the size of the gender gap” (Strand, 2011, p. 197). According to Strand (2011, 2012), Black Caribbean students made up the only group (including Whites and other ethnic minorities) for which no socioeconomic or other contextual variables correlated with academic achievement; ethnicity was the only apparent related factor.

In regional comparisons using international data, the educational inequalities between Africa and the rest of the world appear to be growing (Tikly, 2011), and academic achievement rates for Blacks have also been low in Latin America although indigenous students in Latin American and the Caribbean have been shown to grossly underperform their peers as well (Cox, 2010).

Myriad studies have been designed and conducted to investigate factors that contribute to the underperformance of Black and indigenous children; yet, educational parity among the races or ethnic groups has not been achieved. Bower (2013) contended that one of the shortcomings of educational research and reforms related to educational disparities is that they “tend to focus on what happens inside schools, despite research consistently indicating that non-school factors contribute more to the large achievement gap between different races and classes than do in-school factors” (p. 3). Several studies, however, have focused on the relationship between ethnic identity, which describes “the degree to which an individual understands and associates with his or her ethnic heritage” (Hipolito-Delgado, 2016, p. 98), and academic achievement. A study by Brown and Chu (2012) found that ethnic identity among Latino elementary school children was positively

correlated with academic performance; however, "strong, positive ethnic identity was only associated with greater academic performance among children at predominantly White schools" (p. 1483). Comparably, findings from a study by Falbo and De Baessa (2006) indicated that both ethnic identity and school context were related to academic achievement. In Guatemala, both the Latino (the majority group), also referred to as Ladino or Mestizo, and Mayan (the minority group) students who were enrolled in Mayan schools made significantly greater gains in reading and mathematics skills than their peers enrolled in non-Mayan schools. Additionally, both groups in the Mayan schools have showed higher increases in ethnic identity scores than those in non-Mayan schools.

Ethnicity in Belize

The distinctions between the ethnicities in Belize are not so clear, or "Black and White." There is evidence to suggest that it has been that way even before the adoption of Belize (then British Honduras) as a British colony in 1862 (Cunin & Hoffman, 2013). In the census of 1861, the racial or ethnic categories had included Anglo, African, Spanish, Carib (referring to the Garifuna), Syrian, Chinese, and Coolie (referring to East Indians), while quite obviously missing any categories for the Maya/Natives as they were considered potential enemies (Cunin & Hoffman, 2013). Yet, in 1889, British reports to the empire described the population using only four categories: "Native" who are now referred to as Mayan; "Ladino," also called Spaniard or Spanish; "Colored," who are now classified Creole; and "Carib," who are now appropriately referred to as Garifuna or Garinagu (Cunin & Hoffman, 2013). According to Cunin and Hoffman, by 1931, British representatives reported that "owing to an intermixing, racial classification of the

population is difficult and unreliable" (p. 43). Indeed, the two main ethnic groups (Creole and Mestizo) in the country are essentially mixed groups, and the rates of bi- and multi-ethnicity mixtures are increasing, making it steadily more difficult to classify and track the population associated with ethnicity. At the time of the 2010 census, the Government of Belize addressed the issue by allowing respondents to "indicate membership in up to two ethnic groups" (SIB, 2013, p. 19); there were no classifications for bi- or multi-ethnic. Refer to Table 3 for a depiction of the 2010 census showing Belize's ethnic population according to self-identification.

Table 3

*Percentage of Population by Self-Identified Ethnicity and District, Belize 2010**

Ethnic Groups	No of Persons	Percentage of Population	Percentage of Population in District Claiming Ethnic Group					
			Corozal	Orange Walk	Belize	Cayo	Stann Creek	Toledo
Asian (Japanese, Chinese, Taiwanese)	3,316	1.0	0.8	0.8	1.5	1.0	0.9	0.3
Caucasian/White	4,015	1.2	1.0	0.3	1.7	1.3	1.7	1.0
Creole	83,460	25.9	8.0	7.2	56.5	18.5	22.0	5.0
East Indian	12,452	3.9	4.3	0.7	5.4	2.1	5.0	6.3
Garifuna	19,639	6.1	0.9	0.8	6.4	2.0	27.5	6.1
Maya	36,507	11.3	2.8	1.7	2.4	8.0	16.9	66.5
Mennonite	11,574	3.6	6.7	11.1	0.2	4.2	0.2	0.8
Mestizo/Spanish/Latino	170,446	52.9	79.3	79.7	34.5	67.5	33.9	19.9
Other	4,010	1.2	0.9	0.5	2.4	0.9	1.0	0.5
Not Stated	845	0.3	0.7	0.3	0.2	0.2	0.2	0.1
Total Population	-	322,453	41,061	45,946	95,292	75,046	34,323	30,785

*Column percentages will not sum to 100, as some persons claim more than one ethnic group

Note. Reprinted from *Belize Population and Housing Census 2010: Country Report*, by Statistical Institute of Belize (2013), p. 19.

Multiracial populations are actually increasing globally, not just in Belize yet research on multiracial identity, especially in relation to education and academic achievement, remains limited (Herman, 2009). A study conducted by Herman (2009) to

investigate differences in academic performance among monoracial and multiracial high school students in the United States revealed that among multiracial students, their ancestry did not impact academic performance, but their racial identification did. For example, "part-Black students who assert a Black identity also have lower grades than do those [part-Asian students] who assert an Asian identity" (Herman, 2009, p. 36). Study results also showed that contextual variables were significantly related to grades among monoracial students, but not multiracial students, whose grades were influenced by racial identification, prior grades, and peers' academic values (Herman, 2009). These results suggest that it is important to not lump bi- or multi-racial individuals into a singular group and to acknowledge that self-identification matters. In the case of Belize, the development of more progressive (or sophisticated) ethnic classifications should be considered to capture the complexities and intricacies of the country's diverse, multi-ethnic population for self-identification purposes.

Research on ethnic identity in Belize is scarce; even more rare are studies on the effect of ethnicity or ethnic identity on academic performance. One qualitative study by Palacio (2013) illustrated an academic achievement gap between the ethnic minority and indigenous populations—the Garinagu and Mayan—and all other ethnic groups in Belize. Palacio asserted that Garifuna and Mayan students are underperforming their peers across all educational levels. The results from this study should serve as an important addition to the existing literature on the subject matter and will, hopefully, inspire more extensive research on the issue.

Language

The homogenization of language is one of the ubiquitous consequences of colonialism. Throughout the Caribbean, former British colonies have maintained English as a primary, if not the sole, national language. As such, English is also the preferred and legal medium of most oral and all written general education classes in public schools in these nations (Devonish & Carpenter, 2007). It is worthy to note that the clear majority of those populations do not speak standard English; instead, they speak some form of creole or patois—i.e., a variation of English, with its own grammatical structures. In the words of the Jamaican poet Mutabaruka, "We write a language we do not speak. We speak a language we do not write" (as cited in Devonish & Carpenter, 2007, p. 282). Caribbean schools, which are still modeled after the colonial and Western education systems, continue to operate under the assumption that "pupils were mother-tongue speakers of English, albeit an ungrammatical and non-standard variety of that language" (Devonish & Carpenter, 2007, p. 277).

Belize is distinct among the Caribbean countries, especially in terms of its linguistic diversity. According to the Statistical Institute of Belize (SIB) (2013), "Despite English being its official language, only 63 percent of Belize's population over the age of three years speak English well enough to have a conversation" (p. 21). Statistics show that Spanish is spoken by 56.6% of the population, Creole (Kriol) by 44.6%, Mayan (mostly Kekchi or Mopan) by 10.5%, German by 3.2%, and Garifuna by 2.9%, in addition to Mandarin, Hindi, Arabic, and various other languages (SIB, 2013).

According to the Belize Education Act, Chapter 36, Part VI, Subpart A, 110.(1) (2003), "No citizen or resident of Belize shall be refused admission to any school on

account of race, ethnicity, language, political affiliation, region or the country of origin, special needs or because of perceived social and economic status" (p. 102). The language policy of the Middle Division Language Arts Curriculum states that:

When deciding whether to use languages other than English, teachers should be guided by the following three principles:

- Proficiency in standard English by the end of primary school is the goal for all students in Belize.

- Lower Division students may use any language to attain a language arts learning outcome unless 'standard English' is explicitly stated in the curriculum.

- By the end of lower division, students should be using standard English most of the time (Ministry of Education of Belize, 2008, p. 3).

The language policy also included guidance to teachers, such as:

- Recognize that all students come to school with strengths in their home language;

- Plan language and literacy instruction that builds on students' home language experiences;

- Where appropriate, provide initial language and literacy instruction in the child's home language (Ministry of Education of Belize, 2008, p. 3).

However, the government of Belize does not appear to fully embrace the country's linguistic diversity in practice in the educational realm. While the policy espoused in the curriculum is inclusive, for all intents and purposes, English remains the primary, if not sole, mode of instruction in schools throughout Belize (Salmon, 2015). Notably the National Development Framework 2010-2030 (2010) does not make a single reference to bilingualism or the concept of teaching English as a second language. Overall, the approach to bilingualism in Belize seems lackluster, and raises the question of the implications for students in Belize for whom standard English is not the primary or preferred language.

In Belize, there are other linguistic trends that deserve further investigation. For example, SIB (2013) noted that, "despite the Garifuna population being almost twice as large as the Mennonite population, a larger proportion of the population speaks German than Garifuna" (p. 21). German, of course, is a European language and is spoken by Mennonites who reside in highly homogenous, mostly self-sustaining communities in the country. As Table 4 below indicates, the largest number of Garifuna speakers reside in the Stann Creek district.

Table 4

*Percentage of Population Four Years and Older by Language and District, Belize 2010**

Languages	Number of Persons	Percentage of Population	Percent of Population in Districts Speaking the Language					
			Corozal	Orange Walk	Belize	Cayo	Stann Creek	Toledo
Chinese	2,600	0.9	0.7	0.7	1.3	0.8	0.9	0.3
Creole	130,467	44.6	18.9	16.8	63.6	39.9	67.4	47.2
English	183,903	62.9	54.4	62.2	72.5	66.7	52.0	47.9
Garifuna	8,442	2.9	0.4	0.5	2.7	0.9	13.8	3.0
German	9,364	3.2	5.8	10.0	0.1	3.9	0.3	0.7
Maya	30,748	10.5	2.5	2.3	1.2	6.2	16.3	68.4
Spanish	165,296	56.6	84.7	85.6	34.1	71.5	39.3	28.2
Other	2,729	0.9	0.5	0.6	1.5	0.9	0.8	0.3
Cannot Speak	609	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Not Stated	928	0.3	0.4	0.3	0.4	0.3	0.3	0.2
Population 4 + Yrs.	-	292,263	37,079	41,478	87,486	68,072	31,041	27,107

*Percentages will not sum to 100, as some persons speak multiple languages

Note. Reprinted from *Belize Population and Housing Census 2010: Country Report*, by Statistical Institute of Belize (2013), p. 21.

It is important to note that despite what the statistics show, Creole (Kriol) is the lingua franca of the country. Kriol is viewed by some Belizeans as a formal dialect that merits its own study and, by others, as simply "bad" or "broken" English that should be corrected (Abtahian, 2017). Scholars have argued that the receptivity of language is related to prestige or status and identity (Abtahian, 2017; Bonner, 2001; Devonish & Carpenter, 2007; Salmon, 2015). This sentiment was also recorded in 1967 in regard to the Francophone Caribbean, when Frantz Fanon (1963 or 1967?) noted that:

> The middle class in the Antilles never speak Creole except to their servants. In school the children of Martinique are taught to scorn the dialect. One avoids Creolisms. Some families completely forbid the use of Creole, and mothers ridicule their children for speaking it (p. 20).

A mixed-methods study on attitudes, gender, and prestige related to Kriol in Belize revealed that even slight variations of Kriol were viewed hierarchically (Salmon, 2015). That is to say, the brand of Kriol spoken in the city was considered more prestigious than those spoken in smaller towns, which were, in turn, perceived as favorable to the varieties of Kriol spoken in villages and extremely rural areas (Salmon, 2015). Overall, Kriol was viewed more positively than minority and indigenous languages, such as Garifuna and the Mayan languages of Belize, Mopan and Kekchi; nevertheless, Kriol was ranked below standard English in terms of prestige (Salmon, 2015).

In 2001, Bonner carried out a qualitative study to explore "the effects of ethnic stereotypes, demographic shifts, and nationalism on language choice in the town of Dangriga, Belize [in the Stann Creek District]" (p. 81). She found that "language choice in multilingual Dangriga is complicated by concerns for status as well as by competing norms of affiliation and identification" (Bonner, 2001, p. 94). The study findings also illustrated a perceived association between not only the Kriol language and identity as a Belizean, but also associations between language and legal, political, and financial privileges bestowed to "authentic" Belizeans. Perhaps for that reason, as well as to distinguish themselves from Spanish-speaking immigrants, it was found that Garifuna youth typically opted to speak Kriol (the majority language) in multiethnic settings . The same study found that Spanish speakers, on the other hand, "express[ed] the desire that their children learn U.S. Standard English rather than Creole English" (p. 93). A mixed-methods study on language use by Balam, Pérez, and Mayans (2014), however, posited that in the northern region of Belize Spanish speakers had mostly embraced code-

switching, as they associate it with their "mixed, multiplex identity" (p. 243). It should be emphasized, however, that the study by Balam, Pérez, and Mayans comprised a mere sample of 25 high school students; hence, the results would not be considered generalizable although. the study provided a glimpse into the perceptions of Belizean Spanish-speaking students on language.

More recently, Abtahian (2017) conducted a qualitative study exploring perceptions of Garifuna, Kriol, and English languages among residents of four rural Garifuna communities (Hopkins, Seine Bight, Georgetown, and Barranco), which are less ethnically and linguistically diverse than Dangriga, where Bonner (2001) conducted her study. In fact, Dangriga is commonly referred to as the "Culture Capital" of Belize. Findings indicated that both old and young residents of these communities described Garifuna as their first language, regardless of whether they used it primarily in their daily lives or not. Results also revealed that many of the Garifuna speakers who participated in the study reported some reservations about using Kriol:

> Speakers in Hopkins demonstrate a variety of beliefs about Kriol, but an overarching theme of these is that Kriol is not (or should not be) a native language of Garifuna people. For some this stems from a fear that Kriol is replacing Garifuna; others fear that use of Kriol is detrimental to learning English, stemming from a view of Kriol as an illegitimate form of English (Abtahian, 2017, p. 361).

This finding was in contrast to the earlier findings by Bonner (2001). Abtahian also emphasized that many Garinagu considered the Garifuna language a significant element of their cultural and ethnic identity. Unfortunately, no studies providing

information on linguistic patterns or associations between language and identity of Mayan language speakers were found for comparison or discussion.

According to Devonish and Carpenter (2007), language is not only a question of identity, but also one of schooling. “Bilingualism involving a low status vernacular language tends to be frowned upon as corrupting the speaker’s ability to use the other, higher status language” (p. 285). However, in their study of a bilingual pilot program in Jamaica, they found that, despite public support and a perceived lack of syntax and linguistic structure of Jamaican patois, primary school children acquired literacy in patois concurrently with standard English. Furthermore, those students were able to distinguish and switch between the two depending on context and audience. Interestingly, the researchers did note that the (grades 1-4) students in the study did correlate language with status, with results showing that they associated “English with the Doctor and Jamaican with the Market Vendor” (p. 300).

There are many different ways to view and examine the effect of the relationship between language and education. For example, a secondary analysis of extant data was performed to examine whether first language was related to academic achievement (measured by PSE scores) amongst primary school students in Belize (Vairez et al., 2017). The results indicated that academic achievement seemed to parallel the social hierarchies of language. Specifically, “students who had ‘other languages’ as their first language instead of one of the primary languages (Garifuna, Maya, Spanish, or Creole) experienced more academic success in all the districts” (p. 99). Students with first languages, such as Chinese Mandarin, German, Russian, etc., performed better on the PSE than Belizean students. Garifuna- and Maya-speaking students underperformed their

peers; however, Garifuna-speaking students who live in the southern districts of Belize (which has the largest concentrations of the Garifuna population) obtained higher PSE scores than Garifuna-speaking students who reside elsewhere in the country. In the southern districts (only), it was found that Kriol-speaking students outperformed the Spanish-speaking students as well. It is apparent that the effects of language on the academic achievement of Mayan- and Garifuna-speaking students must be further investigated.

Location of Residence

The world is becoming increasingly urbanized, and there is sufficient evidence to support the idea that populations in urban areas typically have access to greater opportunities—including educational—than their counterparts in rural areas. As one would expect, countries with "the highest structural poverty" (Lopez, 2007, p. 20) tend to display the larger gaps in urban-rural educational attainment; this is especially true in relation to secondary schooling. However, even developed nations are not exempt from rural disadvantage. There is an ongoing struggle to achieve parity between the urban and rural areas, albeit to varying degrees, in all regions of the world. Countries in Asia, Africa, Latin America, the Caribbean, and even the United States have failed to eradicate the urban-rural educational disparity, especially in terms of secondary schooling (Dudwick et al., 2011).

The question of whether the disparities across the urban-rural divide are improving or worsening has been a point of debate among research groups. According to a 2009 World Bank report, "the evidence on the evolution of rural-urban welfare inequalities over time is mixed. Considerable literature exists on both the theoretical and

empirical aspects of the convergence or divergence of rural and urban living standards as countries develop" (as cited in Dudwick et al., 2011, p. 27). One of the limitations to the research on the urban-rural divide is that the terms themselves have not been conclusively defined. Definitions of urban and rural areas vary from country to country (or even within countries) and can be based on administrative boundaries, size, level of services, or population density (Dudwick et al., 2011). According to the United Nations (2004), "given the variety of situations in the countries of the world, it is not possible or desirable to adopt uniform criteria to distinguish urban areas from rural areas" (as cited in Dudwick et al., 2011, p. 16). For instance, in Belize, there are only two major cities across all six districts. It is unclear whether towns or even villages are considered urban, given that a substantial portion of the population resides in isolated mountainous and forest areas. Vague or inexact criteria for what constitute urban and rural areas make it difficult to generalize or compare study results on this topic.

Although great strides towards education for all have been realized, there is evidence that school-aged children who live in rural areas are still at a disadvantage. A study by Lopez (2007) comparing educational attainment and achievement in 11 Latin American countries revealed that some of the lowest urban primary school net enrollment rates (above 80% but below 90%) were expectedly higher than the net enrollment rates among rural primary schools in those countries—Guatemala (83.2% urban, 74.7% rural), Nicaragua (86.4% urban, 78.9% rural), Bolivia (88.8% urban, 84.6% rural), and Honduras (88.9% urban, 83.6%).

The study also uncovered that the disparities in secondary school net enrollment rates were painfully stark—Guatemala (47.2% urban, 12.7% rural), Honduras (49.8%

urban, 21.9% rural), Nicaragua (57.9% urban, 22.4% rural), and Paraguay (37.7% urban, 17.9% rural) (Lopez, 2007). In four of the 11 Latin American countries studied, less than a quarter of the secondary school-aged children population in rural areas were enrolled in school; in fact, only one of the 11 countries had a rural secondary enrollment rate above 60% (Lopez, 2007). These data should be viewed in the context that some rural secondary school-aged children commute to urban areas for schooling; commuting or student educational migration cannot fully account for the dismally low rural enrollment rates.

According to Belize's 2010 Census, the country continues to be among the minority of those in Latin America and the Caribbean with a predominantly rural population (SIB, 2013). In Belize, the rural population makes up roughly 55 percent of the total population, with household sizes only slightly larger than those in urban regions, which are defined as those that have been "officially designated towns or cities" (SIB, 2013, p. 55). The census showed that between 2000 and 2010, "the rural population grew by 31.3 percent or 42,059 (from 134,565 to 176,624), compared to the urban population which increased by 30.2 percent or 33,856 (from 111,973 to 145,829)" (SIB, 2013, p. 8). This may be because of the fact that the country has only two cities—Belize City and Belmopan—and several towns across the six districts. Also, the largest percentage of rural growth was in the Belize District, presumably nearer to the city. As a result of these patterns of reverse urbanization, the Government of Belize has reported that a re-classification of urban and rural regions will be underway, as the population of certain villages has exceeded 3,000 individuals; additional criteria will be considered for reclassification, such as access to utilities and agricultural involvement (SIB, 2013).

Despite Belize's predominantly rural population, a greater number of schools are located in urban areas. National statistics also indicated that urban schools are better attended; however, rates of urban or rural school enrollment are not accurate predictors of rural educational access, as transportation programs provides free bus routes from rural villages into the main towns for school children (Ministry of Education of Belize, 2012). Still, it was found that students "in the rural areas of Toledo, Stann Creek and Orange Walk are the least well served" (Ministry of Education of Belize, 2012, p. 9) in the country, suggesting that inequities to educational access are correlated to location of residence.

Although living in a rural area might negatively impact educational access, there is evidence the effects on academic achievement are not necessarily deleterious. According to an article by Luschei and Fagioli (2016), "in 1997, a cross-national assessment of educational achievement in Latin America and the Caribbean found that rural schools in Colombia outperformed urban schools in tests of reading and mathematics, except in very large cities" and that "analysis of the 2006 data finds that rural schools in several countries outperformed urban schools in tests of math and reading, after adjusting for student background" (p. 703).

As previously mentioned, the urban-rural dynamics of any given country or region are varied. Although data from other areas are helpful in providing perspective, it may not be helpful to generalize findings across borders. Therefore, in order to understand the effects of location of residence on academic achievement in Belize, further research is required.

Commute Time to School

Research on the effect of commute time to school on academic performance and/or educational attainment is very scarce, although the existing literature points to the importance of further research on this topic. At face value, time allotted to traveling between home and school could be alternatively spent on studying, extracurricular activities, exercising, sleeping, family activities, and other activities that could otherwise enhance a student's well-being (Tigre et al., 2017). In fact, a research report published by the Urban Institute in Washington, D.C. supported the claim that commute time had a strongly significant inverse relationship with time spent exercising and sleeping, and positive relationship with absenteeism (Blagg et al., 2018).

The Urban Institute's report did not find a significant difference in test scores between students who travelled different distances to school (although not measure in commute time). Also, a study on active commuting (i.e. walking, cycling and other forms of non-motorized transportation), but not commute time, in Norway, revealed that the link between active commuting and cognitive performance was insignificant (Van Dijk et al., 2014).

However, the findings of a study that investigated the impact of commuting time on youth's school performance in Brazil revealed that time of commute had a significant causal negative effect on academic performance (Tigre et al., 2017). More precisely, the study found that "scores can decrease, on average, about 0.75 standard deviation when commute time increases by 1 hour" (p. 44). Similarly, a study that explored the effects of several factors on learning achievement among primary school students in Cambodia

concluded that commute time to school had a significant negative influence on learning achievement (Ishiguro, 2018).

It is reasonable to consider that discrepant findings indicate that there are contextual factors – such as geographic location, mode of transportation or travel, difficulty of commute, etc. – that potentially influence the effect of commute time on academic performance and other educational variables. Additionally, there are other sociocultural relationships with commute time to research. For instance, "Black students travel farther than their White peers, and students who do not receive free or reduced-price lunch travel farther than those who do" (Blagg et al., 2018, p. 7). Given the small amount of literature and conflicting findings in this area, deeper explorations into this subject are warranted.

Summary

As illustrated in this chapter, there are no conclusive trends regarding inequities in education, nor are there absolute, generalizable sources of educational disparities to pinpoint. For instance, studies have shown that student ethnicity does impact educational attainment and performance (Brown & Chu, 2012; Cox, 2010; Dotterer et al., 2009; Irving & Hudley, 2005; Strand, 2011; Whaley & Noël, 2012); in most cases, findings have revealed that Blacks (Dotterer et al., 2009; Irving & Hudley, 2005; Whaley & Noël, 2012) and indigenous groups (Cox, 2010; Falbo & De Baessa, 2006; Palacio, 2013) tend to underperform their counterparts. However, studies on the relationship between ethnicity and education in more heterogeneous societies, as well as in those that include more mixed-race ethnic groups for whom ethnic identity is less definitive, are more complex and require more local attention.

