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Secondary Student Perceptions of School Climate Elements and Self-Reported Academic Self-Efficacy as Factors of School Continuous Improvement

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SECONDARY STUDENT PERCEPTIONS OF SCHOOL CLIMATE ELEMENTS AND SELF-REPORTED ACADEMIC SELF EFFICACY AS FACTORS OF SCHOOL CONTINUOUS IMPROVEMENT

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Dedication

I dedicate this dissertation to my husband, Marcial, and my daughters, Belinda and Bianca. You all are an inspiration to me, and you willingly made sacrifices to help me achieve my goal. Realizing that you were all secure, happy, and healthy, encouraged me to persevere.

Mom and Dad, I am grateful for the investment that you made so I could come to the United States of America and make a fulfilling life for myself. Your investment was the catalyst for all of my professional and personal accomplishments. Your guidance and encouragement continue to endure even though we are thousands of miles apart.

SECONDARY STUDENT PERCEPTIONS OF SCHOOL CLIMATE ELEMENTS AND SELF-REPORTED ACADEMIC SELF EFFICACY AS FACTORS OF SCHOOL CONTINUOUS IMPROVEMENT

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Abstract

State and national agencies recognize the link between school quality and student academic and behavioral outcomes. Research has shown that a positive school climate and high academic self-efficacy are associated with positive academic and behavioral student outcomes. Determining the school climate factors that contribute to academic self-efficacy will add to the limited research on the relationship between these two constructs and provide information to prospective and current school leaders in cultivating an effective school.

A multiple regression was used to determine how student-perceived school climate factors predict self-reported student academic self-efficacy and of these factors, which one provided the strongest explanation to the amount of variance observed on the outcome variable academic self-efficacy. The factors of school climate investigated in this study are connectedness, classroom environment, safety and belongingness, and academic optimism. In this context, school climate is defined as the quality of a student's school experiences and academic self-efficacy is defined as a student's self-reported level of confidence in discrete academic skills such as reading and writing skills. The results of a multivariate statistical analysis conducted on a secondary data set from a school climate survey administered to nearly 20,000 secondary students in a large, urban school district situated on the US-Mexico border will be discussed.

Keywords: school climate, self-efficacy, school culture, school improvement, school effectiveness, safety, belongingness, connectedness, relationships, classroom environment, academic optimism, teaching and learning, educational leadership

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Chapter 1: Introduction

The current state of education is characterized by high stakes accountability metrics from state and federal educational agencies exerting pressure on United States public schools to increase student achievement. The pressure is greater in high poverty public schools, which research has found less effective in terms of student achievement (Reardon, Weathers, Fahle, Jang, & Kalgrides, 2019). Consequently, schools strive for the distinction of becoming effective schools, or schools that add value to students by increasing student academic performance from where they were before (Urbanovich & Balevinciene, 2014). School climate, an environmental influence, and academic self-efficacy, a personal belief, are both linked to student academic performance and thus associated with effective schools.

The purpose of this quantitative prediction study is to examine the importance of identified school climate factors to self-reported academic self-efficacy. As illustrated in the literature review, research has been conducted on related topics, particularly on the relationship between school climate and academic achievement, school climate and behavioral outcomes, school climate and school effectiveness, and academic self-efficacy and academic achievement. However, there is limited research on the relationship between school climate and academic self-efficacy and which factor(s) of school climate is/are most important in predicting academic self-efficacy including the ascertaining of psychometric properties of typical scales used by schools to assess climate or culture.

Background of the Problem

Research has shown that school climate has implications for academic and behavioral student outcomes (Cornell et al., 2016). Academic outcomes associated with school climate include standardized test passing rates (Cornell et al., 2016; Konold et al., 2018; Ruiz,

McMahon, & Jason, 2018), dropout rates (Cornell et al., 2016), graduation rates (Konold et al., 2018), student engagement (Cornell et al., 2016; Konold et al., 2018; Yang, Sharkey, Reed, Chen & Dowdy, 2018), and student grades (Daily, Mann, Kristjansson, & Zullig, 2019). Behavioral outcomes linked to school climate include student-reported use of alcohol and marijuana, reports of bullying, fighting, weapons carrying, interest in gang membership, aggression towards teachers and peers, and suicidal patterns (Cornell et al., 2016). With increasing accountability demands, educational leaders look to school climate research to potentially influence student academic and behavioral outcomes.