In the case of educational disparities related to language, existing literature has revealed the residual influences of colonialism on the status and perception of languages and dialects in society (Abtahian, 2017; Bonner, 2001; Devonish & Carpenter, 2007; Salmon, 2015) and, more particularly, schools (Devonish & Carpenter, 2007; Vairez et al., 2017). Yet it remains unclear just how a student's primary language impacts academic performance. It would also be interesting to explore how students' perceptions of their primary languages impact their educational achievements; unfortunately, this exploration is beyond the scope of the current study.

The gender divide has also long been noted in educational attainment and achievement. In the Caribbean region, females on average attain more years of schooling than males (Anderson-Fye, 2010; Cobbett & Younger, 2012; Duryea et al., 2007; Parry, 1996; Younger & Cobbett, 2014). Additionally, females seem to be outperforming males in most subjects except science or mathematics. As the review of literature can attest to, there are many variables—such as family income (Duryea et al., 2007; Younger & Cobbett, 2014), school resources (Creighton & Park, 2010), ethnicity (Younger & Cobbett, 2014), and location (Policy and Planning Unit, 2013b; Younger & Cobbett, 2014)—that intersect with gender in academic attainment and performance in school. This review also exposed a limitation in gender research in regions such as the Caribbean; namely, in countries like Belize where gender is still regarded as a binary concept of male and female, with no room for gender fluidity. On the basis of the nature of the present study, this shortcoming will persist in the final analysis of the data.

Location of residence, whether urban or rural, has also been found to impact students' educational opportunities (Dudwick et al., 2011; Lopez, 2007; Luschei &

Fagioli, 2016; SIB, 2013. This is perhaps the one variable that, on the basis of previous research, is more consistently favorable to one group of students—e.g., those who reside in urban areas. What is more ambiguous, however, is how urban and rural areas are defined or classified in different regions (Dudwick et al., 2011). Vague or inexact criteria for what constitute urban and rural areas make it difficult to generalize or compare study results on this topic.

Lastly, research on commute time to school in Brazil and Cambodia suggest that longer commute times have significant negative relationships with academic performance (Ishiguro, 2018; Tigre et al., 2017). Although a study conducted in Washington, DC did not find a significant difference in test scores between students who travelled different distances to school, although distance was not measured in commute time (Blagg et al., 2018, p. 7). Discrepant findings serve as an indicator that further research in different contexts and settings is necessary.

While there are many complexities in addressing educational disparities, this by no means suggests that educational disparities cannot be remedied; this merely indicates that achieving education parity in all its forms will take considerable investments in local or action research, program and curriculum assessment and evaluation, policy analysis, resources, training and professional development, and student advocacy. To start, the proposed study will research the effects of individual and intersectional student-level sociocultural factors on academic achievement; the data and methodology to do so will be described in Chapter 3.

CHAPTER III

METHOD

The present chapter gives an outline of the methods used to carry out this study, the research design, study population, data sources, a breakdown of the dependent and independent variables, and the statistical methods and analytical techniques employed. A brief presentation of limitations of the study and a chapter summary conclude this chapter.

Data and Methodology

The approaches to measuring and assessing educational disparities are varied, complex, and nuanced. For example, one approach incorporates the micro-macro dichotomy where "in studies of education, the macro includes structural forces conceptualized at the societal level, including economic constraints and capitalist demands, while the micro includes individual or group actions and responses to constraints imposed on social actors" (Mehan, 1992, p. 1). A second and more common approach to measuring educational inequalities involves distinguishing the focus of inequality, in key areas such as (a) access to education or opportunities, educational attainment (years of schooling), (b) academic achievement measured by standardized test scores and grades; and (c) quality measured by school resources and facilities, percentage of trained teachers, curriculum/academic rigor (Ferreira & Gignoux, 2011). Another approach for studying educational disparities focuses on data sources and tools of measurement, which include, but are not limited to, school records and surveys, learning assessments, national and international standardized examinations, population censuses, and household surveys (Antoninis & Delprato, 2015; Benavot, 2015; Porta et al., 2011).

According to one World Bank group, there are nearly 2,500 versions of household surveys from which educational disparities are measured (Porta et al., 2011).

Research Design

The present study is a quantitative investigation into educational disparities in academic achievement among students at several high schools across Belize. The study was originally designed as a retrospective study utilizing secondary data, which is encouraged in some research because of its availability and obvious time and resource-saving advantages (Keith, 2015). However, there were severe limitations and discrepancies in the types of data collected independently by schools, including the form in which data were collected, and whether data were collected and stored at all. These are all examples of common disadvantages of using secondary data (Keith, 2015). In consideration of data quality and integrity, the study was redesigned to standardize the data collection and reporting for each of the participating schools.

Per federal, state, and institutional requirements, study approval was sought and granted for protocol#107191, approval #IRB-19-0020, at Florida International University, prior to study initiation. Once IRB approval was obtained, an official application or request for data access and use was submitted to the Ministry of Education (MoE) of Belize for authorization to contact schools for data. Subsequent to local authorization, requests for data collection, access to and use of the 2018-2019 school records were emailed or presented to administrative staff of several high schools across the country.

Population

The study collected data on a total of 1199 students from 11 high schools across Belize. Of the total study sample, certain information was missing for 258 (21.5%) students; for instance, mathematics and English Language Arts grades were not collected for students from two schools. The resulting sample consisted of 940 students from nine high schools across the country. The study sample includes students who attended one of the nine public secondary/high schools for the 2018-2019 academic school year. The location of each of the participating schools is listed in Table 5. The two excluded schools were located in Cayo and Toledo.

Table 5

Location of Schools in Study Sample

	SCHOOL LOCATION	URBAN/RURAL
1	Corozal	Urban
2	Orange Walk	Urban
3	Cayo	Urban
4	Cayo	Urban
5	Belize	Urban
6	Belize	Urban
7	Stann Creek	Urban
8	Stann Creek	Rural
9	Toledo	Urban

All schools included in the study sample were public, general education institutions. Data were not collected from special education or alternative secondary institutions; however, the study did not filter or exclude students with special needs or who are considered outliers of the typical high school age.

Data Sources

The student data used for the current study were sourced directly from nine high schools; each of the six districts was represented in the study sample. The anonymous information included the following data on senior students: school name, student gender, ethnicity, first or native language, location of residence, and commute time to school. De-identified student data were linked, by the schools, to students' end-of-year English/Language Arts grade, end-of-year mathematics grade, and cumulative GPA.

Dependent Variables

The dependent variables for this study are students' end-of-year English/Language Arts grade, end-of-year mathematics grade, and overall end-of-year GPA.

Grade Point Average (GPA)

The study used a standard 4.0 GPA scale, as one of the measures of student academic achievement. According to Uribe and Garcia (2012), "grades are standardized measurements of varying levels of comprehension within a subject area" (p. 19). In Belize, a 4.0 GPA represents an A or mastery of a subject; 3.0 represents a B; 2.0 a C (basic proficiency in a subject); 1.0 a D; and 0 an F, with anything below a 2.0 demarcating the failure of a student to show sufficient evidence of proficiency or the ability to apply the necessary information or skills expected for that subject. Students who earn an overall GPA of less than 2.0 for the school year are not promoted to the next grade level, as is the case for students earning an end-of-year subject GPA of less than 2.0 in English/Language Arts or mathematics as these are considered core subjects.

The GPA is calculated by taking the number of grade points or credits earned by a student in a given period of time, such as a term or semester, divided by the total number of credits taken; whereas, a cumulative GPA is a calculation of the average of all of a student's grades for all subjects and semesters completed for the duration of the schooling period (Uribe & Garcia, 2012), such as an average of four years for secondary school.

End-of-Year English/Language Arts Grade

In general, the end-of-year grade in English Language Arts is the average of grades for homework, classwork, projects, tests/quizzes, and the final exam for the English Language Arts course. Averages are usually reported in a range from 0-100%; although some schools report the average as a corresponding letter grade, such as A for an average percentage of 90 and above, B for an average percentage of 80-89, and so forth.

End-of-Year Mathematics Grade

The end-of-year mathematics grade is also the average of grades for homework, classwork, projects, tests/quizzes, and the final exam for the English Language Arts course. Averages are usually reported in a range from 0-100%; although some schools report the average as a corresponding letter grade, such as A for an average percentage of 90 and above, B for an average percentage of 80-89, and so forth.

Independent Variables

The main independent variables examined in this study are: gender, ethnicity, first or native language, location of residence, and commute time to school.

Gender

Following school and Ministry of Education practices, gender was recorded using two categories: male and female. For data analysis purposes, males were coded as 0 and females as 1.

Ethnicity

Ethnicity options reflect the Belize national census options: Creole, Garifuna, Maya, Mestizo/Hispanic, Other, Don’t Know/Not stated (Statistical Institute of Belize,

2016). The categories were coded as 1-6, respectively. Fill-in responses to "Other" were coded consecutively starting at 7, as applicable. For data analysis, dummy variables were created on the basis of the following recoding: 0 = Mestizo, 1 = Creole, 2 = East Indian, 3 = Garifuna, 4 = Mayan, 5 = Mennonite, 6 = "Other" ethnic group.

Language

Language was recorded as first or native language and the options were: Creole (Kriol), English, Spanish, Garifuna, Mayan languages, and Other (Statistical Institute of Belize, 2016). For this study, the languages were coded as follows: English= 0; Creole = 1; Spanish = 2; unspecified Mayan languages = 3 (Ketchi, Mayan = 4; Mopan Mayan = 5); Garifuna = 6; unspecified Chinese languages = 7 (Mandarin = 8; Cantonese = 9); unspecified Indian languages = 10; French = 11; German = 12, and Other = 13. English served as the reference category for data analysis. These data were also be collected from the high school student records. To create dummy variables for analysis, the categories were recoded as such: 0 = Creole language, 1 = English, 2 = Garifuna language, 3 = Mayan language, 4 = Spanish, 5 = foreign language.

Location of Residence

Location of residence was reported as city, town, village and other, and then recoded using an urban/rural designation. As defined by the Government of Belize, urban referred to cities and towns, while rural referred to villages, smaller living communities, or isolated housing on farms or other uncultivated areas throughout Belize. In data coding, urban = 0 and rural = 1; town = 0, village = 1, city = 2, and other = 3. Dummy variables were simplified to 0 = rural and 1 = urban.

Commute Time

Students reported the amount of time for the commute from home to school each day. Responses were recorded as: 1-15 mins; 16-30 mins; 31-40 mins; 41-50 mins; 51-60 mins; 61-75 mins; 75-90 mins; and, over 1.5 hours. Recoding for dummy variables was as follows: 0 = 1-30 minutes, 1 = 31-60 minutes, 2 = 61-90 minutes, 3 = 91 or more minutes.

Statistical Methods and Techniques

Data Formatting

Quantitative analyses were carried out using IBM's Statistical Package for the Social Sciences (SPSS) software, version 26.0. In preparation for quantitative data analyses, the data sets were imported from Microsoft Excel into SPSS. Categorical variables were coded or recoded as specified above. For instance, nominal values were assigned numbers (see the Dependent Variables and Independent Variables sections) and certain continuous values were categorized into ranges and numbers assigned to the ranges, as necessary, depending on compatibility requirements for the SPSS tests (Best & Kahn, 2006).

Statistical Tests for Exploratory Analyses

In accordance with the overall purpose of this study, which is to investigate whether there are significant educational disparities in secondary schools across Belize, broad exploratory analyses were conducted. The following subsections describe these statistical analyses.

Independent Sample t-Test. The independent sample t-test is a parametric statistical procedure used that tests whether a statistically significant difference exists

between the means of two independent groups (Best & Kahn, 2006; McMillan, 2012). In the present study, the means being investigated are overall achievement, as measured by end-of-year cumulative GPA, English achievement, as measured by end-of-year English grades, and mathematics achievement, as measured by end-of-year mathematics grade.

One-Way ANOVA. Analysis of variance (ANOVA) is another parametric statistical procedure that, similar to the t-test, is used to determine whether there are significant differences in group means; however, ANOVA tests for differences among more than two groups (Best & Kahn, 2006; McMillan, 2012). As a component of the exploratory analyses of the data, separate one-way ANOVA tests were performed, using SPSS, to determine whether there were statistically significant differences in the mean GPA, English grades, and math grades among the student participants associated with the sociocultural factors – ethnicity, first language, location, and commute time – being examined in the study. Results of these statistical tests are outlined in sections to follow.

Assumptions. The t-test and ANOVA tests are conducted when certain assumptions are made about the data; alternative tests can be used, or data can be remedied, in the case that certain assumptions are violated (Laerd Statistics, n.d.; McMillan, 2012). The assumptions are that: (1) there are no significant outlier scores in the data, (2) the data is normally distributed, and (3) there is homogeneity of variance (McMillan, 2012). These assumptions were statistically tested, using SPSS, and are discussed in subsequent sections.

Effect Size. Relevant literature in statistics posits that the statistical significance of results does not always translate to practical significance or replicability (Hetrick, 1999; Rosnow & Rosenthal, 2009). However, an examination of the magnitude of the

effect of sample size (referred to as the effect size) on the results can provide more clarity. The effect size is defined by Rosnow and Rosenthal (2009) as "the magnitude of a study outcome or research finding, such as the strength of the relationship obtained between an independent and a dependent variable" (p. 6). There are several ways to determine or calculate the effect size. For the purposes of the present paper, Cohen's d will be utilized, as it is appropriate for calculations of data used for t tests and ANOVA (Rosnow & Rosenthal, 2009). For instance, Cohen's d is appropriate for calculations of data used for t tests and ANOVA (Rosnow & Rosenthal, 2009); however, for the purposes of this paper, it will be used to measure the effect size in relation to t test results only.

Cohen's d cannot be derived from SPSS; instead, it is calculated as the mean difference divided by the standard deviation of all students in the sample, or:

$$d = \frac{M_1 - M_2}{\text{SDpooled}}$$

where:

$$\text{SDpooled} = \sqrt{((SD_1^2 + SD_2^2)/2)}$$

In general, a *d* value of .2, meaning that 20% of the change in the mean can be accounted for by the independent variable, is considered a small effect, while a .5 is considered medium, and a value of .8 large. It is important to note that these designations are not rigid or universal (Hetrick, 1999; Rosnow & Rosenthal, 2009) particularly for studies in social sciences, but are used for the purposes of this paper.

In order to measure the effect size with ANOVA, the Eta squared or η^2 will be calculated according to:

$$\eta^2 = \frac{\text{Treatment Sum of Squares}}{\text{Total Sum of Squares}}$$

where:

Total Sum of Squares = Treatment Sum of Squares + Error Sum of Squares + Error (between subjects) Sum of Squares.

Statistical Tests for Preliminary Research Questions

In response to the three preliminary research questions that examine the interaction effect between two variables, two-way analysis of variance (ANOVA) tests were performed on the study data. The two-way ANOVA is the most common factorial ANOVA, in which two independent variables are analyzed together on dependent variable (McMillan, 2012). The two-way ANOVA is similar to the one-way ANOVA in that it tests for the significance of group differences (also referred to as the main effect of each independent variable); however, the two-ANOVA also tests for an interaction effect between the two independent variables (McMillan, 2012).

Statistical Tests for Main Research Questions

A multiple regression (MR) test was employed to approach the three main research questions. Multiple regression tests, as the name implies, "can use multiple independent variables to explain variation in a dependent variable" (Keith, 2015, p. 18). In this study, ethnicity, language, gender, and location of residence (i.e., multiple independent variables) will be tested to explain variation in GPA (dependent variable) for Question 1, end-of-year English grades (dependent variable) for Question 2, and end-of-year mathematics grades (dependent variable) for Question 3. These types of tests are also appropriate for this study because of its non-experimental nature, since variables

were not manipulated and study samples were not randomly or selectively assigned during the original collection of data (Keith, 2015).

Although there are several types of multiple regression tests, a standard multiple regression was conducted for this study. According to Keith (2015), "MR is very useful when the goal of research is explanation because of the ability to focus on both the overall effect of all variables and the effect of each variable by itself" (p. 81). Keith also emphasized that simultaneous regressions is "useful for determining the *relative* [emphasis in the original] influence of each of the variables studied; indeed, it may be the best method for making this determination" and that this test also has predictive capabilities and can be used to "determine the extent to which a set of variables *predicts* [emphasis in the original] an outcome and the relative importance of the various predictors" (p. 80); however, at this point, it is unlikely that the predictive function of this test will be necessary for this study.

The sequential multiple regression test would also be suitable to explain the effect of the independent variables on the dependent variable for each question; however, with the sequential form, the order of entry of the independent variables into the model is crucial to the results; the order of entry must be determined by the researcher prior to testing (Keith, 2015). As there was no appropriate theoretical framework to support a specific order of entry or degree of importance of the independent variables being studied, simultaneous regression was deemed preferable to sequential (or hierarchical) regression in the case of this study.

Study Limitations

The focus of the study was whether educational inequalities considering student-level sociocultural factors are present in high schools across Belize. While every effort was made to ensure precision and objectivity in data collection and analysis, there were limitations to this study. They are as follows:

1. The number of sociocultural factors addressed were limited because of practical reasons or confidentiality purposes. For example, data on family socioeconomic status were not collected.

2. Data were gathered from nine of over 50 secondary schools across all six districts in the country; the goal was to collect data from a minimum of one school per district. The inclusion of additional schools in the study was inhibited by limited funding resources; therefore, the study did not include an equal representation of urban and rural schools in each district.

3. Study samples were not matched across sociocultural factors; for instance, the number of students of specific ethnicities in the study sample varies widely across schools or regions.

4. Data collection was confined to fourth form students (high school seniors) for practicality.

Despite its limitations, the present study is expected to serve as an important indicator of some of the current educational trends in Belize and to serve as a basis for further exploratory research on this topic.

Summary

Chapter 3 described the research methods used to carry out the research process. The chapter first restated the study purpose and research questions that were identified in Chapter 1. This chapter then presented the data and methodology, including the research design, study population, data sources, an overview of the dependent and independent variables, and the statistical methods and techniques that were employed for data analysis. A section on the study limitations and a chapter summary concluded this chapter.

CHAPTER IV

RESULTS

This chapter discusses the results of quantitative data analysis. It begins with an introduction, then a section on descriptive statistics, and results from exploratory data analyses. Following are the presentation and analyses of data for the study's preliminary research questions and main research questions. The chapter concludes with a summary.

Introduction

This research investigated whether there were significant educational disparities in relation to academic performance in secondary schools across Belize. More specifically, the study sought to determine whether student-level sociocultural factors—namely gender, ethnicity, language, location of residence, and commute time to school — significantly impacted academic performance as measured by students' end-of-year English/Language Arts grade, end-of-year mathematics grade, and cumulative grade point average (GPA). The research questions that guided this investigation are:

Preliminary Questions

1. Is there a significant interaction between first language and high school on students': overall achievement, English achievement, and mathematics achievement?

2. Is there a significant interaction between ethnicity and gender on high school students': overall achievement, English achievement, and mathematics achievement?

3. Is there a significant interaction between ethnicity and high school on high school students': overall achievement, English achievement, and mathematics achievement?

Main Research Questions

4. Is there a significant effect on high school students' overall academic achievement from gender, ethnicity, language, location of residence, and commute time to school?

5. Is there a significant effect on high school students' English achievement from: gender, ethnicity, language, location of residence, and commute time to school?

6. Is there a significant effect on high school students' mathematics achievement from: gender, ethnicity, language, location of residence, and commute time to school?

Descriptive Statistics

Descriptive analysis is a fundamental component in simplifying large amounts of data and providing context for certain phenomena in quantitative research (Loeb et al., 2017). Given the heterogenous nature of the Belizean population, an in-depth coverage of the descriptive statistics is necessary to present an overview of the demographics and phenomena occurring in this particular study. Results from descriptive analyses are presented in the tables and figures below.

Study Population by School

The study sample included 940 senior students from nine high schools across all six districts in Belize. Table 6 provides an overview of the study population by high school.

Table 6

Study Population by High School

	Frequency	Percent	Valid Percent	Cumulative Percent
1 - Corozal	168	17.9	17.9	17.9
2 - Orange Walk	93	9.9	9.9	27.8
3 - Belize	114	12.1	12.1	39.9
4 - Belize	132	14.0	14.0	53.9
5 - Cayo	117	12.4	12.4	66.4
6 - Cayo	84	8.9	8.9	75.3
7 - Stann Creek	106	11.3	11.3	86.6
8 - Stann Creek	45	4.8	4.8	91.4
9 - Toledo	81	8.6	8.6	100.0
Total	940	100.0	100.0	

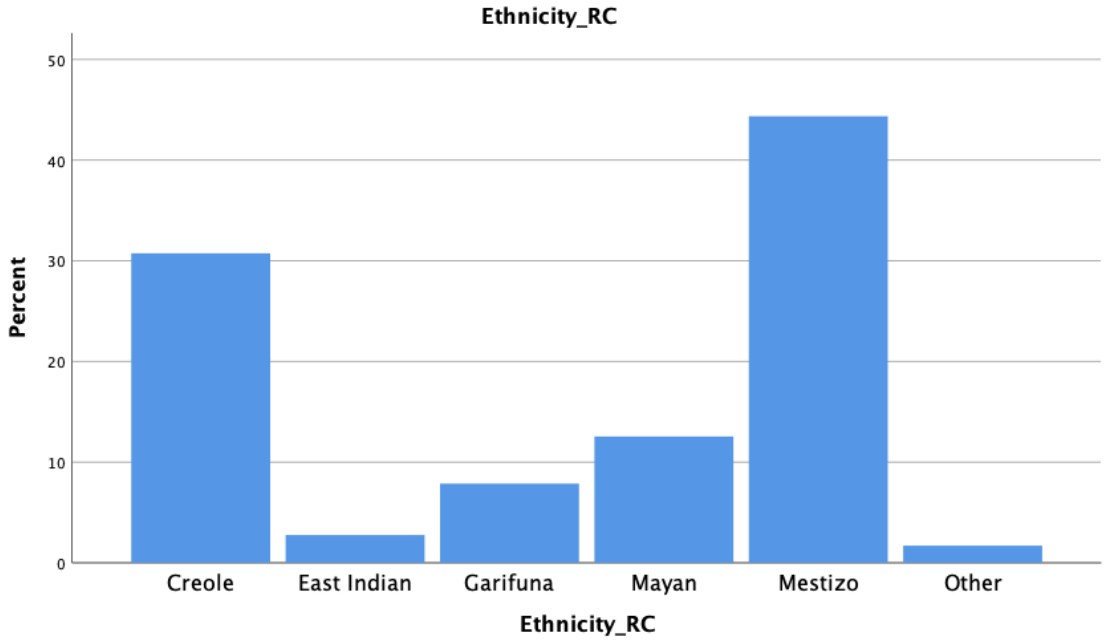
Ethnicity

Students reported the ethnic group(s) with which they identify according to options similar to those that might be found on the Belize Census. As illustrated in Figure 2, of the study population (N = 940), 44.4% (417) of student participants identified as Mestizo, which is slightly lower than the general Belizean Mestizo population of 52.9% (refer to Table 3 for 2010 census population results). Meanwhile 30.7% (289 students) reported their primary ethnicity as Creole, compared to 25.9% of the general population. Students who identified as Mayan accounted for 12.6% of the study sample, those who identified as Garifuna were 7.9%, and East Indian 2.8%; these proportions are highly reflective of those of the 2010 census population reports. Asian and white students, including students who identified as “Other” made up 1.7% of the study sample. The

most notable difference found was the absence of Mennonite students from the general mainstream school populations.

Figure 1

Percentage of Study Population by Ethnicity



Ethnicity by School. Overall, ethnicity trends among the study population shown in Table 7 below parallel those of the general census of 2010 shown in Table 3. For instance, the schools with Mestizo study populations of over 50% were found in Corozal (80.4%), Orange Walk (84.9%), and both schools in Cayo (70.2% and 53.8%); whereas, those with the lowest concentration of Mestizo participants were in Belize District (7.6%) and Toledo (3.7%), which are markedly different from the general population distribution by district. Schools with higher concentrations of Creole participants were the two schools located in the Belize District (64.0% and 71.2%). The two schools located in the Stann Creek district were the most equitably distributed in terms of ethnicity: 32.1% and

11.1% Creole; 29.2% and 20.0% Garifuna; 4.7% and 37.8% Mayan; and, 30.2% and 31.1% Mestizo, respectively. On average, these distributions reflect the general population patterns. The only school with a majority Mayan study sample was located in the Toledo District.

Table 7

Frequency and Percentage of Student Ethnicity by School

High School		Ethnicity						Total
		Creole	East Indian	Garifuna	Mayan	Mestizo	Other	
1 - Corozal	Count	23	4	1	1	135	4	168
	% within HS	13.7	2.4	0.6	0.6	80.4	2.4	100.0
2 - Orange Walk	Count	8	1	2	2	79	1	93
	% within HS	8.6	1.1	2.2	2.2	84.9	1.1	100.0
3 - Belize	Count	73	7	7	3	22	2	114
	% within HS	64.0	6.1	6.1	2.6	19.3	1.8	100.0
4 - Belize	Count	94	5	20	2	10	1	132
	% within HS	71.2	3.8	15.2	1.5	7.6	0.8	100.0
5 - Cayo	Count	34	2	2	16	63	0	117
	% within HS	29.1	1.7	1.7	13.7	53.8	0.0	100.0
6 - Cayo	Count	16	2	2	1	59	4	84
	% within HS	19.0	2.4	2.4	1.2	70.2	4.8	100.0
7 - Stann Creek	Count	34	1	31	5	32	3	106
	% within HS	32.1	0.9	29.2	4.7	30.2	2.8	100.0
8 - Stann Creek	Count	5	0	9	17	14	0	45
	% within HS	11.1	0.0	20.0	37.8	31.1	0.0	100.0
9 - Toledo	Count	2	4	0	71	3	1	81
	% within HS	2.5	4.9	0.0	87.7	3.7	1.2	100.0
Total	Count	289	26	74	118	417	16	940
	% within HS	30.7	2.8	7.9	12.6	44.4	1.7	100.0

Language

First or Native Language. Study participants were asked to report their first or native language(s). Statistics revealed that, of the study sample (N=940), 30.2% reported theirs as Creole, 29.5% as Spanish, 28.8% as Creole, 9.6% as Mayan, 1.2% as Garifuna, and 0.7% as a foreign language (see Table 8).

Table 8

Frequency and Percentage of Study Sample by First or Native Language

Language	Frequency	Percent	Valid Percent	Cumulative Percent
Foreign	7	.7	.7	.7
English	271	28.8	28.8	29.6
Creole	284	30.2	30.2	59.8
Spanish	277	29.5	29.5	89.3
Mayan	90	9.6	9.6	98.8
Garifuna	11	1.2	1.2	100.0
Total	940	100.0	100.0	

First or Native Language by School. According to the results from cross tabulations, three schools in the study sample had at greater than half its student respondents having reported languages other than English (Belize's national language) or English Creole/Kriol as their first or native language. In Corozal, 53.6% of the study participants reported Spanish as their first language, and 51.6% in Orange; in the two Cayo schools Spanish was listed as the first language as well, but with rates of less than half (43.6% and 42.9%).Three schools had majority Creole speakers: 53.5% and 62.9% in the two schools in Belize, and 43.4% in Stann Creek. Statistics on standard English as first language were as follows: 33.9% in Corozal; 41.9% in Orange Walk; 29.8% and

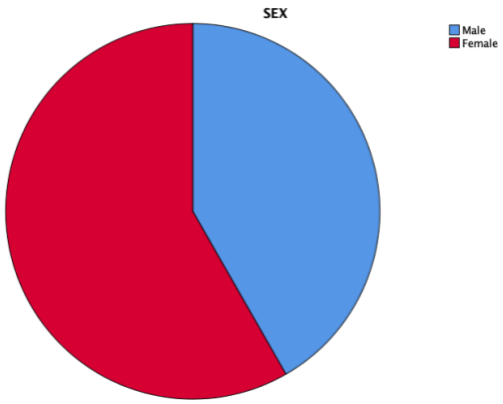
33.3% in Belize District; 23.1% and 29.8% in Cayo; 31.1% and 11.1% in Stann Creek; and, 8.6% in Toledo. Meanwhile, Toledo had an overwhelming majority of study participants with a Mayan language reported as first language amongst 72.8% of them.

Gender

The results from the descriptive statistics revealed that the study population included 392 male students (41.7% of the study sample) and 548 female students (58.3% of the study sample), with N = 940.

Figure 2

Percentage of Study Population by Gender



Gender by School. Of the nine participating schools, a single school in the Stann Creek District and one in the Cayo District were the only two to show higher male participant rates than female participant rates, with 56.4% and 62.2% male rates, respectively. As shown in Table 9, all other schools revealed higher female participant rates than male.

Table 9

Frequency and Percentage of Study Population by Gender and by School

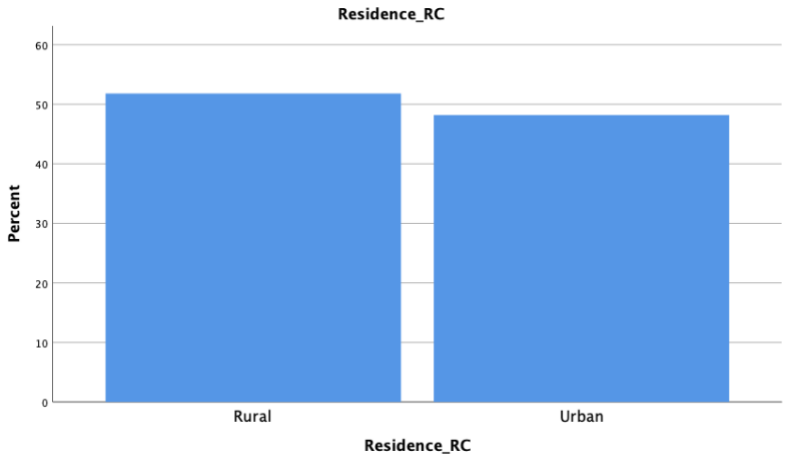
	High School									
	1	2	3	4	5	6	7	8	9	Total
Male										
Count	66	40	40	56	66	32	27	28	37	392
% within HS	39.3	43.0	35.1	42.4	56.4	38.1	25.5	62.2	45.7	41.7
Female										
Count	102	53	74	76	51	52	79	17	44	548
% within HS	60.7	57.0	64.9	57.6	43.6	61.9	74.5	37.8	54.3	58.3
Total										
Count	168	93	114	132	117	84	106	45	81	940
% within HS	100	100	100	100	100	100	100	100	100	100

Location

Residence (Urban/Rural). According to the data, majority (51.8%) of the student participants resided in rural areas, with marginally less (48.2%) in urban areas (towns and cities).

Figure 3

Percentage of Study Population by Residence (Urban/Rural)



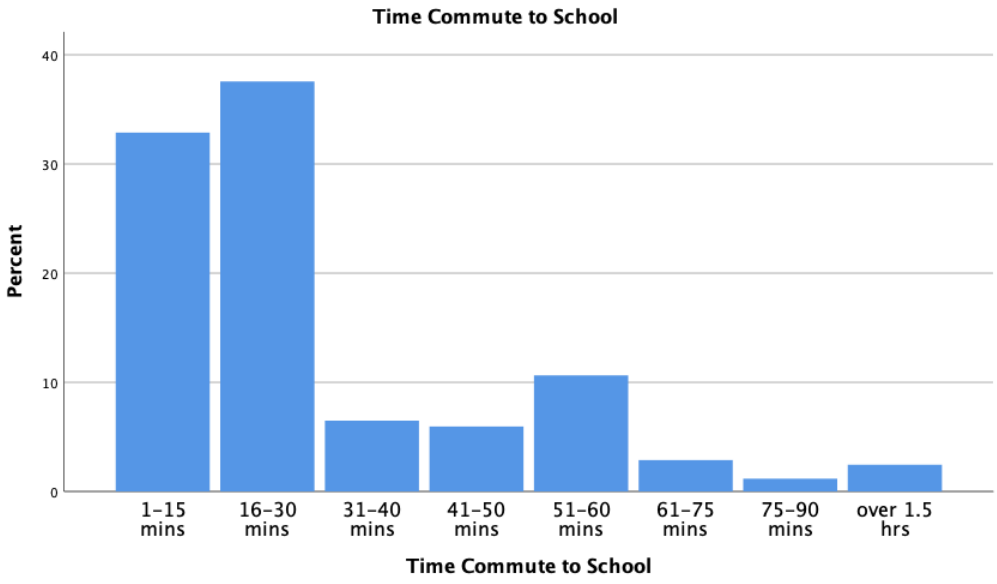
Residence by School. Urban dwellers constituted the majority in Corozal (57.1%), Orange Walk (63.4%), both Belize schools (53.5% and 73.5%), and one school situated in Cayo District (75.0%). In one Stann Creek school, students who resided in rural areas made up the slight majority (52.8%); however, rural dwellers were the overwhelming majority among participants in the second Stann Creek school (97.8%) and in Toledo (97.5%).

Commute Time

According to the data, over half of the study sample had a one-way commute time between home and school of no greater than 30 minutes. On the other hand, 6.5% of the students reported a commute time of over an hour each way, of which 2.4% had a commute time over 1.5 hours.

Figure 4

Percentage of Study Population by Commute time to School



Commute Time by School. The school with the highest concentration of students with commute times of over 1.5 hours was in Stann Creek. Overall, schools in Corozal, Orange Walk, Belize District, and one Cayo and one Stann Creek schools had the highest concentration of commute times of 30 minutes or less.

Exploratory Data Analysis

Normality for Overall, English, and Mathematics Achievement

In the test for normality of overall achievement, the skewness statistic was -.410 (SE = .080) and the kurtosis statistic was 3.5 (.558/.159). These results revealed a negatively skewed and leptokurtic distribution; in other words, many students' scores clustered in the high end compared to a normal distribution. Additionally, the Kolmogorov-Smirnov, with a statistic of 0.029 ($p > .05$) and the Shapiro-Wilk, with a statistic of .054 ($p < .05$), indicated that the assumption of normality was violated.

In relation to the variable of English achievement, as measured by end-of-year English/Language Arts grades, the skewness statistic of -0.035 (SE = .080) and the kurtosis statistic of -0.202 (SE = .159) revealed a normal distribution. Conversely, the Kolmogorov-Smirnov statistic of 0.194 ($p < .05$) and Shapiro-Wilk statistic of 0.933 ($p < .05$) showed a violation of the assumption of normality.

Lastly, for the variable of mathematics achievement, as measured by end-of-year math grades, the skewness and kurtosis of the distribution were normal, as evidenced by the skewness statistic of -0.004 (SE = .080) and the kurtosis statistic of -0.175 (SE = .159). However, the assumption of normality was shown to be violated, as revealed by a Kolmogorov-Smirnov statistic of 0.059 ($p < .05$) and Shapiro-Wilk statistic of 0.984 ($p < .05$).

As illustrated in the Q-Q plots of overall, English, and mathematics achievement (Figures 6, 7 and 8), all three variables showed linear or close to linear patterns. Also, the Kolmogrov-Smirnov and Shapiro-Wilks results are presented in Table 10 for overall, English, and mathematics achievement, respectively.

Although some violations of the assumption of normality are evident, ANOVA and linear regression analysis, which will be employed to address the main research questions, are robust statistical tests that allow for minor violations to the assumption. Additionally, with a population sample of 940, these minor deviations from normality are expected to have inconsequential effects on the results.

Table 10

Tests of Normality: Overall Academic, English, and Mathematics Achievement

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	*df*	*P value*	*Statistic*	*df*	*P value*
Overall Achievement	.029	940	.054	.987	940	.000
English Achievement	.048	940	.000	.988	940	.000
Math Achievement	.059	940	.000	.984	940	.000

Figure 5

Normal Q-Q Plot of Overall Academic Achievement

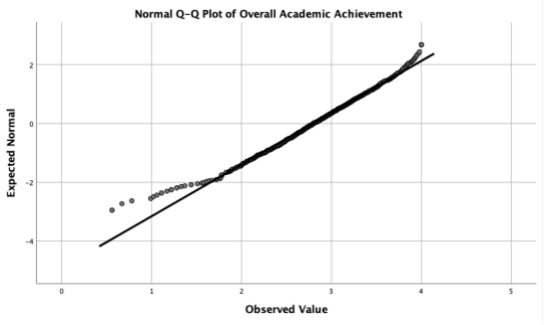


Figure 6

Normal Q-Q Plot of English Achievement

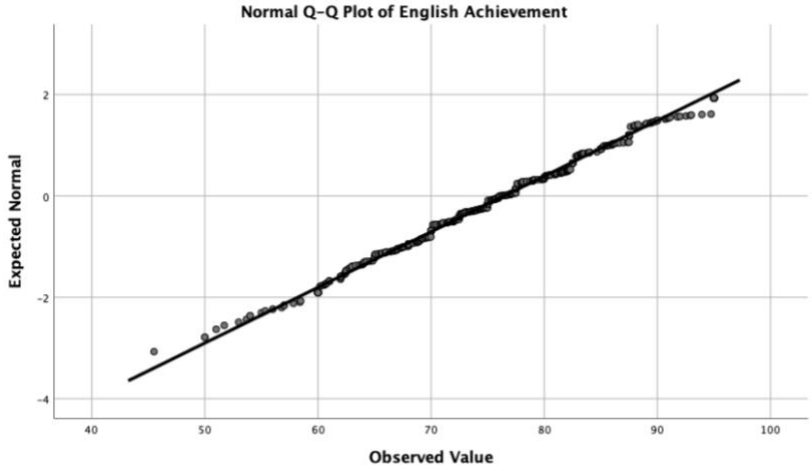
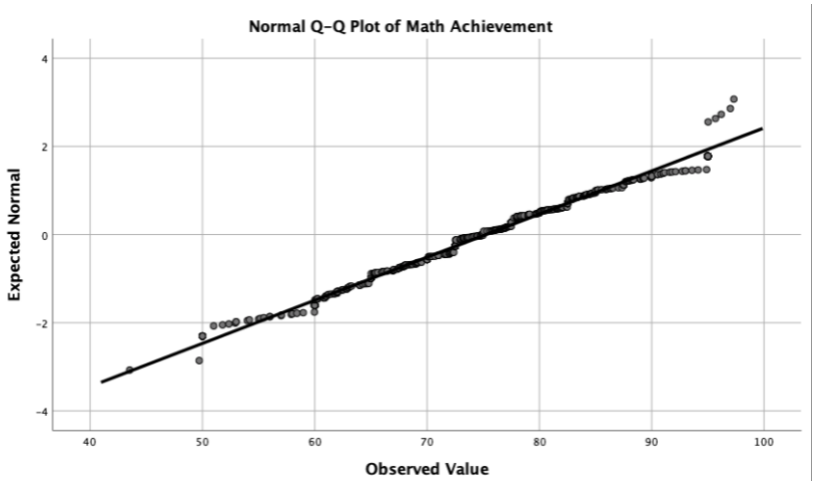


Figure 7

Normal Q-Q Plot of Mathematics Achievement



Outliers

In order to determine whether there are outliers in the data, a Mahalanobis distance test was performed. The critical value of chi-square x^2 at $p < .05$ and degrees of freedom equal to 13 is 22.36. As such, cases with a Mahalabonis distance greater than

22.36 are considered to be multivariate outliers. On the basis of this calculation, the process excluded 101 cases, resulting in a final study sample of 839 cases.

However, considering that the purpose of this study is to investigate educational disparities, the author concluded that all cases were to be included in the analysis, as it is crucial in understanding which students are underperforming academically.

Table 11

Table of Residual Statistics to Identify Outliers

	Minimum	*Maximum*	*M*	*SD*
Mahal. Distance	4.523	199.233	14.984	18.630
Cook's Distance	.000	.036	.001	.003

Gender

Homogeneity of Variance for Overall, English, and Mathematics Achievement by Gender.

The Levene's Test for Equality of Variances tested the three independent variables for variance. According to the results presented in Table 12, all three variables had $p > .05$, indicating that the assumption of homogeneity of variance was not violated for any of the variables.

Table 12

Homogeneity of Variance for Overall, English, and Mathematics Achievement by Gender

	Levene's Test for Equality of Variances	
	F	*P value*
Overall Achievement	1.014	.314
English Achievement	.010	.919
Math Achievement	1.973	.160

Descriptive Statistics for Overall, English, and Mathematics Achievement by Gender.

Descriptive statistics showed that the study population included 392 males and 548 females. Among male students in this study, the mean cumulative GPA was *M* = 2.6974 (*SD* = .59090, *SE* = .02984), the mean end-of-year English grade was *M* = 74.7081(*SD* = 9.05249, *SE* = .45722), and the mean end-of-year mathematics grade was *M* = 74.7931 (*SD* = 10.53271, *SE* = .53198). Among the female students, the mean cumulative GPA was *M* = 2.8608 (*SD* = .54191, *SE* = .02315), the mean end-of-year English grade was *M* = 77.6855 (*SD* = 8.96041, *SE* = .38277), and the mean end-of-year mathematics grade was *M* = 75.5703 (*SD* = 10.00188, *SE* = .42726).

T-Test and Effect Size for Overall Achievement by Gender

According to the results presented in Table 13, female students performed significantly higher on overall achievement, as measured by cumulative GPA, with a statistically significant mean GPA difference of 0.16337 grade points, 95% CI [-0.24, -0.09], $t(938) = -4.388$, $p < 0.05$. Using calculations for the effect size, the Cohen's d was calculated to be 0.288217 (or 28%), Although the difference in male and female GPAs was found to be of statistical significance, the practical significance of the difference in cumulative GPA is considered to be relatively small.

T-Test and Effect Size for English Achievement by Gender. Results showed that female students also significantly outperformed male students in English/Language arts, with a statistically significant mean difference of 2.97737 percentage points, 95% CI [-4.15, -1.81], $t(938) = -5.002$, $p < 0.05$; as measured by Cohen's d, was .330581, having a moderate effect size. Again, despite the statistical significance of the difference in

grades, the significance of the practical difference is comparatively high. Refer to Table 13 for the results of the t-test and Cohen's d effect size.

T-Test and Effect Size for Mathematics Achievement by Gender. As per the findings presented in Table 13, the mean difference in math grades between female and male students was not significantly different $t(938) = -1.149$, $p > 0.05$.

Table 13

T-Tests for Equality of Means and Effect Sizes for Overall, English, and Mathematics Achievement by Gender

	T	*df*	*P value*	*M Difference*	*SE Difference*	95% CI of the Difference		
						Lower	*Upper*	*Cohen's d*
Overall Achievement								
Equal variances Assumed	-4.388	938	.000	-.16337	.03723	-.23644	-.09030	.288217
English Achievement								
Equal variances Assumed	-5.002	938	.000	-2.97737	.59528	-4.14561	-1.80914	.330581
Mathematics Achievement								
Equal variances Assumed	-1.149	938	.251	-.77719	.67648	-2.10479	.55041	.075671

Ethnicity

Homogeneity of Variance for Overall, English, and Mathematics Achievement by Ethnicity

The homogeneity of variance was tested across each of the three dependent variables using the Levene's Test for Equality of Variances. For overall academic achievement, the assumption of homogeneity of variance was violated, as evidenced by the Levene's statistic ($p < .05$). As a result of the violation of assumption, a Welch

ANOVA test was conducted, followed by a Games-Howell post hoc test for multiple comparisons.

The Levene's statistic for English achievement and mathematics achievement were both statistically insignificant ($p > .05$); thus, the assumption of homogeneity of variance was not violated for either.

Descriptive Statistics for Overall, English, and Mathematics Achievement by Ethnicity.

Descriptive statistics were computed to outline the mean GPA, end-of-year English grades, and end-of-year mathematics grades for the participant students according to their self-reported ethnicity. Overall, GPA averages ranged from 2.5098 to 3.2069, with a total average of 2.7927, with a standard deviation of .56829 and standard error of .01854. English grades ranged from 71.0156 to 80.7650; the total average was 76.4439, with a standard deviation of 9.11326 and .29724. Mathematics grades ranged from 69.9277 to 84.3844; the total average was calculated at 75.2462, with a standard deviation of 10.22825 and a standard error of .33361. A complete list of descriptive statistics, including confidence intervals, is illustrated in Table 14.

Table 14

Descriptive Statistics for Overall, English, and Mathematics Achievement by Ethnicity

					95% Confidence Interval for Mean			
	N	*M*	*SD*	*SE*	*Lower Bound*	*Upper Bound*	*Min*	*Max*
Overall Achievement								
Creole	289	2.5727	.58901	.03465	2.5045	2.6409	.56	4.00
East Indian	26	2.6704	.48492	.09510	2.4745	2.8662	2.00	3.84
Garifuna	74	2.5098	.55694	.06474	2.3808	2.6388	.67	3.65
Mayan	118	2.8617	.35653	.03282	2.7967	2.9267	1.99	3.80
Mestizo	417	2.9676	.53427	.02616	2.9161	3.0190	.56	4.00
Other	16	3.2069	.56794	.14199	2.9042	3.5095	2.06	3.92

Total	940	2.7927	.56829	.01854	2.7563	2.8291	.56	4.00
English Achievement								
Creole	289	75.1979	8.29829	.48813	74.2372	76.1587	50.00	95.00
East Indian	26	74.0350	8.91713	1.74879	70.4333	77.6367	60.00	95.00
Garifuna	74	72.0235	7.97382	.92694	70.1761	73.8709	45.50	92.00
Mayan	118	71.0156	8.42274	.77538	69.4800	72.5512	51.00	95.00
Mestizo	417	79.6123	8.74296	.42814	78.7707	80.4539	50.00	95.00
Other	16	80.7650	9.72106	2.43026	75.5850	85.9450	62.00	95.00
Total	940	76.4439	9.11326	.29724	75.8605	77.0272	45.50	95.00
Mathematics Achievement								
Creole	289	72.1743	9.34322	.54960	71.0925	73.2560	50.00	97.31
East Indian	26	73.1531	9.49592	1.86230	69.3176	76.9886	60.00	95.00
Garifuna	74	69.9277	9.94624	1.15623	67.6233	72.2321	50.00	97.00
Mayan	118	73.3367	10.02951	.92329	71.5082	75.1652	51.00	95.00
Mestizo	417	78.6391	9.63985	.47207	77.7112	79.5671	43.52	96.19
Other	16	84.3844	10.61547	2.65387	78.7278	90.0410	69.00	95.00
Total	940	75.2462	10.22825	.33361	74.5915	75.9009	43.52	97.31

ANOVA and Effect Size for Overall Achievement by Ethnicity.

As aforementioned, a one-way Welch ANOVA was conducted to determine if there were significant differences in overall achievement, as measured by mean end-of-year GPA, among the participating high school seniors of various ethnic groups. According to self-reports, students were categorized according to the following ethnic groups: Creole, East Indian, Garifuna, Mayan, Mestizo, or Other.

According to the results of the Welch ANOVA, the difference in mean GPAs among the different ethnic groups was statistically significant, Welch's $F(5, 22.782) = 95.597$, $p < .05$, as presented in Table 15. Using the Eta squared result, the effect size was .11990, meaning that about 11.9% of variance in overall achievement could be attributed to ethnicity; overall, this is considered a small effect size.