The Every Student Succeeds Act (ESSA, 2015) requires each state educational agency to develop a multi-measure accountability system that includes "at least one indicator of school quality or student success" (ESSA, P.L. 114-95, 2015). The Texas Education Agency (TEA, 2018, 2019) provided support in school climate improvement by redesigning principal certification to increase emphasis on school culture. Recent developments in both principal certification requirements and campus and district intervention models reiterate the importance of positive school culture and climate in leading high-performing schools. Due to the changing role of principals as instructional leader and in line with the specific needs of Texas schools and communities, the Texas principal certification was redesigned to include new areas of emphasis, one of which is Domain I. School Culture, composing 22% of the principal certification test (TEA, 2019). Specifically, a beginning principal is expected to know "how to establish and implement a shared vision and culture of high expectations for all stakeholders (students, staff, parents, and community)" (p.10). In part, beginning principals are required to know how to facilitate a positive school culture across all stakeholders through supportive feedback, staff and student safety, collaborative development of shared mission and vision, and valued input from

parents and the community, for student and campus achievement. Establishing positive school culture and climate is a pre-requisite of a high-performing school.

In order to support struggling schools, TEA (2018) provided a framework of support for school improvement through technical assistance providers such as local regional service centers and external vendors. The Effective Schools Framework, or ESF (TEA, 2018), is a research-based set of district commitments and school actions that ensure that all schools are leveraged for success. Five components, or levers, describe the practices of highly successful schools to support powerful learning and teaching. One of the levers of the ESF is positive school culture. ESF (TEA, 2018) provided the following description of positive school culture: "Positive school culture requires compelling and aligned vision, mission, goals and values, explicit behavioral expectations and management system, proactive and responsive student support services, and involved families and community" (p. 4). One of the district commitments required by the ESF is that districts provide systems to monitor school culture data which corresponds to the campus essential action of administering "regular campus climate surveys assess and measure progress on student and staff experiences" (p. 4).

School districts routinely collect school climate data from students, staff, parents, and other stakeholders using locally developed, free, or purchased school climate surveys to assess particular factors of school climate that the district deems significant to the district, school, and student needs. School climate surveys are analyzed by item and utilized by districts to communicate the state of school climate to the community, develop campus intervention plans, or, in part, evaluate principal performance. Districts employ descriptive statistics to analyze school climate data, which are routinely administered and consists of robust numbers of participants. Analyzing school climate data beyond descriptive statistics will support district and

campus leadership in providing targeted support and resources in assessing, monitoring, and responding to deficits in specific school climate factors.

Academic self-efficacy is the student's reported level of confidence in discrete academic skills such as mathematics, reading, and writing skills. It involves the capability of students to influence their environment to create their best academic conditions, using strategies to enhance memory and understanding of taught material, to utilize teachers and peers for support and motivation, to complete assignments, and meet deadlines "and to pursue academic activities when there are other interesting things to do" (Bandura, Barbaranelli, Caprara, & Pastorelli,1996, p. 1211). Similar to school climate, researchers have determined that student academic self-efficacy strongly influences student academic outcomes (Cheema & Kitsantas, 2014; Hoigaard, Kovac, Overby & Haugen, 2015; Lent, Brown, & Larkin, 1984; Pajares, 1996). However, few studies examine the relationship between school climate and academic self-efficacy, thus further research in this area is needed (Cheema & Kitsantas, 2014).

Statement of the Problem

School climate and its dimensions are used to predict academic outcomes such as standardized test passing rates (Cornell et al., 2016; Konold et al., 2018; Ruiz, McMahon, & Jason, 2018), dropout rates (Cornell et al., 2016), graduation rates (Konold et al., 2018), student engagement (Cornell et al., 2016; Konold et al., 2018; Yang, Sharkey, Reed, Chen & Dowdy, 2018), and student grades (Daily, Mann, Kristjansson, & Zullig, 2019). It has also been used with behavioral outcomes such as student-reported use of alcohol and marijuana, reports of bullying, fighting, weapons carrying, interest in gang membership, aggression towards teachers and peers, and suicidal patterns (Cornell et al., 2016).

Without understanding which school climate factors are the most important to student academic self-efficacy, schools overlook opportunities to improve academic self-efficacy, which is an important predictor of student success beyond high school (Chemers, Hu, & Garcia, 2001). At the individual level, self-efficacy has been linked not only to academic achievement but also to behavior engagement (Olivier, Archambault, De Clercq, & Baland, 2019; Zimmerman, 2000), motivation (Pajares, 1996; Zimmerman 2000), and persistence (Chemers, Hu, & Garcia, 2001; Lent et al., 1984). However, there is a gap in current literature as to which school climate factors can predict student academic self-efficacy.

Few publications attempt to establish connections between academic self-efficacy and student perceptions of school climate. In two separate studies, Cheema and Kitsantas (2014) and Hoigaard, et al. (2014) investigated the relationship that exists between school climate and academic self-efficacy in the context of academic achievement. Cheema and Kitsantas (2014) studied 4,199 ninth, tenth, and eleventh-grade students and found that greater perceived disciplinary climate in math classrooms and higher math self-efficacy were associated with higher math achievement scores. Hoigaard et al. (2014) studied 482 ninth and tenth-grade students and determined that students who perceive an environment where the emphasis is on learning more than grades, where peers support and help them, and where students feel responsible for participating or behaving in class are more likely to have greater academic self-efficacy and higher academic achievement. Hoigaard et al. (2014) also found that academic self-efficacy positively predicted student academic achievement.