Table 15

Welch ANOVA Results for Overall Academic Achievement by Ethnicity

Statistic	df1	df2	Sig.	Sum of Squares	Total Sum of Squares	η^2
22.782	5	95.597	.000	36.359	303.254	.11990

Post Hoc for Overall Achievement by Ethnicity. As shown in Table 16, Games-Howell post hoc results revealed that students who identified as ethnic groups categorized as "Other" (M = 3.2069, SD = .56794) performed significantly higher in overall achievement than Creole students (*M* = 2.5727, *SD* = 0.58901) by 0.63421grade points, *SE* = 0.14615, $p < .05$; East Indian students (*M* = 2.6704, *SD* = 0.48492) by 0.53649 grade points, *SE* = 0.17089, $p < .05$; and, Garifuna students (*M* = 2.5098, *SD* = 0.55694) by 0.69708 grade points, *SE* = 0.15605, $p < .05$. Also, as assessed by the Games-Howell post hoc test, Mayan students (*M* = 2.8617, *SD* = 0.35653) outperformed Creole students by 0.28903 grade points, *SE* = 0.04773, $p < .05$, and Garifuna students by 0.35190, *SE* = 0.07259, $p < .05$. Lastly, the mean GPA of Mestizo students (M = 2.9676, SD = 0.53427) was significantly higher than that of their Creole and Garifuna counterparts by 0.39489 grade points (SE = 0.04342, $p < .05$) and 0.35190 grade points (SE = 0.07259, $p < .05$), respectively.

In summary, both Creole and Garifuna students significantly underperformed their Mayan and Mestizo peers, as well as students categorized as Other. East Indians also performed significantly lower than students who identified as an ethnicity in the Other category. Mean differences between no other groups were found to be statistically significant.

Table 96

Games-Howell Post Hoc Results for Significant Differences in GPA by Ethnicity

Ethnicity		*Mean Difference*	*SE*	*P Value*
Higher GPA	*Lower GPA*			
Mayan	Creole	0.28903	.04773	.000
Mayan	Garifuna	0.35190	.07259	.000
Mestizo	Creole	0.39489	.04342	.000
Mestizo	Garifuna	0.45776	.06983	.000
Other	Creole	0.63421	.14615	.005
Other	East Indian	0.53649	.17089	.041
Other	Garifuna	0.69708	.15605	.002

Note. The two largest mean discrepancies in overall achievement are highlighted.

ANOVA and Effect Size for English Achievement by Ethnicity. To determine whether there were significant mean differences in English achievement, as measured by end-of-year English grades in percentages, on the basis of ethnicity, a one-way ANOVA was performed on the study data. Results revealed that the differences in mean English grades among the 6 ethnic groups was statistically significant, $F(5, 934) = 27.500$, $p < .05$, as illustrated in Table 17. According to the results, the effect size was measured at .12832, indicating a small effect of ethnicity on English achievement.

Post Hoc for English Achievement by Ethnicity. According to Tukey post hoc results for mean differences among the ethnic groups, Mestizo students ($M = 79.6123$, $SD = 8.74296$) performed significantly higher in English than: East Indian students ($M = 74.0350$, $SD = 8.91713$) with a mean difference of 5.57728 percentage points, $SE = 1.72448$, $p < .05$; Garifuna students ($M = 72.0235$, $SD = 7.97382$) with a mean difference of 7.58876 percentage points, $SE = 1.07614$, $p < .05$; Mayan students ($M = 71.0156$, $SD =$

8.42274) by 8.59668 percentage points, *SE* = .88957, $p < .05$; and, Creole students (*M* = 75.1979, *SD* = 8.29829) by 4.41435 percentage points, *SE* = .65297, $p < .05$. However, Creole students had a significantly higher mean average than Garifuna students, with a mean difference of 3.17441 percentage points (*SE* = 1.11147, $p < .05$), and Mayan students, with a mean difference of 4.18233 percentage points (*SE* = .93200, $p < .05$). Students who identified as an ethnic group categorized as "Other" also significantly outperformed Garifuna students by 8.74149 percentage points (*SE* = 2.35210, $p < .05$), and Mayan students by 9.74941 percentage points (*SE* = 2.27281, $p < .05$). No other mean differences were statistically significant. Significant findings are presented in Table 18.

In short, similar to the results for overall achievement, Garifuna students underperformed Mestizo and "Other" students but, for English achievement, also significantly underperformed Creole students, but not Mayan students. Whereas, Creole students only performed significantly lower than Mestizo students in English. East Indians and Mayan students underperformed Mestizo students in English as well, with Mayan students also having a lower mean average for English than "Other" students. The largest discrepancies in mean averages were between Mestizos and Mayans, Garifuna and "Other" students, with the largest discrepancy between Mayan students and "Other" students.

ANOVA and Effect Size for Mathematics Achievement by Ethnicity. A one-way ANOVA was used to test whether the mean differences in end-of-year math grades were significantly different among the 6 ethnic groups. According to the results presented in Table 17, there was an overall statistically significant difference in math grades among

the various ethnic groups, $F(5, 934) = 24.770$, $p < .05$. The effect size was a mere .11708, revealing that 11.7% variance in mathematics achievement was because of ethnicity.

Post Hoc for Mathematics Achievement by Ethnicity. A Tukey post hoc test was conducted to specify the groups between which there were statistically significant differences in mean mathematics grades. The findings showed that students who identified as ethnic groups categorized as "Other" had a significantly higher mean end-of-year math grade ($M = 84.3844$, $SD = 10.22825$) than the following groups of students: Creole students ($M = 72.1743$, $SD = 9.34322$) with a mean difference of 12.21008 percentage points, $SE = 2.47493$, $p < .05$; East Indian students ($M = 73.1531$, $SD = 9.49592$) with a mean difference of 11.23130 percentage points, $SE = 3.06196$, $p < .05$; Garifuna students ($M = 69.9277$, $SD = 9.94624$) with a mean difference of 14.45667 percentage points, $SE = 2.65685$, $p < .05$; and, Mayan students ($M = 73.3367$, $SD = 10.02951$) with a mean difference of 11.04768 percentage points, $SE = 2.56728$, $p < .05$. These significant mean differences are also presented in Table 18.

Overall, students who identified as an "Other" ethnic group and Mestizo students had the two highest mean scores. While the Mestizo students outperformed their Creole, Garifuna, and Mayan counterparts, the "Other" students outperformed all other ethnic groups, except for the Mestizo students. The largest mean difference was found between "Other" students and Garifuna students, followed by the mean difference between "Other" students and Mayan students.

Table 17

ANOVA Results English and Mathematics Achievement by Ethnicity

	SS	*η²*	*Df*	*Mean Square*	*F*	*Sig.*
English Achievement						
Between Groups	10007.383	.12832	5	2001.477	27.500	.000
Within Groups	67978.011		934	72.782		
Total	77985.394		939			
Mathematics Achievement						
Between Groups	11501.155	.11708	5	2300.231	24.770	.000
Within Groups	86734.226		934	92.863		
Total	98235.381		939			

Table 18

Tukey Post Hoc Results for English and Mathematics Achievement by Ethnic Groups

Ethnicity		*Mean Difference*	*SE*	*P Value*
Higher Achievement	*Lower Achievement*			
English Achievement (Percentage Points)				
Creole	Garifuna	3.17441	1.11147	.050
Creole	Mayan	4.18233	.93200	.000
Mestizo	Creole	4.41435	.65297	.000
Mestizo	East Indian	5.57728	1.72448	.016
Mestizo	Garifuna	7.58876	1.07614	.000
Mestizo	Mayan	8.59668	.88957	.000
Other	Garifuna	8.74149	2.35210	.003
Other	Mayan	9.74941	2.27281	.000
Mathematics Achievement (Percentage Points)				
Mestizo	Creole	6.46485	.73758	.000
Mestizo	Garifuna	8.71143	1.21557	.000
Mestizo	Mayan	5.30244	1.00482	.000
Other	Creole	12.21008	2.47493	.000
Other	East Indian	11.23130	3.06196	.004
Other	Garifuna	14.45667	2.65685	.000

Other	Mayan	11.04768	2.56728	.000

Note: The two largest mean discrepancies in English and math achievement are highlighted.

First Language

Homogeneity of Variance for Overall, English, and Mathematics Achievement by First Language

According to the Levene's Test for Equality of Variances, the Levene's statistic ($p < .05$) showed that the homogeneity of variance was violated for overall academic achievement. As such, a Welch ANOVA test was conducted for this particular dependent variable, followed by a Games-Howell post hoc test for multiple comparisons.

The Levene's statistic for English achievement and mathematics achievement were both statistically insignificant ($p > .05$), indicating that the assumption of homogeneity of variance was not violated for either.

Descriptive Statistics for Overall, English, and Mathematics Achievement by First Language.

The descriptive statistics results show that the total mean GPAs (overall achievement) ranged from 0.56 to 4.00 (on a standard 4.0 scale), with a total average of 2.7927, with a standard deviation of .56829 and standard error of .01854. The following is a breakdown of mean GPAs among students by their self-reported first language: Foreign M = 3.47, English M = 2.78, Creole M = 2.59, Spanish M = 2.98, Mayan M = 2.33, and Garifuna M = 2.35.

The mean end-of-year English grades ranged from 45.50 to 95.00; the total average was 76.4439, with a standard deviation of 9.11326 and .29724. The mean end-of

-year mathematics grades ranged from 43.52 to 97.31; the total average was calculated at 75.2462, with a standard deviation of 10.22825 and a standard error of .33361.

ANOVA and Effect Size for Overall Achievement by First Language. In response to the violation of homogeneity of variance, a one-way Welch ANOVA was conducted to determine if there were significant differences in overall achievement, as measured by mean end-of-year GPA, among the participating high school seniors according to their self-reported first or native language. The language categories were English, Creole, Spanish, Mayan, Garifuna, and foreign language.

According to the results of the Welch ANOVA, there was a statistically significant mean difference in the GPAs among students according to their first or native language, Welch's $F(5, 42.692) = 20.451$, $p < .05$, as illustrated in Table 19. Using the finding of $\eta^2 = .09290$, the effect size of first language on overall achievement was about 10%.

Table 19

Welch ANOVA Results for Overall Academic Achievement by First Language

Statistic	df1	df2	Sig.
20.451	5	42.692	.000

Post Hoc for Overall Achievement by First Language. In order to determine which of the first language groups were significantly different, a Games-Howell post hoc test was applied to the data. Findings showed that students who identified their first language as one of the foreign languages (M = 3.4686, SD = .37128) performed significantly higher in overall achievement than students reported the following as their

first language: English (*M* = 2.7807, *SD* = .59513) by 0.68791 grade points, *SE* = .14491, *p* < .05; Creole (*M* = 2.5888, *SD* = .55683) by 0.87979 grade points, *SE* = .14417, *p* < .05; Mayan (*M* = 2.8839, *SD* = 0.55694) by 0.58468 grade points, *SE* = .14570, *p* < .05; and, Garifuna students (*M* = 2.3464, *SD* = .59502) by 1.12221 grade points, *SE* = .22777, *p* < .05.

Native Spanish-speaking students had significantly higher GPAs (*M* = 2.7807, *SD* = .59513) than their peers who were native speakers of: English by 0.20381 grade points, *SE* = .04784, *p* < .05; Creole by 0.39569 grade points, *SE* = .04553, *p* < .05; and, Garifuna by 0.63811grade points, *SE* = .18212, *p* < .05.

Meanwhile, native Creole-speaking had significantly lower GPAs than English-speaking students by 0.19188 grade points, *SE* = .04898, *p* < .05 and Mayan-speaking counterparts by 0.29510 grade points, *SE* = .05127, *p* < .05. The above findings are outlined in Table 20.

In simpler terms, students who had a first language considered foreign to Belize performed significantly higher than student who speak all Belizean languages, other than Spanish. Native Spanish-speaking students had significantly higher GPAs than those whose native language included English, Garifuna, or Creole. Native Creole-speaking students also performed significantly lower than native English- and Mayan-speaking students. However, the largest grade point discrepancies were between native foreign language- and Garifuna-speaking students, followed by foreign-language and Creole-speaking students.

Table 20

Games-Howell Post Hoc Results for Significant Differences in overall achievement by First Language

First Language		*Mean Difference*	*SE*	*P Value*
Higher GPA	*Lower GPA*			
Foreign	English	0.68791	.14491	.017
Foreign	Creole	0.87979	.14417	.005
Foreign	Mayan	0.58468	.14570	.039
Foreign	Garifuna	1.12221	.22777	.002
English	Creole	0.19188	.04898	.001
Spanish	English	0.20381	.04784	.000
Spanish	Creole	0.39569	.04553	.000
Spanish	Garifuna	0.63811	.18212	.045
Mayan	Creole	0.29510	.05127	.000

Note The two largest mean discrepancies in English and Math achievement are highlighted.

ANOVA and Effect Size for English Achievement by First Language. Results showed that the differences in mean English/Language Arts grades were statistically significantly different, $F(5, 934) = 23.696$, $p < .05$, as assessed by a one-way ANOVA test using SPSS. The effect size of $\eta^2 = .11257$ indicates that a little over 11% of the variance in English achievement was attributable to students' first language.

Post Hoc for English Achievement by First Language. A Tukey post hoc test was conducted to specify the between group differences in mean end-of-year English grades, as a measure of English/Language Arts academic performance. On the basis of the findings, students who were native Mayan language ($M = 70.2316$, $SD = 8.49803$) speakers significantly underperformed in English compared to those whose first language

was: a foreign language (M = 84.4629, SD = 11.21827), with a mean difference of 14.23130 percentage points (SE = 3.37765, $p < .05$); English (M = 77.8219, SD = 9.33284), with a mean difference of 7.59036 percentage points (SE = 1.04724, $p < .05$); Creole (M = 74.4398, SD = 7.81607), with a mean difference of 4.20827 percentage points (SE = 1.04125, $p < .05$); and, Spanish (M = 79.3255, SD = 8.57040), with a mean difference of 9.09390 percentage points (SE = 1.04441, $p < .05$).

Findings also showed that, in relation to English/Language Arts academic performance, students whose first language was Creole significantly underperformed those whose first language was either Spanish, English, or a foreign language. For the native Creole-speaking students, the mean difference in English/Language Arts grades was 4.88563 percentage points (SE = .72691, $p < .05$) lower than that of students whose first language was Spanish, 3.38209 percentage points (SE = .73097, $p < .05$) lower than that of those whose first language was English, and 10.02303 percentage points (SE = 3.29335, $p < .05$) lower than grades of students who reported a foreign language as their first or native tongue.

The mean end-of-year English/Language Arts grades of students who reported Garifuna (M = 67.3973, SD = 9.72130) as their first language also significantly underperformed those whose native tongue was a foreign language; the mean difference was 17.06558 percentage points (SE = 4.16189, $p < .05$). Garifuna-speaking students also had significantly lower English/Language arts grades than native English-speaking students, with a mean difference of 10.42465 (SE = 2.64754, $p < .05$).

As evidenced by the results, the largest mean differences in grades were between the native Garifuna speakers and foreign language speakers, followed by the mean

difference between grades of native Mayan speakers and native foreign language speakers. Native foreign language speakers had significantly higher English/Language Arts end-of-year grades than native speakers of all the languages presented in the study, except for Spanish. Native Spanish speakers were found to have significantly outperformed their native Creole- and Mayan-speaking counterparts.

ANOVA and Effect Size for Mathematics Achievement by First Language. According to the results of the one-way ANOVA, the overall difference in mean end-of-year mathematics grades among native speakers of different languages was statistically significantly different, $F(5, 934) = 17.787$, $p < .05$. Calculations revealed a minimal effect size of less than 9 %, as evidenced by $\eta^2 = .08694$.

Post Hoc for mathematics Achievement by First Language. In order to clarify which of the first language groups had significantly different end-of-year mathematics grades means, a Tukey post hoc test was performed. Unlike findings for overall achievement and English achievement, students whose native tongue was a foreign language performed significantly higher in end-of-year mathematics grades than students who were native speakers of all other languages identified in the study. Specifically, native foreign language speakers (M = 90.4271, SD = 7.36957) scored: 21.98623 percentage points ($SE = 4.73807$, $p < .05$) higher than native Garifuna-speaking students ($M = 68.4409$, $SD = 7.87343$); 18.31876 percentage points ($SE = 3.74929$, $p < .05$) higher than native Creole-speaking students ($M = 72.1084$, $SD = 9.79236$); 16.92092 percentage points ($SE = 3.84526$, $p < .05$) higher than native Mayan-speaking students ($M = 73.5062$, $SD = 10.66754$); 14.97902 percentage points ($SE = 3.75145$, $p < .05$) higher than native English-speaking students ($M = 75.4481$, $SD = 10.09222$); and, 11.70953 percentage

points (*SE* = 3.75043, $p < .05$) higher than native Spanish-speaking students (*M* = 78.7176, *SD* = 9.32193).

Similarly, students who reported Spanish as their first language scored significantly higher in math grades than their other-language-speaking counterparts, except for foreign language speaking students. For instance, native Spanish speakers scored 10.27671 percentage points (*SE* = 3.01280, $p < .05$) significantly greater than native Garifuna speakers; 6.60924 percentage points (*SE* = .82755, $p < .05$) significantly greater than native Creole speakers; 5.21140 percentage points (*SE* = 1.18900, $p < .05$) significantly greater than native Mayan-speaking students; and, 3.26950 percentage points (*SE* = .83729, $p < .05$) significantly greater than native English-speaking students.

According to the results, there was an 18.31876 percentage point (*SE* = 3.74929, $p < .05$) difference in math grades between native English-speaking students and Creole-speaking students, with English-speaking students scoring significantly higher.

In short, students who reported their first language as a foreign language or as Spanish significantly outperformed all other students in mathematics. Meanwhile, students who listed English as their first language outperformed students who listed Creole as their first language, although Creole is an English dialect. Significant findings are presented in Table 21.

Table 21

ANOVA Results for Overall, English, and Mathematics Achievement by First Language

	SS	η^2	df	Mean Square	F	Sig.
Overall Achievement						
Between Groups	28.173	.09290	5	5.635	19.132	.000
Within Groups	275.081		934	.295		
Total	303.254		939			
English Achievement						
Between Groups	8779.043	.11257	5	1755.809	23.696	.000
Within Groups	69206.350		934	74.097		
Total	77985.394		939			
Mathematics Achievement						
Between Groups	8540.479	.08694	5	1708.096	17.787	.000
Within Groups	89694.902		934	96.033		
Total	98235.381		939			

Table 24

Tukey Post Hoc Results for English and Mathematics Achievement by First Language

First Language				
Higher Achievement	*Lower Achievement*	*Mean Difference*	*SE*	*P Value*
English Achievement (Percentage Points)				
Foreign	Creole	10.02303	3.29335	.029
Foreign	Mayan	14.23130	3.37765	.000
Foreign	Garifuna	17.06558	4.16189	.001
English	Creole	3.38209	.73097	.000
English	Mayan	7.59036	1.04724	.000
English	Garifuna	10.42465	2.64754	.001
Creole	Mayan	4.20827	1.04125	.001
Spanish	Creole	4.88563	.72691	.000
Spanish	Mayan	9.09390	1.04441	.000
Spanish	Garifuna	11.92818	2.64642	.000
Mathematics Achievement (Percentage Points)				
Foreign	English	14.97902	3.75145	.000
Foreign	Creole	18.31876	3.74929	.000
Foreign	Spanish	11.70953	3.75043	.023
Foreign	Mayan	16.92092	3.84526	.000
Foreign	Garifuna	21.98623	4.73807	.000
English	Creole	3.33974	.83217	.000
Spanish	English	3.26950	.83729	.001
Spanish	Creole	6.60924	.82755	.000
Spanish	Mayan	5.21140	1.18900	.000
Spanish	Garifuna	10.27671	3.01280	.009

Note: The two largest mean discrepancies in English and math achievement are highlighted.

Residence (Urban/Rural)

Homogeneity of Variance for Overall, English, and Mathematics Achievement by Residence.

The Levene's Test for Equality of Variances tested the three independent variables for variance. According to the results, data for English achievement and mathematics achievement were both shown to meet the assumption of homogeneity of variance, as evidenced by $p > .05$. However, data for overall academic achievement violated the assumption of homogeneity of variance with a $p < .05$.

Descriptive Statistics for Overall, English, and Mathematics Achievement by Residence. The study population included 487 students who lived in rural areas and 453 students who lived in what are considered urban areas in Belize. Among those who lived in rural areas, the mean cumulative GPA was $M = 2.8194$ ($SD = .53058$, $SE = .02404$), the mean end-of-year English grade was $M = 75.2125$ ($SD = 9.02223$, $SE = .40884$), and the mean end-of-year mathematics grade was $M = 74.9143$ ($SD = 10.44210$, $SE = .47318$). Among the urban-residing students, the mean cumulative GPA was $M = 2.7639$ ($SD = .60549$, $SE = .02845$), the mean end-of-year English grade was $M = 77.7677$ ($SD = 9.03439$, $SE = .42447$), and the mean end-of-year mathematics grade was $M = 75.6029$ ($SD = 9.99247$, $SE = .46949$).

T-Test and Effect Size for Overall Achievement by Residence. According to variances not assumed, there was no statistical significance between the GPAs or rural- and urban- residing students, $t(938) = 1.490$, $p > 0.05$; as such, the effect size was not calculated.

T-Test and Effect Size for English Achievement by Residence. As illustrated in Table 23, the mean difference in English grades between urban-residing and rural-residing students was statistically significant, $t(938) = -4.336$, $p < 0.05$. Results revealed that urban-residing students scored 2.56 percentage points, 95% CI [-3.71, -1.40], higher than their rural-residing peers. As the evidenced by a Cohen's d of .283021, the effect size or practical significance shows a moderate level.

T-Test and Effect Size for Mathematics Achievement by Residence. Findings showed that the mean difference in math grades between students who lived in urban and rural areas was statistically insignificant $t(938) = -1.031$, $p > 0.05$; the effect size was not assessed.

Table 23

T-Tests for Equality of Means and Effect Sizes for Overall, English, and Mathematics Achievement by Residence

	t	*df*	*P value*	*M Difference*	*SE Difference*	95% CI of the Difference		*Cohen's d*
						Lower	*Upper*	
Overall Achievement								
*Equal variances not assumed	1.490	900.854	.137	.05549	.03725	-.01762	.12859	---
English Achievement								
Equal variances assumed	-4.336	938	.000	-2.55522	.58931	-3.71175	-1.39869	.283021
Mathematics Achievement								
Equal variances assumed	-1.031	938	.303	-.68862	.66763	-1.99885	.62160	---

Commute Time

Homogeneity of Variance for Overall, English, and Mathematics Achievement by Commute Time.

All three independent variables were tested for homogeneity of variance using the Levene's Test for Equality of Variances. The results showed that overall achievement and English both violated the assumption of homogeneity of variance, as evidenced by $p < .05$. Meanwhile, the assumption of homogeneity of variance was met, with a $p > .05$, for mathematics achievement.

Descriptive Statistics for Overall, English, and Mathematics Achievement by Commute Time. The descriptive statistics table (refer to Table 24) includes the mean GPA, mean end-of-year English grades, and mean end-of-year mathematics grades for students according to their reported commute time to school from home. The commute time categories were as follows: 1-30 minutes, 31-60 minutes, 61-90 minutes, and over 90 minutes.

The total mean GPAs (overall achievement) ranged from 2.72 to 2.84 (on a standard 4.0 scale), with a total average of 2.79, with a standard deviation of .568 and standard error of .018. The mean end-of-year English grades ranged from 72.87 to 77.21; the total average was 76.44, with a standard deviation of 9.113 and .297. The mean end-of -year mathematics grades ranged from 72.82 to 75.95; the total average was calculated at 75.25, with a standard deviation of 10.228 and a standard error of .334. Refer to Table 24 for a full overview of the mean grades by commute time.

Table 10

Descriptive Statistics for Overall, English, and Mathematics Achievement by Commute Time

	Commute Time	N	M	SD	SE
Overall Academic Achievement	1-30 mins	662	2.8181	.59303	.02305
	31-60 mins	217	2.7228	.50115	.03402
	61-90 mins	38	2.7200	.53717	.08714
	90+ mins	23	2.8409	.43309	.09030
	Total	940	2.7927	.56829	.01854
English Achievement	1-30 mins	662	77.2085	9.37984	.36456
	31-60 mins	217	74.5624	8.51535	.57806
	61-90 mins	38	76.0305	6.76669	1.09770
	90+ mins	23	72.8717	6.80223	1.41836
	Total	940	76.4439	9.11326	.29724
Math Achievement	1-30 mins	662	75.9482	10.24998	.39838
	31-60 mins	217	73.5387	10.03334	.68111
	61-90 mins	38	72.8176	10.49893	1.70315
	90+ mins	23	75.1613	9.00344	1.87735
	Total	940	75.2462	10.22825	.33361

Welch ANOVA and Effect Size for Overall Achievement by Commute Time. Given that the assumption of homogeneity of variance was violated for overall achievement, a one-way Welch ANOVA was conducted to determine if there were significant differences in mean end-of-year GPA associated with commute time to school.

According to the results of the Welch ANOVA, mean difference in the GPAs on the basis of commute time was not statistically significant, as illustrated in Table 25; as such, the effect size was not calculated.

Welch ANOVA and Effect Size for English Achievement by Commute Time.

According to the results of a one-way Welch ANOVA, it was determined that there was an overall significant difference in English achievement associated with commute time, Welch's $F(3, 73.661) = 6.922$, $p < .05$, as illustrated in Table 25. The effect size revealed that just under 4% of variance in English achievement was attributed to commute time, as a result of $\eta^2 = .039364$.

Table 11

Welch ANOVA Results for Overall and English Achievement by Commute Time

	Welch Statistic	*df1*	*df2*	*P value*	*SS*	*Total SS*	η^2
Overall Academic Achievement	2.070	3	72.380	.112	6.552	303.354	---
English Achievement	6.922	3	73.661	.000	3069.8	77985.4	.039364

Post Hoc for English Achievement by Commute Time. A Games-Howell post hoc test was conducted to determine the specific between group differences in mean end-of-year English/Language Arts grades. Students whose commute time was no more than 30 minutes ($M = 77.21$, $SD = 9.37984$) scored 2.65 percentage points ($SE = .68341$, $p < .05$) than those whose commute time was between 31 and 60 minutes ($M = 74.56$, $SD = 8.51535$), and 4.34 percentage points higher than those whose commute time was greater than 90 minutes ($M = 72.87$, $SD = 6.80223$). Although statistically significant, these findings offer small practical significance with 4% (.039364). Confirming the effect size, no other commute time categories were significantly different in terms of English achievement. Refer to Table 26 for an overview of the significant findings.

Table 12

Games-Howell Post Hoc Results for Significant Differences in English Achievement by Commute Time

Commute Time		*Mean Difference*	*SE*	*P Value*
Higher Grade	*Lower Grade*			
1-30 mins	31-60 mins	2.64606	.68341	.001
1-30 mins	90+ mins	4.33672	1.46446	.031

ANOVA and effect size for Mathematics Achievement by Commute Time. Results showed that the differences in mean end-of-year math grades were statistically significantly different, $F(3, 936) = 3.804$, $p < .05$, as assessed by a one-way ANOVA test using SPSS. According the calculation for Eta square, $\eta^2 = .01205$, meaning that just a little over 1% of variance in math achievement was attributable to students' commute time to school.

Table 13

ANOVA Results for Mathematics Achievement by Commute Time

Mathematics Achievement	*SS*	η^2	*df*	*Mean Square*	*F*	*Sig.*
Between Groups	1183.257	.01205	3	394.419	3.804	.010
Within Groups	97052.124		936	103.688		
Total	98235.381		939			

Post Hoc for Mathematics Achievement by Commute Time. The Tukey post hoc test revealed that the only statistically significant difference in math achievement, associated with commute time, was between students whose commute was up to 30 minutes (M = 75.95, SD = 10.25) and those whose commute was 31 to 60 minutes in

duration (M = 72.82, SD = 10.50). The difference between the two means was 2.41 percentage points (SE = .79653, $p < .05$). Refer to Table 28 for results.

Again, the author concluded that, despite the statistical significance, the practical significance is small.

Table 14

Tukey Post Hoc Results for Significant Differences in Mathematics Achievement by Commute Time

Commute Time		*Mean Difference*	*SE*	*P Value*
Higher Grade	*Lower Grade*			
1-30 mins	31-60 mins	2.40957	.79653	.014

High School

Although students' high school of attendance was not considered a sociocultural factor in this study, the author deemed it necessary to carry out a basic analysis on whether there were significant differences in grades by high school, in order to consider high school of attendance should be considered a covariate in further statistical analyses.

Homogeneity of Variance for Overall, English, and Mathematics Achievement by High School.

The homogeneity of variance was tested for overall achievement, English achievement, and mathematics achievement using the Levene's Test for Equality of Variances. Using the results, the assumption of homogeneity of variance for all three variables was violated, as evidenced by the Levene's statistic ($p < .05$). Hence, for further analyses, Welch ANOVA tests were conducted, followed by a Games-Howell post hoc test for multiple comparisons, in lieu of the standard ANOVA and Tukey post hoc test.

Descriptive Statistics for Overall, English, and Math Achievement by High School.

For overall achievement, the schools with mean GPAs over 3.0 were HS 6 – Cayo (*M* = 3.11, *SD* = .59432) and HS 2 – Orange Walk (*M* = 3.10, *SD* = .41849). The schools with the highest mean English grades, over 80 percentage points, were HS 2 – Orange Walk (*M* = 84.44, *SD* = 6.09179) and HS 1 – Corozal (*M* = 81.06, *SD* = 8.66240), both in the northern region of the country. HS 6 – Cayo (*M* = 84.67, *SD* = 9.59088) and HS 2 – Orange Walk (*M* = 80.19, *SD* = 7.59216) also had the highest mean end-of-year mathematics grades, both over 80 percentage points.

The low-performing schools in overall achievement and mathematics achievement were both located in Belize City, HS 3 – Belize (overall *M* = 2.69, *SD* = .34518; mathematics *M* = 69.97, *SD* = 8.95937) and HS 4 – Belize (*M* = 2.15, *SD* = .58332; *M* = 67.77, *SD* = 8.38743). For English achievement, in contrast to the high-performing schools, the low-performing schools were both located in the southern region of the country, HS 9 (*M* = 69.42, *SD* = 8.50127) and HS 8 (*M* = 66.89, *SD* = 7.74763).

Analysis of variance tests were performed on the data to determine whether the differences in mean GPA and grades were statistically significant. Results are discussed in subsequent sections.

Welch ANOVA and Effect Size for Overall Achievement by High School. As previously mentioned, a one-way Welch ANOVA was conducted to determine whether the differences in overall achievement among the high schools were statistically significant. On the basis of the results, the difference in mean GPAs, used as the measure of overall achievement, was statistically significant, Welch's $F(8, 333.453) = 32.402$, $p <$

.05, as presented in Table 29. Approximately 25% variance in overall achievement could be attributed to the students' high school, with $\eta^2 = .25299$.

Post Hoc for Overall Achievement by High School. A Games-Howell post hoc test was conducted to determine the specific between-group differences in mean cumulative GPA among the participating high schools. Overall, the mean GPA of HS2 – Orange Walk students was significantly higher than that of all other high schools except for HS6 – Cayo. Meanwhile, HS4 – Belize significantly underperformed all schools in overall achievement, and HS3- Belize significantly underperformed all other schools except HS4- Belize and HS7 – Belize.

Refer to Table 30 for statistically significant mean differences.

Welch ANOVA and Effect Size for English Achievement by High School. Results from the Welch ANOVA determined that the differences in English achievement among the high schools were statistically significant, Welch's $F(8, 331.726) = 51.572$, $p < .05$, as presented Table 29. The effect size of high school on English achievement was found to be almost 30% with $\eta^2 = .28462$.

Post Hoc for English Achievement by High School. The Games-Howell post hoc test revealed the specific between-group differences in mean end-of-year English grades among the participating high schools. Similar to results for overall achievement, HS2 – Orange Walk students outperformed their peers at all other high schools in English achievement. Meanwhile, HS4 – Belize significantly underperformed all schools in overall achievement, and HS3- Belize significantly underperformed all other schools except HS4- Belize and HS7 – Belize.

In contrast to findings for overall achievement, HS8 – Stann Creek underperformed all other schools, except HS9 – Toledo, which also underperformed all other schools except HS4 – Belize and HS8 – Stann Creek. HS8 – Stann Creek and HS9 – Toledo are 2 of the 3 southern schools in the study.

Refer to Table 30 for the complete list of statistically significant mean differences in English achievement.

Welch ANOVA and Effect Size for Mathematics Achievement by High School. Results from the Welch ANOVA showed that the differences in mathematics achievement among the high schools were statistically significant, Welch's $F(8, 329.089) = 36.415$, $p < .05$, as presented in Table 29. According to the calculated Eta squared ($\eta^2 = .23403$), the effect was moderate with about 23% variance in mathematics achievement attributable to students' high school of attendance.

Post Hoc for Mathematics Achievement by High School. The statistically significant between-group differences in mean end-of-year math grades among the participating high schools were revealed by the Games-Howell post hoc test.

Results for math achievement were similar to those for overall achievement, in that HS6 – Cayo and HS2 – Orange Walk were the top-performing schools and HS3 – Belize and HS4 – Belize were the low-performing schools.

HS6 – Cayo students had higher mean end-of-year math grades than that of all other high schools. Conversely, HS4 – Belize students significantly underperformed all schools in math achievement, except HS3- Belize. HS3 – Belize underperformed all schools except HS9 – Toledo and HS4 – Belize.

Refer to Table 30 for a complete list of statistically significant mean differences.

Table 29

Welch ANOVA Results for Overall, English, and Mathematics Achievement by High School

					Total		
	Statistic	df1	df2	Sig.	SS	SS	η^2
Overall Achievement	32.402	8	333.453	.000	76.723	303.254	.25299
English Achievement	51.572	8	331.726	.000	22196.2	77985.4	.28462
Mathematics Achievement	36.415	8	329.089	.000	22989.9	98235.4	.23403

Data Analysis for Preliminary Research Questions

Data Analysis for Research Question 1

Is there a significant interaction between first language and high school on students': overall achievement, English achievement, and mathematics achievement?

Homogeneity of Variance for Overall, English, and Mathematics Achievement.

The homogeneity of variance was tested across each of the three dependent variables using the Levene's Test for Equality of Variances. According to the results, the assumption of homogeneity of variance was violated for all three variables – overall achievement, English achievement, and math achievement – as evidenced by the Levene's statistic ($p < .05$) in each case. However, considering that the two-way ANOVA is somewhat robust to heterogeneity of variance in these circumstances (Jaccard, 1998), the author proceeded with further analyses of the study data.

Table 30

Games-Howell Post Hoc Results for Overall, English, and Mathematics Achievement by High School

High School		*Mean Difference*	*SE*	*P Value*
Higher Achievement	*Lower Achievement*			
Overall Achievement				
HS1 – Corozal	HS3 – Belize	.18372	.05610	.032
HS1 – Corozal	HS4 – Belize	.72073	.06841	.000
HS2 – Orange Walk	HS1 – Corozal	.22278	.06313	.014
HS2 – Orange Walk	HS3 – Belize	.40650	.05411	.000
HS2 – Orange Walk	HS4 – Belize	.94351	.06679	.000
HS2 – Orange Walk	HS5 – Cayo	.18448	.05635	.034
HS2 – Orange Walk	HS7 – Stann Creek	.29869	.06629	.000
HS2 – Orange Walk	HS9 – Toledo	.23019	.05710	.003
HS3 – Belize	HS4 – Belize	.53701	.06019	.000
*HS5 – Cayo	HS3 – Belize	.22202	.04835	.000
HS5 – Cayo	HS4 – Belize	.75902	.06221	.000
HS6 – Cayo	HS3 – Belize	.42145	.07253	.000
HS6 – Cayo	HS4 – Belize	.95846	.08242	.000
HS6 – Cayo	HS7 – Stann Creek	.31364	.08201	.006
HS6 – Cayo	HS9 – Toledo	.24514	.07478	.035
HS7 – Stann Creek	HS4 – Belize	.64482	.07134	.000
HS8 – Stann Creek	HS3 – Belize	.26426	.07677	.027
HS8 – Stann Creek	HS4 – Belize	.80127	.08617	.000
HS9 – Toledo	HS3 – Belize	.17631	.04922	.013
HS9 – Toledo	HS4 – Belize	.71332	.06289	.000
English Achievement				
HS1 – Corozal	HS3 – Belize	6.48637	1.03373	.000
HS1 – Corozal	HS4 – Belize	8.89746	.89441	.000
HS1 – Corozal	HS7 – Stann Creek	6.81381	.97820	.000
HS1 – Corozal	HS8 – Stann Creek	14.16788	1.33438	.000
HS1 – Corozal	HS9 – Toledo	11.63679	1.15711	.000
HS2 – Orange Walk	HS1 – Corozal	3.37894	.91961	.009

High School		*Mean Difference*	*SE*	*P Value*
Higher Achievement	*Lower Achievement*			
HS2 – Orange Walk	HS3 – Belize	9.86531	1.01044	.000
HS2 – Orange Walk	HS4 – Belize	12.27639	.86738	.000
HS2 – Orange Walk	HS5 – Cayo	5.86044	.93592	.000
HS2 – Orange Walk	HS6 – Cayo	5.08727	1.06649	.000
HS2 – Orange Walk	HS7 – Stann Creek	10.19275	.95355	.000
HS2 – Orange Walk	HS8 – Stann Creek	17.54682	1.31641	.000
HS2 – Orange Walk	HS9 – Toledo	15.01573	1.13634	.000
HS3 – Belize	HS8 – Stann Creek	7.68151	1.39852	.000
HS3 – Belize	HS9 – Toledo	5.15042	1.23052	.001
HS4 – Belize	HS8 – Stann Creek	5.27042	1.29893	.004
HS5 – Cayo	HS7 – Stann Creek	4.33231	.99355	.001
HS5 – Cayo	HS8 – Stann Creek	11.68638	1.34567	.000
HS5 – Cayo	HS9 – Toledo	9.15529	1.17011	.000
HS6 – Cayo	HS3 – Belize	4.77804	1.16632	.002
HS6 – Cayo	HS4 – Belize	7.18912	1.04484	.000
HS6 – Cayo	HS7 – Stann Creek	5.10548	1.11741	.000
HS6 – Cayo	HS8 – Stann Creek	12.45955	1.43954	.000
HS6 – Cayo	HS9 – Toledo	9.92846	1.27695	.000
HS7 – Stann Creek	HS8 – Stann Creek	7.35407	1.35799	.000
HS7 – Stann Creek	HS9 – Toledo	4.82298	1.18426	.002
Mathematics Achievement				
HS1 – Corozal	HS3 – Belize	7.28997	1.05826	.000
HS1 – Corozal	HS4 – Belize	9.49675	.97403	.000
HS1 – Corozal	HS9 – Toledo	5.26190	1.32138	.003
HS2 – Orange Walk	HS3 – Belize	10.21624	1.15062	.000
HS2 – Orange Walk	HS4 – Belize	12.42302	1.07366	.000
HS2 – Orange Walk	HS7 – Stann Creek	6.22912	1.19484	.000
HS2 – Orange Walk	HS9 – Toledo	8.18817	1.39644	.000
HS5 – Cayo	HS3 – Belize	7.61200	1.21624	.000
HS5 – Cayo	HS4 – Belize	9.81878	1.14370	.000
HS5 – Cayo	HS9 – Toledo	5.58393	1.45098	.005
HS6 – Cayo	HS1 – Corozal	7.41071	1.22917	.000
HS6 – Cayo	HS2 – Orange Walk	4.48445	1.30952	.022

High School		*Mean Difference*	*SE*	*P Value*
Higher Achievement	*Lower Achievement*			
HS6 – Cayo	HS3 – Belize	14.70069	1.34134	.000
HS6 – Cayo	HS4 – Belize	16.90747	1.27593	.000
HS6 – Cayo	HS5 – Cayo	7.08869	1.36754	.000
HS6 – Cayo	HS7 – Stann Creek	10.71356	1.37946	.000
HS6 – Cayo	HS8 – Stann Creek	6.65884	1.79688	.011
HS6 – Cayo	HS9 – Toledo	12.67262	1.55734	.000
HS7 – Stann Creek	HS3 – Belize	3.98713	1.22963	.036
HS7 – Stann Creek	HS4 – Belize	6.19391	1.15793	.000
HS8 – Stann Creek	HS3 – Belize	8.04185	1.68460	.000
HS8 – Stann Creek	HS4 – Belize	10.24863	1.63300	.000

Note: The two largest mean discrepancies in overall, English, and math achievement are highlighted.

Descriptive Statistics for Ethnicity and Gender on Overall, English, and Math Achievement.

The descriptive statistics revealed that the schools had different language demographics depending on the region or district in which they were located. For instance, the two northern schools and two schools in Cayo had high concentrations of native Spanish-speaking students, while the two Belize district schools were slightly more diverse with higher concentrations of native Creole speakers. HS7- Stann Creek had the highest concentration of Garifuna-speaking students of all nine schools. HS8 – Stann Creek and HS9 – Toledo had majority native Mayan-speaking students.

Effect of First Language and High School on Overall Achievement

In order to determine there was an interaction effect between first language and high school on overall achievement, as measured by GPA, a two-way ANOVA was

conducted. The results showed that the interaction effect between first language and high school on overall achievement was statistically insignificant, $F(30, 896) = 1.391$, $p = .08$.

In confirmation of exploratory analyses, the main effect of first language was statistically significant, $F(5, 896) = 7.673$, $p < .05$, with a small effect size of $\eta^2 = .02959$, as was the main effect of high school on overall achievement, $F(8, 896) = 3.287$, $p < .05$, with a small effect size of $\eta^2 = .02028$.

Refer to the corresponding section in exploratory analysis for post hoc results for the effects of ethnicity and of high school.

Effect of First Language and High School on English Achievement. Per the SPSS output for the two-way ANOVA on first language and high schools on English achievement, there was a statistically significant interaction effect, $F(30, 896) = 1.649$, $p < .05$. However, the effect size was $\eta^2 = .03806$, showing that only less than 4% of variance in English grades was attributable to the interaction between students' first language and high school.

Additionally, the main effect of first language was statistically significant, $F(5, 896) = 4.706$, $p < .05$, $\eta^2 = .17520$ (accounting for a little over 17% of variance in English grades), as well as the main effect of high school, as shown by $F(8, 896) = 9.843$, $p < .05$, $\eta^2 = .03682$. Refer to Table 31 for results.

Univariate Tests for English Achievement. Results of the univariate tests showed that the within-group differences were significant for the following language groups: Creole-speaking, English-speaking, Mayan-speaking, and foreign language-speaking students. In other words, there were significant differences in mean end-of-year English grades within the aforementioned ethnic groups from one high school to the next.

However, there was no significant difference in English grades among Garifuna-speaking students from one high school to the next.

Effect of First Language and High School on Mathematics Achievement. Findings from a two-way ANOVA test to determine whether there was an interaction effect between first language and high school showed that the interaction effect was statistically significant, $F(30, 896) = 1.612$, $p < .05$, $\eta^2 = .03806$, which is a small effect size.

Additionally, the main effects of both first language and high school on math achievement were statistically significant. For first language, results were $F(5, 896) = 7.395$, $p < .05$, $\eta^2 = .02911$; for high school, results were significant at $F(8, 896) = 3.711$, $p < .05$, with a small effect size of $\eta^2 = .02337$.

Table 31

ANOVA Results for the Interaction Effect of First Language and High School on Overall, English, and Mathematics Achievement

Source	*Type III Sum of Squares*	η^2	*df*	*Mean Square*	*F*	*P value*
Overall Achievement						
High School	6.150	.02028	8	.769	3.287	.001
First Language	8.973	.02959	5	1.795	7.673	.000
High School* First Language	9.759	---	30	.325	1.391	.080
Error	209.543		896	.234		
Total	7634.348		940			
Corrected Total	303.254		939			
English Achievement						
High School	4571.800	.05862	8	571.475	9.843	.000
First Language	1366.257	.17520	5	273.251	4.706	.000
High School* First Language	2871.718	.03682	30	95.724	1.649	.016
Error	52020.274		8	571.475	9.843	.000

Total	5571032.604		940			
Corrected Total	77985.394		939			
Mathematics Achievement						
High School	2295.705	.02337	43	673.258	8.707	.000
First Language	2859.233	.02911	1	540576.087	6990.751	.000
High School* First Language	3738.940	.03806	8	286.963	3.711	.000
Error	69285.281		5	571.847	7.395	.000
Total	5420502.344		940			
Corrected Total	98235.381		939			

Univariate Tests for Mathematics Achievement. Findings of univariate tests revealed that the groups that performed differently depending on the high school they attended were: Creole-speaking, English-speaking, and Mayan-speaking students. There were no significant differences in math grades based on school attended, for students who reported Garifuna or a foreign language as their mother tongue.

Data Analysis for Research Question 2

Is there a significant interaction between ethnicity and gender on students': overall achievement, English achievement, and mathematics achievement?

Homogeneity of Variance for Overall, English, and Mathematics Achievement

The homogeneity of variance was tested across each of the three dependent variables using the Levene's Test for Equality of Variances. For overall academic achievement, the assumption of homogeneity of variance was violated, as evidenced by the Levene's statistic ($p < .05$). However, considering that the two-way ANOVA is somewhat robust to heterogeneity of variance in these circumstances (Jaccard, 1998), the author proceeded with further analyses of the study data.

As shown in Table 32, the Levene's statistic for English achievement and mathematics achievement were both statistically insignificant ($p > .05$); thus, the assumption of homogeneity of variance was not violated for either.

Table 32

Tests of Homogeneity of Variance for Overall, English, and Mathematics Achievement

	Levene Statistic	df1	df2	Sig.
Overall Achievement				
Based on Mean	3.071	11	928	.000
Based on Median	2.996	11	928	.001
Based on Median and with adjusted df	2.996	11	853.853	.001
Based on trimmed mean	3.066	11	928	.000
English Achievement				
Based on Mean	.960	11	928	.482
Based on Median	.880	11	928	.559
Based on Median and with adjusted df	.880	11	901.218	.559
Based on trimmed mean	.947	11	928	.494
Mathematics Achievement				
Based on Mean	.622	11	928	.811
Based on Median	.581	11	928	.845
Based on Median and with adjusted df	.581	11	923.077	.845
Based on trimmed mean	.656	11	928	.781

Descriptive Statistics for Ethnicity and Gender on Overall, English, and Math Achievement

The descriptive statistics, including mean, standard deviation, and sample size, by ethnicity and gender, are presented in full in Table 33. As a reminder, identification with ethnic categories was self-reported by students. In short, females outnumbered males in

every ethnic category, except for Mayan, which had a sample of 60 males and 58 females.

In regard to overall achievement, males had a lower GPA (*M* = 2.70, *SD* = .59090) than did females (*M* = 2.86, *SD* = .54191). The only two groups with GPAs over 3.0 were females who identified as an "Other" ethnic group (*M* = 3.41, *SD* = .58809) and females who identified as Mestizo (*M* = 3.06, *SD* = .49529). The two groups with the lowest GPAs were Creole males (*M* = 2.45, *SD* = .59050) and Garifuna males (*M* = 2.24, *SD* = .66616).

For English achievement, similar to the statistics for overall achievement, females who identified as an "Other" ethnicity (*M* = 85.35, *SD* = 8.35700) and Mestizo females (*M* = 80.91, *SD* = 8.34803) were the only two groups with end-of-year English grade averages over 80 percentage points. The groups with the lowest end-of-year English averages were Mayan females (M = 71.18, SD =8.26015), Mayan males (*M* = 70.86, *SD* = 8.64384), and Garifuna males (*M* = 68.41, *SD* = 9.70098).