Research Questions

Research questions for a prediction study attempt to "determine which of a number of variables are most highly related to the criterion variable" (Gay, Mills, & Airasian, 2012, p. 213). The research questions for this study are:

Research Question 1: How do the identified school climate factors contribute to the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 2: Which combination of school climate factors provide the strongest explanation of the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 3: Do relationships exist between the identified outcome and predictor variables (academic self-efficacy and school climate factors) and the factors of grade level, campus performance, and neighborhood affluence of secondary students?

In addition to investigating the research questions and due to the nature of the secondary data set used in this study, this study also seeks to provide psychometric information about the school climate survey instrument, including instrument validity and reliability analyses and interpretations.

Although research has shown that both school climate and student academic self-efficacy are associated with academic performance, there is limited research on the link between perceived school climate factors and academic self-efficacy. A prediction study may be used to determine which school climate factor(s) best predict academic self-efficacy.

Significance of the Study

The findings of this study will benefit the body of knowledge for the following reasons:

1. This study will add to the limited research in the relationship between the constructs of student perceived school climate and academic self-efficacy, which research has shown are both strong predictors of student academic performance.
2. This study will add to the limited research on student perceived school climate and student academic self-efficacy that has been conducted on schools comprising a high percentage of minority students, specifically on schools composed of predominantly Hispanic students of mostly low socio-economic status.
3. The results of this study will inform and support principal preparation programs and beginning principals in understanding and applying the recently revised standards for principal certification from the Texas Education Agency.
4. The results of this study will inform and support the current principals of struggling schools identified for targeted interventions due to student academic achievement.
5. The results of this study will inform and support school stakeholders in improving school climate and increasing academic self-efficacy.

Assumptions

This study utilizes a secondary data set collected in the spring of 2019 by Border ISD. Border ISD conducted the school climate survey with the following five goals in mind:

1. Provide Border ISD and schools with data on student, staff, and parent perceptions of school safety, order, engagement, and climate that will help them measure progress and impact on efforts to build a positive and respectful school culture.
2. Provide Border ISD and schools with data on students' social and emotional competencies to help counselors meet the needs of our students.

3. Provide Border ISD and schools with the most theoretical relevant constructs of student academic performance using self-reported perceptions.
4. Provide Border ISD and schools with data on parent, student, and staff perceptions of home and school relationships, parent satisfaction, support for academics, and response to informational needs of families.
5. Provide Border ISD and schools with useful resources to help them review climate data and develop strategies and plans to improve school climate based on their data.
6. Provide Border ISD and schools with data on parent, student, and staff perceptions on safety and order that will serve as a comparison to a district-adopted bullying prevention survey.

Using a secondary data set offers researchers the ability to produce findings faster than building an instrument and collecting data in a typical research study, thus, "the development and contribution of new knowledge occurs in a timely manner before they are considered dated by the field" (Johnston, 2014, p. 624). However, the use of the secondary data set came with some considerations, as explained by Johnston (2014). Firstly, the secondary data used in this study was not collected specifically for determining which of the school climate factors of connectedness, classroom environment, and safety and belongingness best predict student academic self-efficacy. Secondly, the secondary data set is specific to the demographics of the sample surveyed. Thirdly, the researcher did not participate in the development of the climate survey instrument, data collection, and was not privy to the problems that may have beset the survey process. Finally, and most significantly, the survey was conducted anonymously, thus no follow-up or additional student data or demographics could be collected.

Hence, due to the nature of the secondary data set used in this study the researcher made

the following assumptions.

a. The school climate survey instrument is an accurate measure of the student perceptions of school climate and academic self-efficacy during the 2018-2019 academic school year, with the particular administrative, instructional, and support staff employed that year.
b. Participants responded honestly and accurately to each of the individual survey items and across the extant components on the scale.
c. Participants who responded "not applicable" neither agreed nor disagreed with the statement.
d. At the time of the survey, all participants had current membership on the campus they responded.
e. The factors identified for this study are the only factors that are deemed to contribute significantly to most pertinent aspects of school climate.

Limitations

The researcher recommends exercising caution when deriving generalizations from the findings of this study due to the following limitations:

a. Survey questions did not provide a means to further quantify nor qualify student responses.
b. The survey instrument was bidirectional with one rating descriptor being "not applicable." To remedy this, the researcher assigned the midpoint value of 3 to responses of "not applicable."
c. This research study was guided by a pilot study with a sample from a representative high school campus. The factors of school climate that emerged from a factor analysis

conducted on the student participants in one of the representative campuses of Border ISD and were identified as connectedness, classroom environment, and safety and belongingness. The dependent factor selected from the pilot study was student academic self-efficacy. These four constructs yielded alpha values greater than 0.7 indicating adequate levels of scale reliability (Field, 2018).

d. Student actual academic performance through typical content-based grades or standardized tests was not possible for this particular data set.
e. Student internal factors are one of the three elements of the social cognitive theory that influences behavior and outcomes (Bandura, 2001). Individual factors such as gender, race, or ethnicity was not possible for this particular data set. However, some categorical values (i.e. grade, campus performance, and neighborhood affluence) are available.

Delimitations

A delimitation of this study is that the participants have a specific demographic composition and may not fully represent the norm for all secondary students across other regions in the state or nation. The primary goal of this quantitative study is to determine which perceived school climate factors best predict self-reported student academic self-efficacy specific to a large, urban school district situated on the US-Mexico Border characterized by predominantly Hispanic and mostly economically disadvantaged participants, which may not be similar to other districts or campuses and may not generate similar findings. Another delimitation of this study is that the data is confined to the perceptions of secondary students. Perceptions may vary from other grade levels or other educational stakeholders. Findings may not be applicable across these groups.

Definition of Terms

The researcher chose to define some of the terms to clarify them for this study. Some terms will also be defined in the review of literature, and in that case, sources are cited.

Border Independent School District. Border Independent School District, or Border ISD, is the pseudonym given to the school district in this study.

K-8 Combination Schools. Also known as K-8 combo schools, or kindergarten to eighth-grade combination schools, these schools are elementary and middle schools housed in the same school building.

Student Academic Self-Efficacy. Student academic self-efficacy is the student's self-reported level of confidence in discrete academic skills such as mathematics, reading, and writing skills. Schunk and Zimmerman (1997) define perceptions of self-efficacy as the "belief s about one's capabilities to learn or perform designated behaviors" (p. 195)

School Climate. School climate is defined as "the quality and character of school life" (Cohen et al., 2009; Cohen, 2014; Zullig et. al, 2010; Cornell et al., 2016; Rudasill et al., 2018). School climate generally refers to "the physical, social and emotional environment at school" (National Association of School Psychologists, 2019).

Factors of School Climate. Researchers have used terms such as facets, components, domains, dimensions, variations, aspects, and indicators to describe the factors of school climate. For this study, the factors of school climate are academic optimism, connectedness, classroom environment, and safety and belongingness.

Connectedness. Connectedness, as a factor of school climate, is defined as "the belief by students that adults in the school care about their learning as well as about them as individuals" (CDC, 2009, p. 3).

Classroom Environment. Classroom environment, as a factor of school climate, includes the student perceptions of routines, seating and grouping configurations, resources, and academic tasks.

School Safety. School safety, as a factor of school climate, is defined as the student perception of the presence or absence of physical or emotional threat (Centers for Disease Control and Prevention, 2009).

Belongingness. Belongingness, as a factor of school climate, is defined as the student perception of the school's sense of community (Vieno et al., 2018) or the "feeling of being supported and accepted by others" (Van Ryzin, Gravely, & Roseth, 2009, p. 2).

Student Academic Optimism. Student academic optimism is the perception of student trust that efforts made in school lead to future achievement. Tschannen-Moran, Bankole, Mitchell, and Moore (2013) defined student academic optimism as student trust in teachers, principal, and school.

Campus Performance. Campus performance is the secondary schools' accountability ratings from the academic school year 2018 – 2019, as reported by TEA (2019). Schools were categorized as Above Average Performance (student's campus performance is above the sample mean) or Average or Below Average Performance (student's campus performance is at or below the sample mean).

Neighborhood Affluence. Neighborhood affluence is the secondary schools' percent of economically disadvantaged students from the academic school year 2018 – 2019, as reported by TEA (2019). Schools were differentiated as either More Affluent (student is attending a school where less than 70% of students enrolled in the neighborhood school is economically disadvantaged) or Less Affluent (student is attending a school where 70% or more of students

enrolled in the neighborhood school is economically disadvantaged).

Chapter Summary

There is a continuous interest in both school climate and academic self-efficacy and its effect on school outcomes, driven by state and national accountability metrics that link school quality with student outcomes. Both the external influence of a positive school climate and the personal belief of academic self-efficacy have been associated with positive academic and behavior student outcomes. The notion that the school-wide efforts can be made to increase student academic self-efficacy may have implications for campus leadership, instructional practice, professional development, and campus improvement efforts. However, few publications attempt to establish the relationship between student academic self-efficacy and student perceptions of school climate.