As it pertains to math achievement, "Other" females (*M* = 85.59, *SD* = 10.29092) and "Other" males (*M* = 82.83, *SD* = 11.64147) were the only two groups to score above 80 mean percentage points in end-of-year math grades. The groups with the lowest end-of-year mean math grades were East Indian females (*M* = 70.79, *SD* = 8.76226), Creole males (*M* = 70.68, *SD* = 9.45099), Garifuna females (*M* = 70.63, *SD* = 9.93038), and Garifuna males (M = 69.93, SD = 9.94624). Further analyses were carried out to determine whether the differences in mean grades were statistically significant.

Table 33

Descriptive Statistics for Overall, English, and Math Achievement by Ethnicity and Gender

			Overall Achievement		English Achievement		Mathematics Achievement	
Ethnicity	Gender	N	M	SD	M	SD	M	SD
Mestizo	Male	179	2.85	.56261	77.89	8.97971	78.05	10.05650
	Female	238	3.06	.49529	80.91	8.34803	79.09	9.31074
	Total	417	2.97	.53427	79.61	8.74296	78.64	9.63985
Creole	Male	117	2.45	.59050	72.96	7.53730	70.68	9.45099
	Female	172	2.66	.57463	76.72	8.46772	73.19	9.15829
	Total	289	2.57	.58901	75.20	8.29829	72.17	9.34322
East Indian	Male	7	2.68	.59765	75.07	7.72134	79.57	8.92295
	Female	19	2.67	.45553	73.65	9.48647	70.79	8.76226
	Total	26	2.67	.48492	74.04	8.91713	73.15	9.49592
Garifuna	Male	22	2.24	.66616	68.41	9.70098	68.26	10.01343
	Female	52	2.63	.46431	73.55	6.65243	70.63	9.93038
	Total	74	2.51	.55694	72.02	7.97382	69.93	9.94624
Mayan	Male	60	2.87	.38708	70.86	8.64384	74.00	10.21651
	Female	58	2.86	.32525	71.18	8.26015	72.65	9.87351
	Total	118	2.86	.35653	71.02	8.42274	73.34	10.02951
Other	Male	7	2.94	.44622	74.87	8.42508	82.83	11.64147
	Female	9	3.41	.58809	85.35	8.35700	85.59	10.29092
	Total	16	3.21	.56794	80.77	9.72106	84.38	10.61547
Total	Male	392	2.70	.59090	74.71	9.05249	74.79	10.53271
	Female	548	2.86	.54191	77.69	8.96041	75.57	10.00188
	Total	940	2.79	.56829	76.44	9.11326	75.25	10.22825

Effect of Gender and Ethnicity on Overall Achievement. A two-way ANOVA as conducted to examine the effects of gender and ethnicity on overall achievement, as measured by GPA. The findings revealed that the interaction effect between gender and ethnicity on overall achievement was not statistically significant, $F(5, 928) = 1.696$, $p =$

.133. In other words, there were no significant differences in mean GPA between the genders within their ethnic groups. Results are outlined in Table 34.

However, as was found in the exploratory analysis, the main effect of ethnicity was statistically significant, as evidenced by $F(5, 928) = 27.249$, $p < .05$, with an effect size of $\eta^2 = .12414$. Post hoc results were discussed in the corresponding section in exploratory analysis. Also, the effect of gender on overall achievement was found to be statistically significant, $F(1, 928) = 9.930$, $p < .05$, with females ($M = 2.86$, $SD = .54$) outperforming males ($M = 2.79$, $SD = .57$). The effect size was small with $\eta^2 = .00904$.

Effect of Gender and Ethnicity on English Achievement. Results from the two-way ANOVA showed no statistically significant interaction effect between gender and ethnicity on English achievement in this study, $F(5, 928) = 1.828$, $p = .105$. As with overall achievement, there were no significant differences in mean end-of-year English grades between the genders within their ethnic groups. Refer to Table 34 for results.

In line with one-way ANOVA results in the exploratory analysis, the main effect of ethnicity, $F(5, 928) = 28.053$, $p < .05$, and the main effect of gender, $F(1, 928) = 11.271$, $p < .05$, were statistically significant; females ($M = 77.69$, $SD = 8.96041$) outperformed males ($M = 74.71$, $SD = 9.05249$) in English achievement. The effect size for ethnicity was $\eta^2 = .12639$, and was $\eta^2 = .01016$ for gender, which is minimal.

Effect of Gender and Ethnicity on Mathematics Achievement. According to the results of the two-way ANOVA, the interaction effect between ethnicity and gender was statistically insignificant, $F(5, 928) = 1.845$, $p = .102$. In summary, there was no interaction effect between gender and ethnicity for any of the variables tested – overall, English, and math achievement.

As with the one-way ANOVA findings, the main effect of gender on math achievement was also not statistically significant, $F(1, 928) = .041$, $p = .840$; however, the main effect of ethnicity was significant, $F(5, 928) = 24.573$, $p < .05$, with an effect size of $\eta^2 = .01016$.

Table 34

ANOVA Results for the Interaction Effect of Ethnicity and Gender on Overall, English, and Mathematics Achievement

Source	*Type III Sum of Squares*	η^2	*df*	*Mean Square*	*F*	*P value*
Overall Achievement						
Ethnicity	37.646	.12414	5	7.529	27.249	.000
Gender	2.744	.00904	1	2.744	9.930	.002
Ethnicity* Gender	2.343	---	5	.469	1.696	.133
Error	256.418		928	.276		
Total	7634.348		940			
Corrected Total	303.254		939			
English Achievement						
Ethnicity	9857.001	.12639	5	1971.400	28.053	.000
Gender	792.071	.01016	1	792.071	11.271	.001
Ethnicity* Gender	642.415	---	5	128.483	1.828	.105
Error	65213.517		928	70.273		
Total	5571032.604		940			
Corrected Total	77985.394		939			
Mathematics Achievement						
Ethnicity	11335.918	.11539	5	2267.184	24.573	.000
Gender	3.750	---	1	3.750	.041	.840
Ethnicity* Gender	851.209	---	5	170.242	1.845	.102
Error	85620.902		928	92.264		
Total	5420502.344		940			
Corrected Total	98235.381		939			

Data Analysis for Research Question 3

Is there a significant interaction between ethnicity and high school on high school students': overall achievement, English achievement, and mathematics achievement?

Homogeneity of Variance for Overall, English, and Mathematics Achievement

The homogeneity of variance was tested across each of the three dependent variables using the Levene's Test for Equality of Variances. For overall academic achievement and math achievement, the assumption of homogeneity of variance was violated, as evidenced by the Levene's statistic ($p < .05$). However, considering that the two-way ANOVA is somewhat robust to heterogeneity of variance in these circumstances (Jaccard, 1998), further analyses of the study data were carried out with equal variances not assumed.

As shown in Table 35, the Levene's statistic for English achievement was statistically insignificant ($p > .05$), and so results with equal variances assumed were interpreted.

Table 15

Tests of Homogeneity of Variance for Overall, English, and Mathematics Achievement

	Levene Statistic	df1	df2	Sig.
Overall Achievement				
Based on Mean	3.343	41	890	.000
Based on Median	2.990	41	890	.000
Based on Median and with adjusted df	2.990	41	711.836	.000
Based on trimmed mean	3.312	41	890	.000
English Achievement				
Based on Mean	1.333	41	890	.081
Based on Median	1.256	41	890	.133
Based on Median and with adjusted df	1.256	41	796.784	.134

Based on trimmed mean	1.341	41	890	.077
Mathematics Achievement				
Based on Mean	1.489	41	890	.026
Based on Median	1.250	41	890	.138
Based on Median and with adjusted df	1.250	41	762.441	.140
Based on trimmed mean	1.445	41	890	.037

Descriptive Statistics for Ethnicity and High School on Overall, English, and Math Achievement

A complete list of the descriptive statistics, including mean, standard deviation, and sample size, by ethnicity and gender, is presented in Table 36. The descriptive statistics revealed that the schools had different demographics depending on the region or district in which they were located. For instance, the two northern schools had high concentrations of Mestizo students, while the two Belize district schools were slightly more diverse with higher concentrations of Creole students. The western region (Cayo) schools had more Mestizo students, as well as Creole students. HS7- Stann Creek had the highest concentration of Garifuna students of all nine schools. HS8 – Stann Creek and HS9 – Toledo had majority Mayan students.

Refer to Table 36 for the complete list of overall GPA, English and mathematics grades by ethnic group per high school.

Table 36

Descriptive Statistics for Overall, English, and Mathematics Achievement by Ethnicity and High School

High School	*Ethnicity*	*N*	Overall Achievement		English Achievement		Mathematics Achievement	
			M	*SD*	*M*	*SD*	*M*	*SD*
1 - Corozal	Mestizo	135	**2.8756**	.57783	80.9074	8.66352	77.2037	8.17858
	Creole	23	2.8343	.61273	82.1739	7.80823	76.7391	7.12848
	East Indian	4	2.6650	.49400	75.0000	10.40833	77.5000	4.08248
	Garifuna	1	1.3700	.	67.5000	.	50.0000	.
	Mayan	1	2.6000	.	**82.5000**	.	**82.5000**	.
	Other	4	**3.6775**	.20288	**88.7500**	8.29156	**87.5000**	10.60660
	Total	168	2.8735	.59432	81.0565	8.66240	77.2619	8.35782
2 - Orange Walk	Mestizo	79	3.1280	.40239	84.5886	6.05041	**80.5063**	7.57843
	Creole	8	2.7650	.46350	82.1875	6.87094	75.6250	6.51235
	East Indian	1	2.4900	.	77.5000	.	77.5000	.
	Garifuna	2	3.1100	.31113	85.0000	3.53553	80.0000	3.53553
	Mayan	2	**3.3650**	.61518	**88.7500**	8.83883	80.0000	10.60660
	Other	1	**3.2800**	.	**87.5000**	.	**95.0000**	.
	Total	93	3.0962	.41849	84.4355	6.09179	80.1882	7.59216
3 - Belize	Mestizo	22	2.7895	.34330	74.1818	8.61138	70.8182	10.31705
	Creole	73	2.6296	.31627	74.4110	8.17998	69.6000	8.11117
	East Indian	7	**2.8486**	.46596	**77.7143**	11.33893	**71.5714**	12.14986
	Garifuna	7	**2.9471**	.43462	**78.1429**	7.86190	**72.7143**	12.52616
	Mayan	3	2.5267	.19140	69.6667	7.09460	62.6667	2.51661
	Other	2	2.5750	.21920	68.5000	9.19239	70.0000	1.41421
	Total	114	2.6897	.34518	74.5702	8.42034	69.9719	8.95937

High School	*Ethnicity*	*N*	Overall Achievement		English Achievement		Mathematics Achievement	
			M	*SD*	*M*	*SD*	*M*	*SD*
4 - Belize	Mestizo	10	**2.4460**	.81347	**75.5000**	11.16791	**72.0000**	11.83216
	Creole	94	2.1112	.56933	71.6489	6.61492	67.5532	7.71623
	East Indian	5	2.1780	.14220	72.0000	4.47214	70.0000	3.53553
	Garifuna	20	**2.1980**	.61954	72.7500	5.95487	65.2500	9.93068
	Mayan	2	2.1700	.15556	72.5000	3.53553	**75.0000**	7.07107
	Other	1	2.0600	.	**75.0000**	.	70.0000	.
	Total	132	2.1527	.58332	72.1591	6.82925	67.7652	8.38743
5 - Cayo	Mestizo	63	**2.9841**	.38531	**79.2530**	7.22358	**79.1937**	9.68241
	Creole	34	2.8541	.38605	78.2700	8.50212	76.1947	8.87793
	East Indian	2	2.5400	.28284	72.2850	3.59917	72.2650	6.10233
	Garifuna	2	2.1975	.61872	67.2200	12.47336	**78.6950**	7.36098
	Mayan	16	**2.8850**	.28284	**78.7594**	4.57390	74.7238	10.31533
	Total	117	2.9118	.38881	78.5750	7.46984	77.5839	9.52299
6 - Cayo	Mestizo	59	3.1236	.62752	79.7669	8.12813	84.9153	9.90217
	Creole	16	3.0913	.53449	**79.7813**	7.92248	83.1250	8.39146
	East Indian	2	**3.1850**	.92631	**80.0000**	7.07107	**88.7500**	8.83883
	Garifuna	2	2.9500	.11314	73.7500	1.76777	82.5000	10.60660
	Mayan	1	2.4400	.	70.0000	.	72.5000	.
	Other	4	**3.2200**	.52077	76.2500	6.29153	**89.3750**	11.25000
	Total	84	3.1112	.59501	79.3482	7.87544	84.6726	9.59088
7 - Stann Creek	Mestizo	32	2.8403	.54999	72.5412	7.90139	74.5556	9.67748
	Creole	34	2.8800	.51540	76.3824	6.93681	75.7556	9.69572
	East Indian	1	**3.5400**	.	**83.8400**	.	**84.4500**	.
	Garifuna	31	2.6090	.45340	72.7329	6.22430	70.8919	8.10225
	Mayan	5	2.7340	.33716	72.6220	3.78922	69.8880	6.42038
	Other	3	**3.2133**	.59181	**83.2467**	11.58609	**82.2167**	4.54956
	Total	106	2.7975	.51591	74.2427	7.35424	73.9591	9.25378
8 - Stann Creek	Mestizo	14	**3.1657**	.39841	**70.4150**	7.32610	**80.7886**	9.82407
	Creole	5	2.9360	.24511	64.0040	5.56715	77.8520	2.07788
	Garifuna	9	2.4856	.41253	61.5089	8.44652	70.0678	9.13180
	Mayan	17	**3.0329**	.44887	**67.6812**	6.90032	**79.9829**	9.82235
	Total	45	2.9540	.46708	66.8887	7.74763	78.0138	9.79889

High School	*Ethnicity*	*N*	Overall Achievement		English Achievement		Mathematics Achievement	
			M	*SD*	*M*	*SD*	*M*	*SD*
9 - Toledo	Mestizo	3	2.9400	.41581	66.6667	10.21437	72.0000	18.00000
	Creole	2	**3.3400**	.65054	**81.5000**	9.19239	**86.0000**	12.72792
	East Indian	4	2.6150	.09256	63.7500	2.62996	64.2500	4.42531
	Mayan	71	2.8535	.31346	69.3239	8.31483	71.7746	9.82300
	Other	1	**3.5900**	.	**83.0000**	.	**91.0000**	.
	Total	81	2.8660	.33403	69.4198	8.50127	72.0000	10.38027
Total	Mestizo	417	**2.9676**	.53427	**79.6123**	8.74296	**78.6391**	9.63985
	Creole	289	2.5727	.58901	75.1979	8.29829	72.1743	9.34322
	East Indian	26	2.6704	.48492	74.0350	8.91713	73.1531	9.49592
	Garifuna	74	2.5098	.55694	72.0235	7.97382	69.9277	9.94624
	Mayan	118	2.8617	.35653	71.0156	8.42274	73.3367	10.02951
	Other	16	**3.2069**	.56794	**80.7650**	9.72106	**84.3844**	10.61547
	Total	940	2.7927	.56829	76.4439	9.11326	75.2462	10.22825

Effect of Ethnicity and High School on Overall Achievement. In order to determine there was an interaction effect between ethnicity and high school on overall achievement, as measured by GPA, a two-way ANOVA was conducted. The results showed that the interaction effect between gender and ethnicity on overall achievement was statistically insignificant, $F(36, 890) = 1.400$, $p = .061$.

In confirmation of exploratory analyses, the main effect of ethnicity was statistically significant, $F(8, 890) = 5.795$, $p < .05$, with an effect size of $\eta^2 = .03587$, as was the main effect of high school on overall achievement, $F(5, 890) = 3.861$, $p < .05$, with a small effect size of $\eta^2 = .01494$.

Refer to the corresponding section in exploratory analysis for post hoc results for the effects of ethnicity and of high school.

Effect of Ethnicity and High School on English Achievement. Per the SPSS output for the two-way ANOVA on ethnicity and high schools on English achievement, there was a statistically significant interaction effect, $F(36, 890) = 1.482$, $p < .05$. The effect size was $\eta^2 = .04016$, showing that about 4% of variance in English grades was attributable to the interaction between students' ethnicity and high school.

Additionally, the main effect of ethnicity was statistically significant, $F(8, 890) = 8.838$, $p < .05$, $\eta^2 = .05321$; however, the main effect of high school was not statistically significant, as shown by $F(5, 890) = 2.160$, $p = .057$. Refer to Table 37 for results.

Univariate Tests for English Achievement. Results from univariate tests showed that the differences in end-of-year English grades varied significantly from one high school to the next for Mestizo, Creole, Garifuna, and Mayan students depending. However, there were no significant differences in English grades for East Indian students and students who belonged to an ethnic group labelled as "Other" across the different high schools.

Effect of Ethnicity and High School on Mathematics Achievement. Findings from a two-way ANOVA test to determine whether there was an interaction effect between ethnicity and high school showed that the interaction effect was not statistically significant, $F(36, 890) = 1.208$, $p = .189$.

Meanwhile, the main effect of both ethnicity and high school on math achievement were statistically significant. For ethnicity, results were $F(8, 890) = 5.789$, $p < .05$, $\eta^2 = .03690$; for high school, results were significant at $F(5, 890) = 3.606$, $p < .05$, with an effect size of $\eta^2 = .01437$.

Table 37

ANOVA Results for the Interaction Effect of Ethnicity and High School on Overall, English, and Mathematics Achievement

Source	*Type III Sum of Squares*	η^2	*df*	*Mean Square*	*F*	*P value*
Overall Achievement						
Ethnicity	10.877	.03587	8	1.360	5.795	**.000**
High School	4.530	.01494	5	.906	3.861	**.002**
Ethnicity* High School	11.828	---	36	.329	1.400	.061
Error	208.819		890	.235		
Total	7634.348		940			
Corrected Total	303.254		939			
English Achievement						
Ethnicity	4149.794	.05321	8	518.724	8.838	**.000**
High School	633.832	---	5	126.766	2.160	.057
Ethnicity* High School	3131.648	.04016	36	86.990	1.482	**.035**
Error	52234.600		890	58.691		
Total	5571032.604		940			
Corrected Total	77985.394		939			
Mathematics Achievement						
Ethnicity	3624.500	.03690	8	453.063	5.789	**.000**
High School	1411.210	.01437	5	282.242	3.606	**.003**
Ethnicity* High School	3404.521	---	36	94.570	1.208	.189
Error	69656.820		890	78.266		
Total	5420502.344		940			
Corrected Total	98235.381		939			

Data Analysis for Main Research Questions

Data Analysis for Research Question 4

Is there a significant effect on high school students' overall academic achievement from gender, ethnicity, language, location of residence, and commute time to school?

Tests of Assumptions

Before reporting the results of the main analyses, the normality of the dependent variable examined by a histogram of residuals, a normal P-P plot of regression, and a simple scatterplot. The graphs showed that there were no major violations of normality.

Figure 8

Histogram of Residuals for Overall Academic Achievement

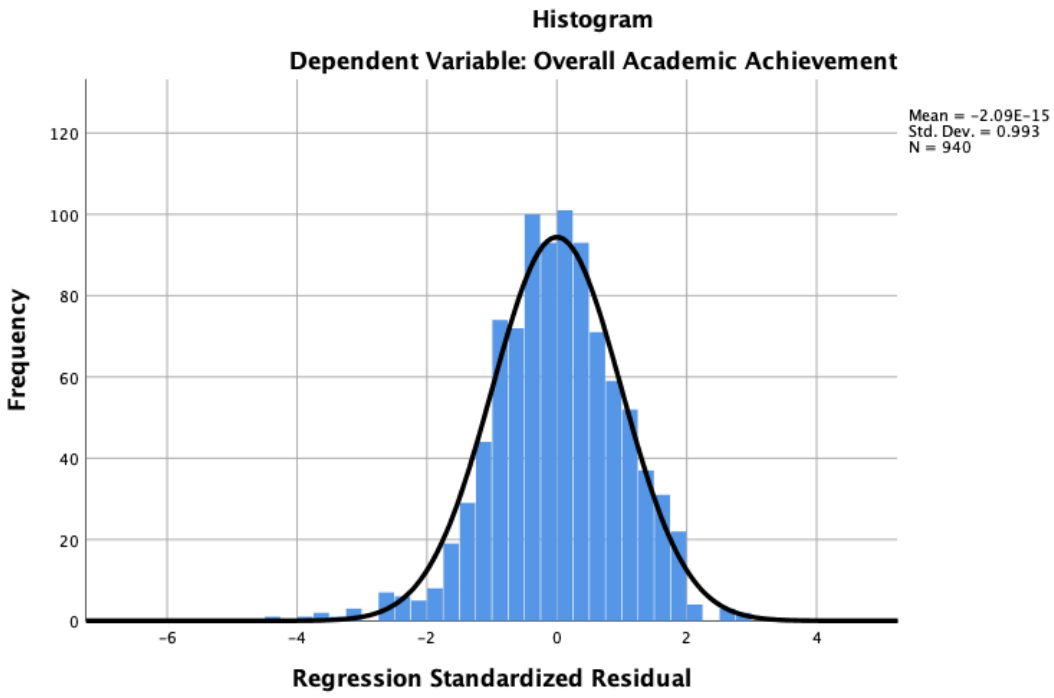


Figure 9

Normal P-P Plot for Overall Academic Achievement

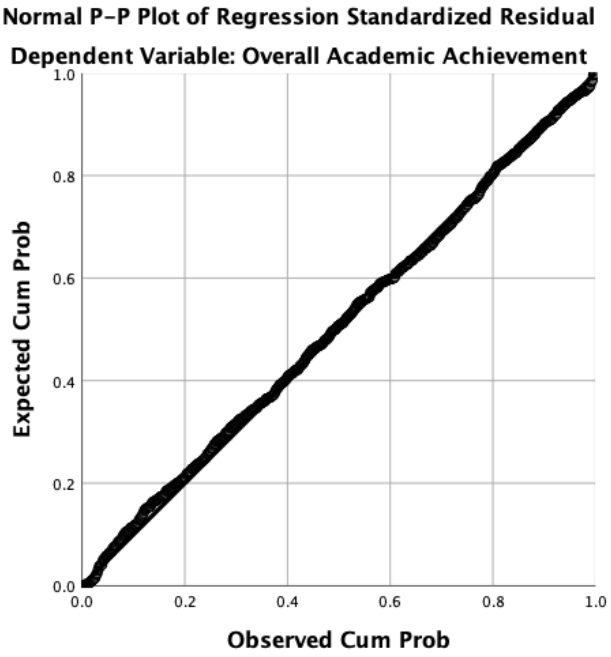
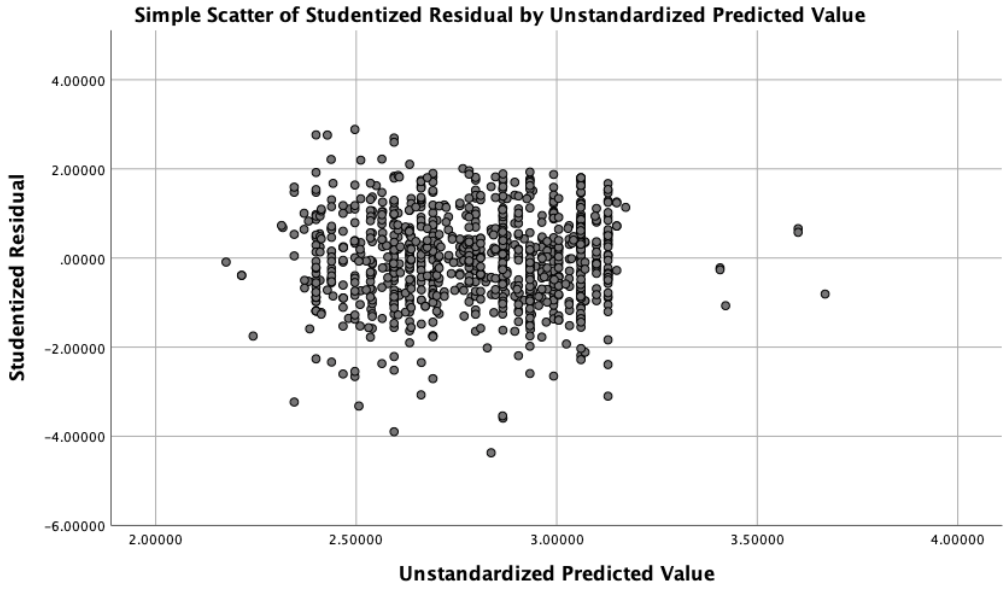


Figure 10

*Scatterplot for Overall Academic Achievement**



Multiple Regression of Independent Variables on Overall Achievement

A multiple regression was performed to assess whether the independent variables – gender, ethnicity, first language, residence, and commute time – significantly impacted overall achievement, as measured by GPA, among senior students in nine high schools across Belize. The results showed that the model explained 16.3% of variance in GPA, which was statistically significant, as evidenced by $F(13, 926) = 13.851$, $p < .05$, as shown in Table 38.