The results of this study may help educational leaders make strategic decisions on interventions to improve school climate to reinforce student academic self-efficacy, which has lasting implications on student success beyond K-12. Chapter 1 presented a background for this study, specified the problem, defined key terms, and presented a brief overview of the methodology that will be used. The first chapter concluded by stating some specific assumptions, limitations, and delimitations applied to this study. Chapter 2 is a comprehensive review of the literature on school climate, academic self-efficacy, and school and student outcomes. This chapter also considers the research connections to the factors of school climate and the implications of school climate on school improvement. Chapter 3 will present a description of the research design, the participants, the instrument used, the data collection and analysis methods, and includes the results of the pilot study that identified the factors of school climate.

Chapter 2: Review of Related Literature

School climate and self-efficacy have both been associated with academic and behavioral outcomes. School climate is the internal characteristic of the school that distinguishes it from another school and influences the behavior of those in the school (Hoy & Tarter, 1992). In contrast, self-efficacy is a characteristic of the individual that determines behavior and influences outcomes (Bandura et al., 1996). While there is a large body of knowledge in the relationship between school climate and academic achievement, school climate and behavioral outcomes, school climate and school effectiveness, and academic self-efficacy and academic achievement, there are limited studies on the relationship between school climate and academic self-efficacy. The recent changes in the principal certification requirements and district and campus-level intervention efforts for struggling schools place school culture and climate in the forefront of school improvement (TEA, 2018, 2019), thus, this research contributes to the body of knowledge by identifying school climate predictors of student academic self-efficacy, itself a strong predictor of student academic achievement (Lent et al., 1984; Pajares & Miller, 1994).

Search Strategy

The search strategy for this study was initiated by creating a literature review outline, which guided the keywords used in searching databases for relevant sources. Keywords included but were not limited to *school climate, self-efficacy, school culture, school improvement, school effectiveness, safety, belongingness, connectedness, academic optimism, classroom environment, teaching and learning, academic achievement, behavioral outcomes,* and *educational leadership.* ProQuest, ERIC, EBSCOHOST, and SAGE databases were searched. Google Scholar was also utilized for additional resources. Sources of information included peer-reviewed articles, books, dissertations and state and federal agency websites. Over 200 sources, dating from the 1970s to

the present, were acknowledged as relevant to the study. Older sources were included to provide the reader with the theoretical and conceptual origins of the topic and a perspective of the history of the topic. A subset of the sources, as listed in the references section of this dissertation, was identified as the most pertinent sources for this study and provide the groundwork for the literature review.

Culture and Climate

School effectiveness research has delved beyond the simplistic input-output model, such that the school inputs value into students to produce output in the form of academic performance (Van Houtte, 2005). Since the 1970s, school effectiveness research has gained attention in investigating what truly happens behind school walls (Van Houtte, 2005). Most researchers define school effectiveness as referring to student academic achievement or student retention with several effectiveness studies combining both school-level and classroom-level effects in models that attempt to explain the factors or processes that significantly affect student outcomes (Gaziel, 1997). In the past, researchers have used the term school climate to describe these entrenched school processes, but in the 1980s, the term school culture was introduced as an alternative concept (Van Houtte & Van Maele, 2011). Researchers have argued that there is a lack of clarity in the concept of school climate and school culture, as most people use these terms interchangeably (McNeil et al., 2009; Stolp, 1994; Van Houtte & Van Maele, 2011).

Educational leadership research look to organizational climate and organizational culture research to understand the relationship between culture, climate and school effectiveness (Gaziel, 1997). Denison (1996) contrasted organizational culture and climate as two different phenomena. Whereas culture refers to the "deep structure of organizations, rooted in the values, beliefs, and assumptions held by organizational members" (p. 624) constructed to socialization and

interaction and whose stability depends on the convergence of individual thought and action, climate is "relatively temporary, subject to direct control, and largely limited to those aspects of the social environment that are consciously perceived by organizational members" (p. 624). Organizational culture tends to be studied by qualitative methods, while organizational climate is studied using quantitative methods, often through survey data. Denison (1996) argues that both organizational culture and climate attempt to describe the "holistic nature of social contexts in the organization's system of beliefs, values, and assumptions" (p. 626). Organizational culture and climate have a common dilemma of understanding how the culture and climate of the organization creates the interactions while the individual interactions create the culture and climate of the organization (Denison, 1996). In organizational culture and climate literature, there is a high overlap between the study of the dimensions of culture and climate, especially when researchers use quantitative methods to study culture.

Both school climate and culture have found their place in the rhetoric of school effectiveness and educational reform, and like organizational culture and climate there are meaningful differences between school climate and school culture (Hoy, 1990). School climate, or the shared perceptions of school members, has been operationalized, with data commonly collected in surveys endeavoring to generalize concepts in school climate (Gaziel, 1997). School climate studies presume that the results of these surveys imply agreement of member perceptions (Van Houtte & Van Maele, 2011). Gaziel (1997) suggested that this attempt at generalizing, rather than specifying member perceptions, is more profoundly expressed by school culture. School culture, or shared assumptions and beliefs, are deeply held by the school's members, and when clearly expressed, "provide a way of viewing the world" (p. 311). Thus, culture informs climate to help members determine what is most important for them and help them make sense

of their perceptions (Gaziel, 1997). However, approaches to both climate and culture studies have included survey items that presume to differentiate collective perceptions and individual beliefs, often by electing to use first-person singular rather than plural (Van Houtte & Van Maele, 2011). Van Houtte and Van Maele (2011) hypothesized that the differences in the concepts of collective perceptions and individual beliefs of 2,069 teachers tested through the use of both first person singular and plural iterations of alternatively equivalent items were trivial and would show high correlations between equivalent items. Items such as "I care whether or not the students get good grades" and "Teachers in this school care whether or not the students get good grades" all yielded bivariate correlations ranging from 0.308 to 0.504, indicating that none of the items is interchangeable with its alternative item (Van Houtte & Van Maele, 2011). This result implies that one's individual beliefs do not necessarily mirror one's perceptions of collective beliefs despite being in the same environment and experiencing the same events. Hence, culture and climate should be studied true to their definitions and measured accordingly (Van Houtte & Van Maele, 2011).

School climate and school culture also differ in content, instrumentation, and analysis (Hoy, 1990). School climate research primarily studies perceptions of behavior, employs survey techniques, applies multivariate statistics, and considers climate as an independent variable whereas school culture research largely examines norms, values, and assumptions, employs ethnographic techniques, applies qualitative methods, and considers culture as a dependent variable (Hoy, 1990). Limited research in school culture, especially research that examines norms, values, and assumptions using qualitative methods, deals with the issue of whether a school has a singular culture or multiple subcultures (Hoy, 1990). Hoy (1990) argued that it is useful for school climate and school culture to remain separate and distinct perspectives and

advised against the indiscriminate use of climate and culture in describing factors that lead to school effectiveness and reform. Both school climate and school culture each bring unique perspectives into the study of schools (Hoy, 1990).

School climate appears to have been chosen as the term to represent the characteristics of effective schools, including school culture (Hoy, 1990). Climate has been found effective in determining relationships between positive cognitive and affective student outcomes and has been used to provide a context by which to study the various aspects of effective school leadership, such as decision-making, motivation, and communication (Hoy, 1990). Hoy (1990) suggested that while school climate is generally used as an independent variable, a healthy school climate can also be envisioned as an outcome in itself. Hoy (1990) argued that change efforts should be focused on fostering a healthy school climate which creates an environment open to change.

School Effectiveness and Demographic Factors

It is undeniable that home, school, and the surrounding environment influence students in different ways. Schools cannot change the circumstances of the students' home and community environment. However, schools can slightly change some general facets of student academic and behavioral development and greatly influence students in more specific aspects (Goodlad, 1984) At the very least, schools should avoid practices that perpetuate societal inequalities. Goodlad (1984) states that

> …if the school is to be anything other than a perpetuator of whatever exists in society, states and local school districts must set – if they have a mind to – school policies that to some degree transcend and minimize the role of the classroom as reproducer of the culture (p.61).

In his seminal work, *Effective Schools for the Urban Schools*, Edmonds (1979) argue that there is a disparity in the education of middle-class students and poor students. However, some schools are able to instruct poor students more effectively than others. These effective schools do not necessarily follow an exact model but may project a climate that all staff are "instructionally effective" (p. 22) for all students, may have an administrator that "compels the teachers to bring all children to a minimum. level of mastery of basic skills" (p. 22), may have teachers that work collaboratively to be effective for all students, or may have a group of stakeholders who hold schools accountable. Edmonds (1979) notes that effective schools share the following characteristics: a strong school administration, a climate of strong expectations that all students can learn, a structure conducive for student learning, an emphasis on acquisition of basic skills above all other activities and the ability to divert resources to this goal, and a system for student progress monitoring.

Lezotte (1993) reinforces the mission of "Learning for All" (p. 1) and the importance of school climate in school improvement efforts. In order to achieve the first two correlates of effective schools, a transformation of school climate is needed. The first correlate, safe and orderly environment, requires "an orderly, purposeful, businesslike atmosphere which is free from threat of physical harm, the school climate is not oppressive and in conducive to teaching and learning" (p. 1). The second correlate, climate of high expectations for success, demands that "the staff believe and demonstrate that all students can attain mastery of the essential school skills, and the staff also believe that they have the capability to help all students achieve that mastery" (p. 2). Effective schools are able to provide equitable opportunity and student success regardless of demographic factors and have a school climate that reflects this belief across stakeholders. School climate has been found to provide a protective effect against the negative

effects on academic achievement associated with race, ethnicity, gender, and socio-economic factors (Thapa et al., 2013; Berkowitz et al.2013).