Table 38

Model Summary Table for Overall Achievement

Model	*df*	*F*	*P*	R^2
Regression	13	13.851	.000	.163
Residual	926			
Total	939			

According to the results outlined in Table 39, females scored significantly higher in GPA by an average of 0.195 grade points ($p < .05$). In relation to ethnicity, the overall achievement of Garifuna students ($B = -.355$, $p < .05$), Creole students ($B = -.301$, $p < .05$), and East Indian students ($B = -.273$, $p < .05$) was significantly lower than that of Mestizo students, as measured by GPA. The largest discrepancy was between Mestizo and Garifuna students. There were no significant differences in GPA between Mestizo and Mayan students or Mestizo students and students of "Other" ethnicity.

Significant differences in GPA associated with the first language of students were found between native Creole-speaking students and those who reported their first language as standard English, Spanish, or a foreign language. The difference between

foreign-language-speaking students and Creole-speaking students was the greatest for any variable in this model, with the former scoring an average of .549 grade points higher than the latter ($p < .05$). Students who reported Spanish ($B = .165$, $p < .05$) or English ($B = .097$, $p < .05$) as their first language also had significantly higher GPAs than those who reported Creole as their first language. The differences between native Creole speakers and Maya- and Garifuna-language speakers were not statistically significant.

Lastly, on the basis of the results, neither students' residence in rural or urban areas nor students' commute time to and from school had a statistically significant impact on overall achievement, as measured by GPA.

Table 39

Coefficients Table for Overall Achievement

Overall Achievement	*B*	*SE*	*P*
(Constant)	2.768	.061	.000
Gender	.195	.035	**.000**
Creole	-.301	.053	**.000**
East Indian	-.273	.111	**.014**
Garifuna	-.355	.078	**.000**
Mayan	-.091	.084	.278
Other Ethnicity	.157	.154	.308
English	.097	.048	**.043**
Garifuna Lang	-.170	.170	.318
Mayan Lang	.133	.091	.146
Spanish	.165	.060	**.006**
Foreign Lang	.549	.229	**.016**
Residence	-.067	.039	.081
Commute Time	-.029	.027	.288

Data Analysis for Research Question 5

Is there a significant effect on high school students' English achievement from: gender, ethnicity, language, location of residence, and commute time to school?

Tests of Assumptions

A histogram of residuals, a normal P-P plot of regression, and a simple scatterplot were examined to test the normality of the dependent variable – English achievement. The graphs showed that there were no major violations of normality.

Figure 11

Histogram of Residuals for English Achievement

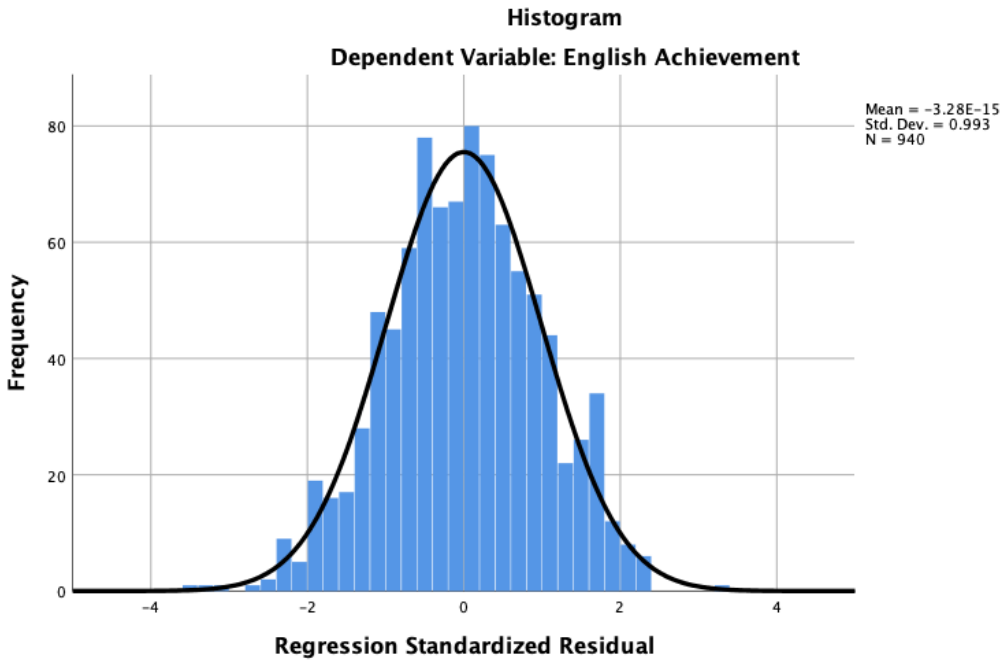


Figure 12

Normal P-P Plot for English Achievement

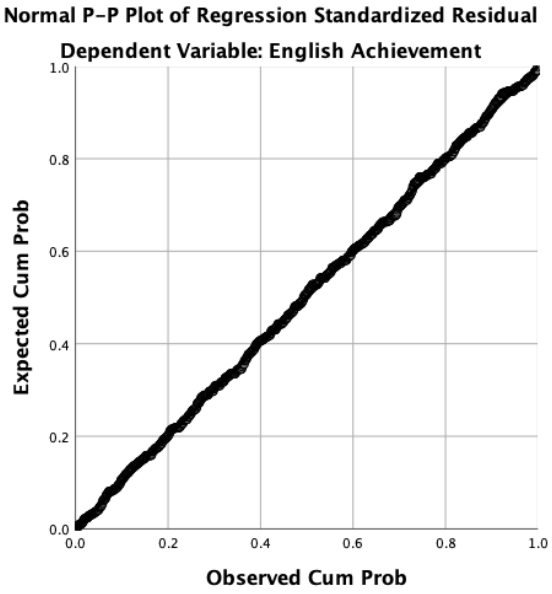
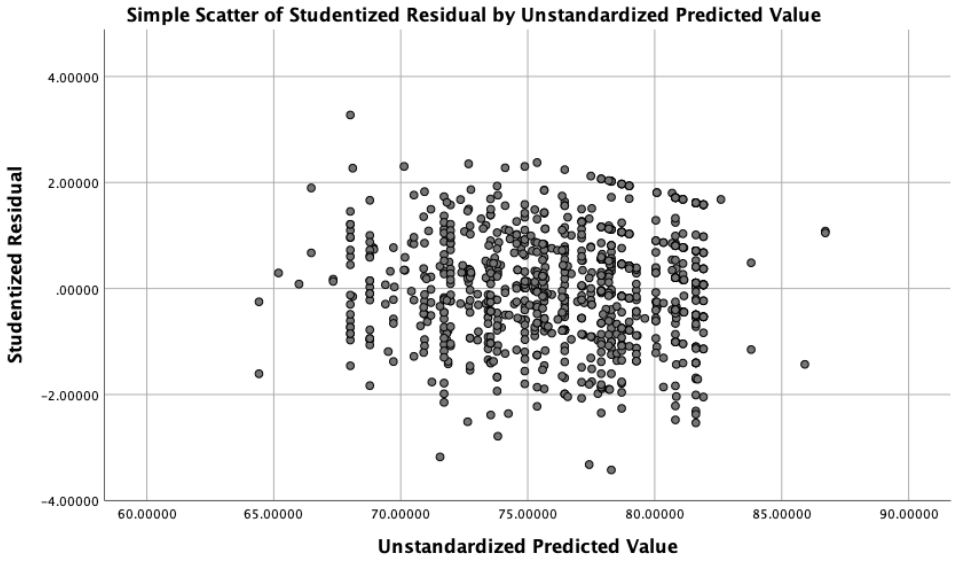


Figure 13

Scatterplot for English Achievement



Multiple Regression of Independent Variables on English Achievement

To test whether the particular sociocultural factors – gender, ethnicity, first language, residence, and commute time – had a significant effect on students' English achievement, a multiple regression test was conducted. According to the findings presented in Table 40, the sociocultural factors studied explained 18.2% of variance in end-of-year English grades; the variance was statistically significant, with $F(13, 926) = 15.872$, $p < .05$.

Table 160

Model Summary Table for English Achievement

Model	*df*	*F*	*P*	R^2
Regression	13	15.872	.000	.182
Residual	926			
Total	939			

Specifically, results revealed that females scored significantly higher than male students in end-of-year English grades, by an average of 2.923 percentage points ($B = 2.923$, $SE = .556$, $p < .05$), $p < .05$). Findings also showed that end-of-year English grades of students of all ethnic groups, except those who identified as an ethnic group referred to as "Other," were significantly lower than those of the reference group of Mestizo students. Results were as follows: Garifuna students ($B = -6.643$, $SE = 1.232$, $p < .05$); Mayan students ($B = -5.454$, $SE = 1.327$, $p < .05$); East Indian students ($B = -5.345$, $SE = 1.759$, $p < .05$); and, Creole students ($B = -3.628$, $SE = .838$, $p < .05$). The difference in English achievement between Mestizo students and those who identified as ethnic groups labelled as "Other" were not statistically significant.

The only difference in end-of-year English grades associated with students' first language was between the reference group (native Creole-speakers) and students who reported standard English as their first language East Indian students (B = -7.868, SE = 3.622, $p < .05$). Again, students' residence in rural or urban areas and students' commute time to and from school did not have a statistically significant impact on English achievement, as measured by students' average end-of-year English grades. Results are reported in Table 41.

Table 41

Coefficients Table for English Achievement

Overall Achievement	*B*	*SE*	*P*
(Constant)	76.355	.973	.000
Gender	2.923	.556	**.000**
Creole	-3.628	.838	**.000**
East Indian	-5.345	1.759	**.002**
Garifuna	-6.643	1.232	**.000**
Mayan	-5.454	1.327	**.000**
Other Ethnicity	-1.233	2.442	.614
English	1.835	.756	**.015**
Garifuna Lang	-4.526	2.695	.093
Mayan Lang	-2.118	1.447	.143
Spanish	1.537	.951	.106
Foreign Lang	7.868	3.622	**.030**
Residence	.806	.612	.188
Commute Time	-.769	.427	.072

Data Analysis for Research Question 6

Is there a significant effect on high school students' mathematics achievement from: gender, ethnicity, language, location of residence, and commute time to school?

Tests of Assumptions

Interpretation of the histogram of residuals, normal P-P plot of regression, and simple scatterplot for mathematics achievement showed that there were no major violations of normality.

Figure 14

Histogram of Residuals for Mathematics Achievement

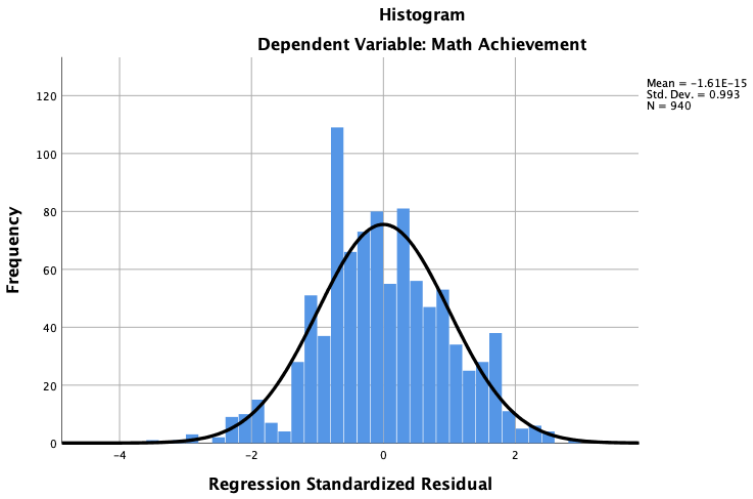


Figure 15

Normal P-P Plot for Mathematics Achievement

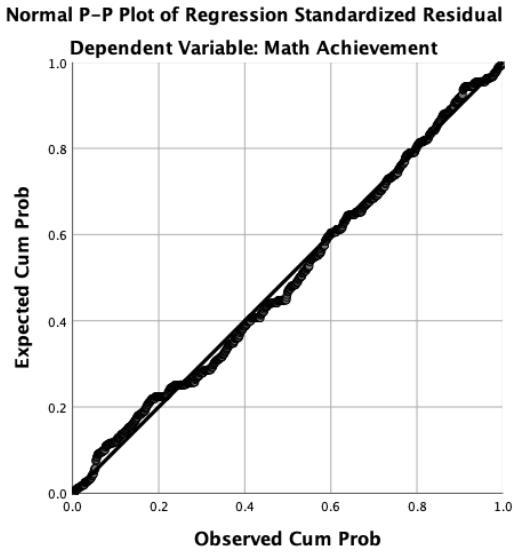
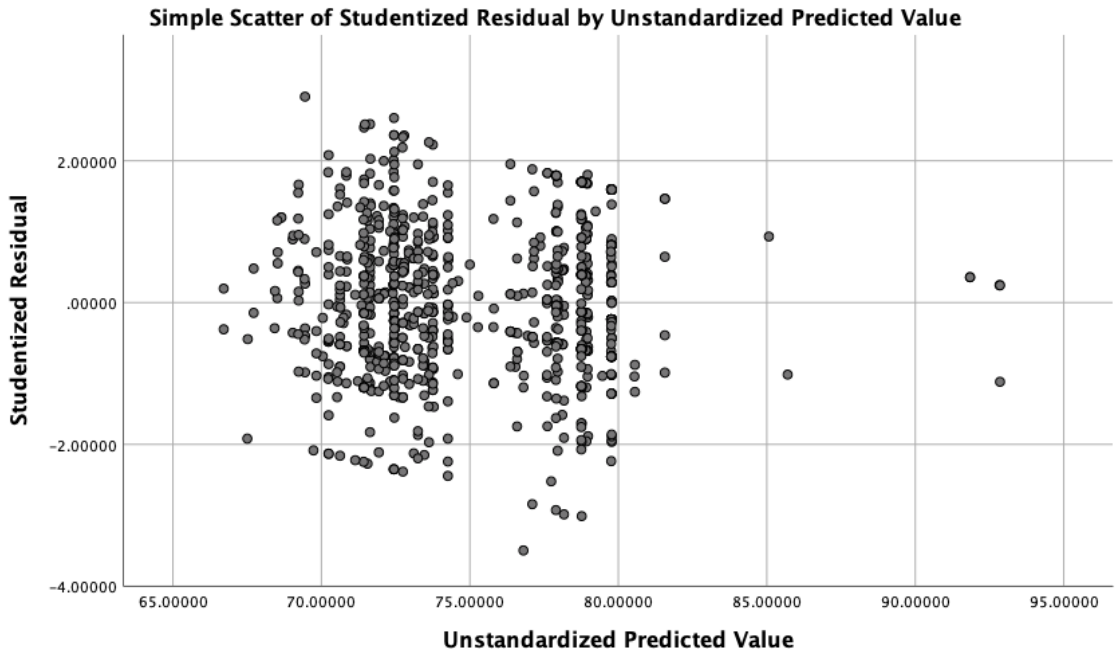


Figure 16

Scatterplot for Mathematics Achievement



Multiple Regression of Independent Variables on Mathematics Achievement

As demonstrated by the findings of a multiple regression test performed using SPSS, 13.5% of variance in end-of-year math grades were attributable to a composite of the following sociocultural factors: gender, ethnicity, first language, residence, and commute time. The results were statistically significant at $F(13, 926) = 11.087$, $p < .05$.

Table 42

Model Summary Table for Mathematics Achievement

Model	*df*	*F*	*P*	R^2
Regression	13	11.087	.000	.135
Residual	926			
Total	939			

Contrary to results for overall and English achievement, the differences in math scores between male and female students was not statistically significant. However, similar to results from standard multiple regression tests on overall and English achievement, students' residence in rural or urban areas and students' commute time to and from school did not have a statistically significant impact on math achievement, as measured by students' average end-of-year math grades.

Also, in line with results for English achievement, student ethnicity had the most impact on the regression model. End-of-year math grades for students of all ethnic groups, except those who identified as an ethnic group referred to as "Other," were significantly lower than those of the reference group of Mestizo students. Results were as follows: Garifuna students (B = -7.368, SE = 1.422, $p < .05$); East Indian students (B = -5.136, SE = 2.030, $p < .05$); Creole students (B = -5.167, SE = .968, $p < .05$), and Mayan students (B = -4.489, SE = 1.533, $p < .05$). The difference in math achievement between Mestizo students and those who identified as ethnic groups labelled as "Other" were not statistically significant.

Differences in end-of-year math grades associated with students' first language were statistically significant between the reference group (native Creole speakers) and native Spanish-speaking students (B = 2.163, SE = 1.097, $p < .05$), as well as those who reported a foreign English as their first language (B = 12.593, SE = 4.181, $p < .05$); the latter groups both scored higher in end-of-year math grades than did native Creole speakers. Findings are outlined in Table 43.

Table 43

Coefficients Table for English Achievement

Overall Achievement	*B*	*SE*	*P*
(Constant)	76.588	1.123	.000
Gender	1.009	.642	.116
Creole	-5.167	.968	**.000**
East Indian	-5.136	2.030	**.012**
Garifuna	-7.368	1.422	**.000**
Mayan	-4.489	1.533	**.003**
Other Ethnicity	2.646	2.820	.348
English	1.309	.873	.134
Garifuna Lang	-1.715	3.112	.582
Mayan Lang	1.151	1.670	.491
Spanish	2.163	1.097	**.049**
Foreign Lang	12.593	4.181	**.003**
Residence	.014	.706	.984
Commute Time	-.795	.493	.107

Summary

The purpose of this chapter was to provide a detailed report of data analysis results. It began with an introduction, followed by a section on descriptive statistics, and results from exploratory data analyses. Following were the presentation and analyses of data for the study's preliminary research questions and main research questions. The chapter concluded with a summary. The next and final chapter will provide a summary and interpretation of the findings, including a reference of the findings to previous research.

CHAPTER V

DISCUSSION

This final chapter first restates the study purpose and research questions. A summary of findings, findings in relation to previous research, and a theoretical analysis follow. Finally, sections on implications for practice, recommendations for future research, and a brief conclusion end this chapter and dissertation.

Introduction

As stated in Chapter 1, the overall purpose of this dissertation was to investigate whether there are significant educational disparities in relation to academic performance in secondary schools across Belize. More specifically, the study sought to determine whether student-level sociocultural factors—namely gender, ethnicity, language, location of residence, and commute time to school — significantly impact academic performance as measured by students' end-of-year English/language arts grade, end-of-year mathematics grade, and cumulative GPA.

This research was guided by three preliminary research questions and three main research questions.

The preliminary research questions were:

1. Is there a significant interaction between first language and high school on students' overall achievement, English achievement, and mathematics achievement?

2. Is there a significant interaction between ethnicity and gender on high school students': overall achievement, English achievement, and mathematics achievement?

3. Is there a significant interaction between ethnicity and high school on high school students': overall achievement, English achievement, and mathematics achievement?

The main research questions were:

4. Is there a significant effect on high school students' overall academic achievement from gender, ethnicity, language, location of residence, and commute time to school?

5. Is there a significant effect on high school students' English achievement from: gender, ethnicity, language, location of residence, and commute time to school?

6. Is there a significant effect on high school students' mathematics achievement from gender, ethnicity, language, location of residence, and commute time to school?

In response to these inquiries, a quantitative study was designed and conducted to collect student data from high schools throughout Belize. Survey data were collected from a total of 1199 students for the 2018-2019 academic year, from 11 high schools, representing all six districts. After data cleaning, final analyses were performed on data for 940 students from nine high schools across Belize.

The rationale behind the study design was to further investigate the current data trends, showing significant disparities in educational attainment and achievement in Belize. Previous reports and studies using aggregated data indicated there were inequalities along gender and ethnic lines (Inter-American Development Bank, 2013; Palacio, 2013; Policy and Planning Unit, 2013b; Vairez et al., 2017), as well as between rural and urban dwellers (Inter-American Development Bank, 2013; Policy and Planning Unit, 2013b). Educational gaps were especially notable at the secondary school level

(Inter-American Development Bank, 2013). However, limited student-level data exists on inequalities in Belize's education system. This study adds to literature on educational disparities associated with student-level, sociocultural factors in secondary schools in Belize.

Summary of Findings

Findings for Exploratory Analyses

As this quantitative study was exploratory in nature, a broad statistical analysis was first applied to the data. Overall, the findings from one-way ANOVA tests suggested that, among the study population, there were some disparities in academic achievement associated with gender, ethnicity, and first/native language.

In regard to gender, the results revealed that female students outperformed their male counterparts in overall achievement and English achievement, but there was no significant difference in math achievement.

Among the various ethnic groups, findings suggested that students who identified as Garifuna had the lowest scores in comparison to their peers in all three areas of measured achievement. Creole students performed significantly lower than many of their counterparts in overall achievement and math achievement. Mayan students underperformed students of many of the other ethnic groups in English/language arts. Students who identified as belonging to an "other" ethnic group and Mestizo students typically received the highest scores in all three areas of measurement. The disparities illustrated among ethnic groups were largely mirrored according to the first or native language spoken by the students, which likely corresponded with the students' ethnic group identification.

Location of residence (urban or rural) and commute time did not significantly influence overall academic achievement or math achievement but had small effects on English achievement. The author considered further exploration of these two variables on English achievement to be impractical, as effect sizes were very small.

A summary of findings from exploratory analyses are outlined in Table 44.