O'Malley, Voight, Renshaw, and Eklund (2015) studied the moderating effects of student perceptions of school climate on the relationship between home structure and academic achievement. Family structure was categorized as either two-parent, single-parent, foster parent, or homeless while academic achievement was measured using student self-reported grade point average. O'Malley et al. (2015) defines family structure as "a sociodemographic indicator that differentiates youths' living conditions by the number of caregiving adults with whom they live" (p. 2). The assumption of the measurement of family structure is that the less traditional the family structure, the more the family experiences poverty and stress. O'Malley et al. found that family structure is associated with academic achievement, in that students who live in a one-parent, foster, or homeless environment reported lower GPAs than students in a two-parent home environment. However, an important finding of this study is that the relationship between school climate perceptions and GPA were positive and significant, regardless of family structure. This finding shows that a positive school climate can act as a protective factor for students with less traditional home structure.

Berkowitz, Moore, Astor, and Benbenishty (2017) examined the assertion of educational researchers that positive school climates have a positive influence on academic achievement across students and schools of different socio-economic status. Bekowitz et al. (2017) conducted a meta-analysis of school climate studies and observed that there is a lack of clarity in the definition of school climate, as well as the constructs by which school climate is measured. Bekowitz et al. (2017) found that overall, school climate is important to the relationship between socio-economic status and academic achievement. In most of the studies, they found evidence

that school climate counters the negative contribution of low socio-economic status to academic achievement.

De Pedro, Gilrath, and Berkowitz (2016) investigated race, grade level and gender as predictors of school climate using the results of the 2009-2010 California Healthy Kids Survey. The findings of this study indicated that race and grade level was a predictive factor in school climate. Minority Black, Hispanic and Asian students were more likely than White students to be in an environment with a negative school climate. De Pedro et al. (2016) suggests that this result could be a consequence of the conditions of schools that typically serve minority students of low socio-economic status, characterized by limited resources and staff, higher rates of turnover, greater poverty, and higher incidences of violence. Another finding of this study was that high school students are more likely to be in a negative school climate than middle school students, which may be a result of the change in structure as students transition from middle school to high school (De Pedro et al., 2016). High school students usually have more subject teachers, and are part of a larger population of students, and are more likely to be separated according to ability and interest, when compared to middle schools, thus high school students may feel more isolated than their middle school counterparts. De Pedro et al. (2016) also found that gender did not significantly predict membership in a positive or negative school climate.

School Climate

The systematic study of school climate resulted from organizational climate research conducted before the 1950s to study the effect of the organizational environment on employee outcomes (Cohen et al., 2009; Zullig et al., 2010). It was not until the late 1950s that researchers began to study school climate systematically (Anderson, 1982; Cohen et al., 2009). School climate research was influenced by psychological traditions in the measurement of perceptions of

individuals within the school environment, that is, students, teachers, support staff, administrators, parents, and other school community members (Rudasill et al., 2018). Interest in the complexity of school climate and its measurement took hold in the 1960s, resulting in the development of the Organizational Climate Description Questionnaire (OCDQ) (Chirkina & Khavenson, 2018). The OCDQ presumed that school climate was the responsibility of the principal, thus it included questions on principal behaviors (Chirkina & Khavenson, 2018). The prolific use of the OCDQ in school climate research in the 1960s and 1970s has provided inconsistent findings in the association between school climate and student achievement but has kept the construct of school climate in mainstream school improvement research (Anderson, 1982).

The first educational measurement instrument was the College Characteristics Index (CCI), which was used to measure the perception of environmental pressures exerted on college students (Anderson, 1982). Multiple adaptations of the CCI were developed to further delineate factors that contribute to college pressures such as administration, other students, faculty, and personal aspirations (Anderson, 1982). An alternative instrument, the Environmental Assessment Technique (EAT), studied the eight characteristics of student body size, average cognitive level of the student body, and six personal value orientations of students (Anderson, 1982). Another instrument, the Classroom Environment Scale (CES) was applied to both teachers and students, based on the belief that climate is a perception of classroom interactions (Anderson, 1982). The Learning Environment Inventory (LEI) and the My Class Inventory (MCI) were developed in 1969 to study secondary and elementary school climate, respectively (Anderson, 1982). More recently used school climate survey instruments are the Perception of School Climate Questionnaire (PSCQ) which measures four dimensions: rules, aggressiveness of students,

satisfaction of school environment, satisfaction and collaboration of teachers (Bocchi, Dozza, Chianes, & Cavrini, 2015) and the Organizational Health Inventory (OHI) which measures 10 dimensions of school climate, with a focus on providing data for leadership approaches of principals towards school climate. (MacNeil et al., 2009). Driven by state and federal interest in the relationship between school culture and climate and effective schools characterized by high levels of student achievement, districts like Border ISD employ locally created, publicly available, or externally produced school climate surveys to assess local school climate. State educational agencies such as TEA (2018) regard school climate as a measurable component of school culture.