Table 44

Exploratory Analyses Findings

Variable – Achievement Type	Higher Achievement	Lower Achievement
Gender - Overall	Females	Males
Gender - English	Females	Males
Gender - Mathematics	NS	
Ethnicity - Overall	Mayan	Creole
	Mayan	Garifuna
	Mestizo	Creole
	Mestizo	Garifuna
	Other	Creole
	Other	East Indian
	Other	Garifuna
Ethnicity – English	Creole	Garifuna
	Creole	Mayan
	Mestizo	Creole
	Mestizo	East Indian
	Mestizo	Garifuna
	Mestizo	Mayan
	Other	Garifuna
	Other	Mayan

Variable – Achievement Type	Higher Achievement	Lower Achievement
Ethnicity – Mathematics	Mestizo	Creole
	Mestizo	Garifuna
	Mestizo	Mayan
	Other	Creole
	Other	East Indian
	Other	Garifuna
	Other	Mayan
First Language – Overall	Foreign	English
	Foreign	Creole
	Foreign	Mayan
	Foreign	Garifuna
	English	Creole
	Spanish	English
	Spanish	Creole
	Spanish	Garifuna
	Mayan	Creole
First Language – English	Foreign	Creole
	Foreign	Mayan
	Foreign	Garifuna
	English	Creole
	English	Mayan
	English	Garifuna
	Creole	Mayan
	Spanish	Creole
	Spanish	Mayan
	Spanish	Garifuna

Variable – Achievement Type	Higher Achievement	Lower Achievement
First Language – Mathematics	Foreign	English
	Foreign	Creole
	Foreign	Spanish
	Foreign	Mayan
	Foreign	Garifuna
	English	Creole
	Spanish	English
	Spanish	Creole
	Spanish	Mayan
	Spanish	Garifuna
Residence – Overall	NS	
Residence – English	Urban	Rural
Residence – Mathematics	NS	
Commute Time – Overall	NS	
Commute Time – English	1-30 mins	31-60 mins
	1-30 mins	90+ mins
Commute Time - Mathematics	1-30 mins	31-60 mins
High School – Overall	HS1 – Corozal	HS3 – Belize
	HS1 – Corozal	HS4 – Belize
	HS2 – Orange Walk	HS1 – Corozal
	HS2 – Orange Walk	HS3 – Belize
	HS2 – Orange Walk	HS4 – Belize
	HS2 – Orange Walk	HS5 – Cayo
	HS2 – Orange Walk	HS7 – Stann Creek
	HS2 – Orange Walk	HS9 – Toledo
	HS3 – Belize	HS4 – Belize
	HS5 – Cayo	HS3 – Belize
	HS5 – Cayo	HS4 – Belize
	HS6 – Cayo	HS3 – Belize
	HS6 – Cayo	HS4 – Belize
	HS6 – Cayo	HS7 – Stann Creek
	HS6 – Cayo	HS9 – Toledo
	HS7 – Stann Creek	HS4 – Belize
	HS8 – Stann Creek	HS3 – Belize
	HS8 – Stann Creek	HS4 – Belize
	HS9 – Toledo	HS3 – Belize
	HS9 – Toledo	HS4 – Belize

Variable – Achievement Type	Higher Achievement	Lower Achievement
High School - English	HS1 – Corozal	HS3 – Belize
	HS1 – Corozal	HS4 – Belize
	HS1 – Corozal	HS7 – Stann Creek
	HS1 – Corozal	HS8 – Stann Creek
	HS1 – Corozal	HS9 – Toledo
	HS2 – Orange Walk	HS1 – Corozal
	HS2 – Orange Walk	HS3 – Belize
	HS2 – Orange Walk	HS4 – Belize
	HS2 – Orange Walk	HS5 – Cayo
	HS2 – Orange Walk	HS6 – Cayo
	HS2 – Orange Walk	HS7 – Stann Creek
	HS2 – Orange Walk	HS8 – Stann Creek
	HS2 – Orange Walk	HS9 – Toledo
	HS3 – Belize	HS8 – Stann Creek
	HS3 – Belize	HS9 – Toledo
	HS4 – Belize	HS8 – Stann Creek
	HS5 – Cayo	HS7 – Stann Creek
	HS5 – Cayo	HS8 – Stann Creek
	HS5 – Cayo	HS9 – Toledo
	HS6 – Cayo	HS3 – Belize
	HS6 – Cayo	HS4 – Belize
	HS6 – Cayo	HS7 – Stann Creek
	HS6 – Cayo	HS8 – Stann Creek
	HS6 – Cayo	HS9 – Toledo
	HS7 – Stann Creek	HS8 – Stann Creek
	HS7 – Stann Creek	HS9 – Toledo

Variable – Achievement Type	Higher Achievement	Lower Achievement
High School - Math	HS1 – Corozal	HS3 – Belize
	HS1 – Corozal	HS4 – Belize
	HS1 – Corozal	HS9 – Toledo
	HS2 – Orange Walk	HS3 – Belize
	HS2 – Orange Walk	HS4 – Belize
	HS2 – Orange Walk	HS7 – Stann Creek
	HS2 – Orange Walk	HS9 – Toledo
	HS5 – Cayo	HS3 – Belize
	HS5 – Cayo	HS4 – Belize
	HS5 – Cayo	HS9 – Toledo
	HS6 – Cayo	HS1 – Corozal
	HS6 – Cayo	HS2 – Orange Walk
	HS6 – Cayo	HS3 – Belize
	HS6 – Cayo	HS4 – Belize
	HS6 – Cayo	HS5 – Cayo
	HS6 – Cayo	HS7 – Stann Creek
	HS6 – Cayo	HS8 – Stann Creek
	HS6 – Cayo	HS9 – Toledo
	HS7 – Stann Creek	HS3 – Belize
	HS7 – Stann Creek	HS4 – Belize
	HS8 – Stann Creek	HS3 – Belize
	HS8 – Stann Creek	HS4 – Belize

Note: The two largest mean discrepancies in overall, English, and math achievement are highlighted.

Findings for Preliminary Research Questions

Summary of Findings for Research Question 1

Is there a significant interaction between first language and high school on students' overall achievement, English achievement, and mathematics achievement?

Although the actual high school that a student attended was not a formal variable in this study, it was viewed as a sort of confounding variable. Given the exploratory

quality of the study, the author opted to investigate whether first language had an interaction effect with the high school that a student attended. The study results showed that there was no significant interaction between the two variables on overall achievement; however, there were significant interaction effects for English achievement and math achievement.

For all three measures of achievement, the high school a student attended, and first language did have significant main effects.

Table 45

Summary Table of Main and Interaction Effects of First Language and High School on Overall, English, and Math Achievement

Effect	Result
Overall Achievement	
High School	Significant
First Language	Significant
High School* First Language	Not Significant
English Achievement	
High School	Significant
First Language	Significant
High School* First Language	Significant
Mathematics Achievement	
High School	Significant
First Language	Significant
High School* First Language	Significant

Summary of Findings for Research Question 2

Is there a significant interaction between gender and ethnicity on students' overall achievement, English achievement, and mathematics achievement?

As found in the preliminary analyses, ethnicity proved to have a significant effect on overall achievement, English achievement, and math achievement whereas gender significantly impacted overall achievement and English achievement, but not math achievement. None of the interaction effects were significant. A summary of the findings from the two-way ANOVA tests are provided in Table 46.

Table 46

Summary Main and Interaction Effects of Gender and Ethnicity on Overall, English, and Math Achievement

Effect	Result
Overall Achievement	
Ethnicity	Significant
Gender	Significant
Ethnicity*Gender	Not Significant
English Achievement	
Ethnicity	Significant
Gender	Significant
Ethnicity*Gender	Not Significant
Mathematics Achievement	
Ethnicity	Significant
Gender	Not Significant
Ethnicity*Gender	Not Significant

Summary of Findings for Research Question 3

Is there a significant interaction between ethnicity and high school on high school students': overall achievement, English achievement, and mathematics achievement?

The research findings showed that there was no significant interaction between the two variables on overall achievement or math achievement. For both overall and math achievement, the high school a student attended did have significant influence.

There was a significant interaction effect between the two variables on English achievement; yet, there was no effect of high school alone on English achievement.

Table 47

Summary Table of Main and Interaction Effects of Ethnicity and High School on Overall, English, and Math Achievement

Effect	Result
Overall Achievement	
Ethnicity	Significant
High School	Significant
Ethnicity* High School	Not Significant
English Achievement	
Ethnicity	Significant
High School	Not Significant
Ethnicity* High School	Significant
Mathematics Achievement	
Ethnicity	Significant
High School	Significant
Ethnicity* High School	Not Significant

Findings for Main Research Questions

Summary of Findings for Research Question 4

Is there a significant effect on high school students' overall academic achievement from gender, ethnicity, language, location of residence, and commute time to school?

Findings in response to the above inquiry showed that the overall regression model had a significant effect of the combined variables on overall academic achievement. The multiple regression test also which of the specific sub-variables following had significant independent effects on overall achievement. This portion of the research more clearly defined the disparities among the variables.

Overall, females were proven to outperform male students. Among the ethnic groups, Creole, East Indian, and Garifuna students (but not Mayan students) significantly underperformed Mestizo students (the control group for the regression model). There was no significant difference between Mestizo students and those who identified as an "other" ethnic group.

In terms of first language, students whose first or native language was English, Spanish, or a foreign language performed significantly higher in overall achievement than students whose first language was recorded as Creole/Kriol (control group).

As with the results of the ANOVA tests, location of residence and commute time were found to not be significant factors.

Summary of Findings for Research Question 5

Is there a significant effect on high school students' English achievement from: gender, ethnicity, language, location of residence, and commute time to school?

The cumulative effect of the regression model (the combined effect of the variables) was found to significantly influence English achievement. Again, in harmony with previous ANOVA tests and the regression test for overall achievement, male students underperformed their female counterparts in end-of-year English/language arts grades.

In terms of the effect of ethnicity on English achievement, students who identified as an ethnic group labelled “other” for the purpose of this paper or Mestizo, performed significantly higher than students of all other ethnic groups; however, the English grades between “other” ethnic groups and Mestizo were not significantly different from each other.

Similar to the regression results for overall achievement, students who spoke English or a language considered “foreign” for the purpose of this paper outperformed native Creole speakers. There was no significant difference in English/language arts performance between Creole-speaking students and those whose first language was Garifuna or a Mayan language; this was also consistent with previous results. However, in a departure from the results of the previous regression model on overall achievement, native Spanish speakers did not perform significantly different in English/language arts from those whose first language was Creole.

Location of residence and commute time did not significantly contribute to the variance in end-of-year English/language arts grades.

Summary of Findings for Research Question 6

Is there a significant effect on high school students' mathematics achievement from: gender, ethnicity, language, location of residence, and commute time to school?

The multiple regression test conducted to ascertain whether the five variables had significant effect on the study population's end-of-year math grades proved affirmative. In accordance with previous one-way and two-way ANOVA tests, the effect of gender on math achievement was found to be insignificant.

Students who identified as Mestizo or as an ethnic group labelled "other" for the purpose of this paper performed significantly higher in mathematics achievement than students of all other ethnic groups; this aligned with previous regression models on overall achievement and English achievement, However, the English grades between "other" ethnic groups and Mestizo were not significantly different from each other.

Mirroring the results of ethnic groups, students who spoke Spanish (generally Mestizo students) and those who native language was labelled "foreign," for the purpose of this paper, outperformed native Creole speakers (control group in the regression model). However, math achievement of native Creole speakers was not significantly different from those whose native language was reported as English, Garifuna, or a Mayan language.

The factors of location of residence and commute time were not found to have significant effects on the study population's math achievement; this was consistent with all previous findings on location of residence and commute time.

Major Findings and Observations

The following is a summary of the major findings and observations in this study grouped by gender, ethnicity, and language.

Gender

This study confirmed an academic gap between Belizean male and female high school students in overall achievement and English achievement, with females outperforming males. Among some scholars who study this "reversed" phenomenon, it is argued that "one of the causes of boys' underachievement is the dominance of female teachers in the teaching profession resulting in the feminization of teaching" (Majzub & Rais, 2010, p. 685). Underlying gender roles stemming from the patriarchal derivatives of colonialism have invariably created schism between females and males in society, and even gendered subjects within education (TIkly & Bond, 2013). Consequently, a disconnect between male students and female teachers is a plausible explanation for male underachievement, especially in cultures that subscribe to gender roles that make it taboo for males to be instructed by females.

According to Younger and Cobbett (2014), students feel under pressure "to perform gender along normative lines" (p. 1). Younger and Cobbett also stressed the impact of the "gender regime" of an institution, which they basically described as the structures, policies, and processes that establish and perpetuate how gender roles are implicitly defined and acted out in an institution. Their research suggested that the gender regime also influenced or was perpetuated by gendered assumptions held by educators. However, in this study it is not feasible to confirm a causal relationship between the gender regime and the issue of male underachievement.

Ethnicity

One of the major findings of this study was that Garifuna (Black) and Creole (Black) students had significantly lower marks in overall achievement and math achievement, and Garifuna (Black) and Mayan (indigenous) students underperformed their peers in English achievement. As disturbing as these results are, they are not unexpected. By the common measures of academic achievement– GPA and standardized aptitude test scores – Black students have and continue to underperform all other ethnic groups (Dotterer, McHale, and Crouter, 2009; Irving & Hudley, 2005; Whaley & Noël, 2012) in many countries. Indigenous students have also been found to have fewer educational opportunities than their non-indigenous counterparts in Latin America and typically exhibit lower academic performance (Cox, 2010).

Although researchers have taken countless approaches, explored a plethora of variables, and developed and refuted innumerable theories to reach a conclusive stance on the causes of Black and indigenous underachievement, the underlying causes remains elusive. Over the decades, the momentum these different theories carry have waxed and waned. One assertion that has held its weight is that traditional Western pedagogies are not suitable for multicultural classrooms (Yeh, 2016). According to George and Glasgow (1999), "common syllabi and common examinations make one of two covert assumptions--either that the cultural background of students does not significantly affect learning, or that this background is similar in those for whom these syllabi and examinations are intended" (p. 9).

A postcolonial perspective argues that the traditional systems of knowing and learning of indigenous and non-European or non-Western thinkers are viewed as

peripheral, archaic, or simply inferior. For instance, Heckt (1999) states that "The most important principle in the transmission of knowledge and skills in Mayan cultures is its practical approach. Children have to gain confidence and experience by learning from practical example and by helping their parents" (p. 326); however, this is not translated into what is labelled education. The researcher in this study acknowledges that Caribbean curricula are increasingly infused with regional and cultural content that is relevant to its students. However, from the researcher's perspective, this is mostly in the cases of literature and history; these adaptations of the curriculum to include local culture have yet to manifest in culturally-relevant pedagogical praxis.

Additionally, even in multi-ethnic countries such as Belize, ethnic discrimination against minority groups must be considered. It is plausible that, as a result of decades or centuries of mistreatment, dismissiveness, and discrimination, indigenous and Black populations have succumbed to an internalized inferiority in which they, "see themselves and their ways of being and knowing as inferior and accepted their knowledge and capabilities as being of lesser value" (Kayira, 2015, p. 108). Studies have shown that academic self-concept was positively correlated with academic achievement (Bowe, 2012); in other words, the lower a student's academic self-concept, the lower her or his academic performance. It is not, then, a radical idea that an assumed internalized inferiority transmitted across generations could have an influence in present-day classrooms, given that many structures of colonialism remain intact.

Language

Language was a fundamental element of historical colonizing processes (Guerrettaz, 2020) and the adoption of the oppressors' language a national language by

many formerly colonized nations is a major testament to the reverberating influences of colonialism throughout the world (Davis & Asbenyega, 2012; Guerretaz, 2020; Tikly, 2016). Tikly (2016) argued that this postcolonial condition perpetuates the "hegemony of colonial languages in the context of contemporary globalisation and the marginalisation and under-development of indigenous languages" (p. 409). Yet, many policymakers and educators remain ignorant to the concept that certain language policies and linguistic practices within schools serve as tools to homogenize, universalize, and sustain the domination of (neo)colonial powers and, henceforth, the oppression of all others.

In education, "medium of instruction policies often impact negatively on the development of linguistic capabilities for disadvantaged groups" (Tikly, 2016, p. 408) and "this in turn has a negative impact on other learning outcomes including basic literacy and numeracy" (p. 408). In support of multilingualism, Tikly added that "being proficient in both the mother tongue and a global language is not only an important outcome in its own right but is also critical for achieving other learning outcomes (p. 408). Unfortunately, many educators, as well as parents, of indigenous or minority group students prefer colonial languages as the medium of instruction in schools (Davis & Agbenyega, 2012; Heckt, 1999). In fact, qualitative studies have revealed that some parents flatly reject the formal teaching of their own languages within the classroom (Heckt, 1999).

Whereas language is a "socially constructed practice that reflects the subjectivities of a social group" (Davis & Agbenyega, 2012, p. 342), language identity permeates social and cultural identity. Therefore, when indigenous and minority groups adopt beliefs regarding legitimate ways of speaking that result in identities that are "redefined

almost entirely in relation to that of the coloniser ” (Guerretaz, 2020, p. 2), it is problematic since, in almost every case, the colonizer is viewed as superior.

Current Study Findings in Relation to Previous Research

The current study’s findings on educational inequalities associated with gender, ethnicity, and first/native language support previous research in many countries, especially developing, formerly colonized nations, as well as reports of emerging educational patterns within Belize using aggregated data.

Gender

For decades, an awareness that females were disadvantaged in many aspects of development, including education, has been at the forefront of human rights efforts. Consequently, the world has been inching towards gender equity in education, with parity reportedly achieved in primary school completion in almost two-thirds of the world. However, global entities, such as UNICEF, emphasize that “progress has been uneven and far from equitable” (UNICEF, 2020b, p. 5); and, gender disparities have reversed in some regions. In Latin America and the Caribbean, for instance, the trend has shifted so that females have outnumbered males in primary, lower secondary, and upper secondary school completion (UNICEF, 2020c).

Results from this study in Belize were similar to those of previous studies conducted in the Caribbean, as opposed to the trends evident in Latin America, such as in Bolivia, Guatemala, Peru, and certain areas in Mexico (Dureya et al., 2007). Consistent with findings from Parry’s study (1996) conducted across four Caribbean countries, as well as those findings reported by Cobbett and Younger (2012) in Antigua and Barbuda in the Caribbean, the current study revealed that females outperformed males in overall

achievement and English/language arts achievement. Contrary to previous findings (Parry, 1996), this study showed that female and male students performed about the same in mathematics.

Ethnicity

As a plethora of research has shown that ethnicity- or race-based educational disparities exist in regions spanning the globe. Among those disparities, a common theme has emerged; Black students tend to collectively underperform their peers belonging to all other ethnic groups (Dotterer et al., 2009; Irving & Hudley, 2005; Whaley & Noel, 2012). In Latin America and the Caribbean, indigenous students have also been found to perform at lower levels than their non-indigenous counterparts (Cox, 2010).

Findings from this study suggested that Garifuna (Black) students underperformed students of all other ethnic groups in overall achievement, English achievement, and math achievement – all three measures of academic performance used in this study. This study also revealed that, apart from Garifuna students, Creole (Black) students underperformed students of all other ethnic groups in the study population in the areas of overall achievement and math achievement, while Mayan (indigenous) students underperformed their non-indigenous peers (save for Garifuna students) in English achievement. These findings are an extension of the research results found by Palacio (2013), which reported that the Garinagu (Garifuna students) and Mayan students underperformed their peers at all educational levels.

First or Native Language

Analysis of study data illustrated that students' first or native language had significant influence on the three measures of academic achievement used for this paper.

In the same vein as results found by Vairez and colleagues (2017) in research on primary school students in Belize, students who reported their native language as a "foreign" language outperformed their local-language speaking counterparts in overall, English, and math achievement. Native Spanish-speaking students also performed significantly higher than their Garifuna- and Creole-speaking peers in cumulative GPA, and higher than Garifuna-, Creole-, and Mayan-speaking peers in English and math grades. However, in contrast to the results from the Vairez and colleagues (2017) study, the current study showed no conclusive evidence of Garifuna- and Mayan-speaking peers performing higher in schools with larger concentrations of native Garifuna and Mayan speakers than those with lower concentrations.

Intersectionality (Interaction Effects)

Intersectionality is a concept more and more commonly applied to the study of inequality using a critical framework. As Bhopal (2020) explained:

> Intersectionality used correctly is a useful approach to analyse how overlapping or competing identities affect the experiences of individuals in society. Discourses of inequality cannot be explained by any one single factor, but rather intersectionality analyses how competing factors work to produce different outcomes of power relations (p. 808).

For instance, extant literature has indicated that the intersecting effects of gender and SES (World Bank, 2018), as well as gender and ethnicity, influenced educational gaps within LAC (Duryea et al., 2007). Within Belize, previous research has shown that first language and location (district or region) intersected to impact academic performance (Vairez et al., 2017). The current study also found that there was a

significant interaction effect between first language and high school (which is also an indicator of district/region) on English and math achievement, but not on overall academic achievement. Surprisingly, however, this study revealed no interaction effects between gender and ethnicity, or ethnicity and high school, on any measure of achievement used in this paper.

Theoretical Analysis of Findings

Findings derived from this study were analyzed using a postcolonial framework because, as Yeh (2016) succinctly asserted, "education is a colonized space, no matter whether in curriculum knowledge or in pedagogical praxis" (p. 889). In formerly colonized nations throughout the world, the very structure of formal schooling, which has become synonymous with education, has a colonial foundation (Crossley & Tikly, 2004; Kayira, 2015; Tikly, 2011; Yeh, 2016). The current findings on educational inequalities in secondary schools in Belize support postcolonial theory's critiques of the ways in which these lingering remains of colonial times affect current society, including education.

Residual colonial influences abound in curricular content, textbooks, assessments, in teacher-centered forms of pedagogy that are a mainstay of many schooling systems, and in the language of instruction (Tikly, 2011). The specific issues are that textbooks and curricula are rarely culturally relevant to the non-Western or non-European students to whom they are addressed. A second issue is that archaic authoritarian and teacher-centered pedagogic practices prevail in most school systems in Belize. Students are perceived as having nothing to contribute to the learning process, as their prior knowledge is deemed as useless.

Other archaic perceptions and practices upheld by present-day educational systems include gendered schooling in which subjects and skillsets are approached as gender specific. Lastly, there is the issue of the primacy of colonial languages. Indigenous languages, especially, are perceived to be of lesser value than colonial languages and not worthy to be taught or spoken in schools.

Implications for Practice

Underachievement in school has deleterious effects on students, since schooling is a significant determinant of social mobility (Yeh, 2016). Therefore, research on educational inequalities should be used to add value to students' academic experiences. The current study's findings have three important implications for practice.

The first is a call to action on the reform or modification of Belizean curricula and/or pedagogic approaches so that they are more meaningfully infused with localized knowledge and practices. According to George and Glasgow (1999), in order to appropriately educate non-Western children in a system steeped in Western ideologies and practices, what must be considered is "not conceptual change, but conceptual addition. One might also add conceptual modification. The important outcome should be that two sets of knowledge, rather than one, become available to students for use in the different contexts in which they find themselves" (p. 10). Other scholars support the idea of a hybridized curriculum, in opposition to a shift towards a heavily or fully indigenous-leaning one. Researchers, such as Kayira (2015), caution against romanticizing purely indigenous schooling experiences, explaining the all cultures have their shortcomings and can benefit from supplemental learning practices, and also that a homogeneous curriculum steeped in any culture can be limiting in this globalized world. Instead, it is

critical for all students to be schooled in holistic, supportive, and culturally compatible learning environments.

Second, the present study's results support the development of ESL and bi- or multi-lingual programs in primary and secondary schools in Belize. The current educational system is dismissive of non-colonial languages, such as Garifuna and the Mayan languages (Ketchi and Mopan), this can have a potentially negative impact on students' cultural and self-identities. Also, the system is exclusive in that it does not accommodate students who might have learning difficulties because their first language is not English. New linguistic programs must be designed, researched, implemented, evaluated, and adjusted as appropriate to limit educational disparities related to language barriers.

A final application of the current study's findings would be the development of culturally-relevant learning metrics using more holistic, contextualized measures of academic performance. Equal consideration should be given to assessment types as should be given to learning styles. Optimally, learning assessments should measure multiple forms of learning and conceptualization; this way, students would be able to offer their unique ways of articulating and sharing knowledge, while allowing them to add to a richer, more diverse learning experience for all. Additionally, this would counter the reductionism implicit in equating learning with the results of rote memory tests and standardized exams (Tikly, 2015).

Recommendations for Research

It is the desire of the author that this research serves as an impetus to further qualitative and quantitative explorations of educational disparities in Belize.

A more specific, but far from exhaustive, list would include further studies that are:

(a) longitudinal, student-level investigations into the needs, perceptions, and performance of students.

(b) concentrated on different aspects of educational disparities.

(c) focused on the impact of teachers' perceptions, coupled with classroom observations.

(d) focused on the influence of school-level factors.

Conclusion

While the struggle for global educational equality may seem insurmountable, it is worthy to note that even modest contributions toward the meaningful advancement of educational policies and pedagogic practices can translate to monumental improvements in an individual student's educational experiences and outcomes. Should that not be the incentive for the collective efforts of educators, administrators, researches, policymakers, governments, organizations, and parents/guardians? Students of this and future generations can inherit more equitable educational systems if issues of disparity are identified, studied in context, and resolved.

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