While culture and climate have been used interchangeably, organizational studies differentiate between culture and climate (MacNeil et al., 2009). Culture is defined as the shared norms of individuals in an organization, while climate is defined as the shared perceptions of these individuals (MacNeil et al., 2009). Researchers prefer to study climate rather than culture in measuring the organizational health of schools since climate is a more feasible construct for empirical studies (MacNeil et al., 2009). Although no single survey instrument can assess every nuance of school climate, findings from these instruments provide a glimpse into how stakeholders feel about a specific construct of the school climate (Loukas, 2007). The results of these assessments allow school personnel to take the preliminary steps to improve school climate for all stakeholders (Loukas, 2007).

Approaches to school climate research include quantitative studies, qualitative studies, and meta-analyses. Ozen (2018) utilized a qualitative approach in the study of the perceptions of school climate among teachers and found that schools that were characterized by a highly bureaucratic climate negatively affected teacher behaviors and autonomy. Anderson (1982)

summarized the results of 39 major climate studies from 1964 to 1980 and found that researchers used a variety of objective and subjective independent variables but 23 of the 39 studies used achievement as a dependent variable. However, Anderson (1982) argued that climate serves to mediate between the individual and the environment and the desired student outcomes and should thus be treated as both an independent and dependent variable. Common limitations that emerged from current school climate research are linked to the lack of consensus in the definition of school climate, research models, and methodologies for examining school climate (Thapa et al., 2013).

Anderson (1982) identified three theoretical frameworks that are the most significant in creating institutional climate. The Input-Output theory is a simplistic view of school climate, such that the school is an economic entity that inputs variables or resources to create a climate that results in positive school outputs (Anderson, 1982). The sociological theory presents the more complex social and cultural relationships between and among students, family, and teachers, which produce the variance in student outcomes (Anderson, 1982). The ecological theory studies the social and cultural processes of the institutions but also incorporates the input-output theory with the notion that all variables can be studied and reformed to produce positive student outcomes (Anderson, 1982).

Other theoretical approaches to school climate include social capital, organizational theory, authoritative school climate theory, social disorganization theory, and resilience theory, although the common approach to school climate research is the ecological systems theory (Acosta, Chinman, Ebener, Malone, Phillips, & Wilks, 2019; Ruiz et al., 2018; Rudasill et al. 2018; Yang et al., 2018). Bronfenbrenner (1974) utilized an ecological orientation to human development theory in that child development is influenced by the child's "enduring

environment", or the "child's ecology" (p. 2), which is composed of three dimensions: (a) the physical space and objects, (b) the persons, with varying roles and relationships with the child, and (c) the experiences in which the child engages with the persons and the interactions between these persons that the child observes. In a socio-ecological systems perspective, teachers and other adults contribute to school climate and student self-efficacy through their interactions with students while contributing to and being influenced by student perceptions of school climate. The external environment also influences school climate but to a lesser degree. A positive school climate acts as a mediating factor on any student in the school regardless of environmental and social contexts.

Dimensions of School Climate

It is common knowledge that positive school culture predicts academic achievement and youth development (Cohen et al., 2009). If students feel safe, have healthy adult and peer relationships, and have rich teaching and learning experiences within a sufficiently resourced environment, then student academic achievement should increase (Cohen et al., 2009). Some state entities equate school climate with school safety, but research has shown that school climate is more complex and multi-dimensional (Cohen et al., 2009; Loukas, 2007). There is no universal list of factors that comprise school climate, but school climate researchers offer different interpretations of the dimensions of school culture. Cohen et al. (2009) identified four major dimensions that have been shown to consistently contribute to school climate: safety, relationships, teaching and learning, and the external environment.

Cohen et al. (2009) describes subdimensions that comprise the major dimensions of school climate. Safety, as a dimension of school climate, include attitudes and perceptions of physical safety, such as clear and consistent rules and consequences, and socio-emotional safety,

such as student and staff responses to bullying (Cohen et al., 2009). Teaching and learning include the subdimensions of quality of instruction, social, emotional and ethical learning, and leadership (Cohen et al., 2009). Relationships include respect of diversity, school community and collaboration, and morale and connectedness (Cohen et al., 2009). The environmental-structural dimension of school climate includes cleanliness, space and resources, aesthetics, and curricular offerings (Cohen et al., 2009).

Statewide climate survey data was used to identify significant factors of authoritative school climate in a study by Cornell et al. (2016). Cornell et al. (2016) characterized authoritative school climates in to two domains: structure and support. Structure is related to the high academic and behavioral expectations on students by teachers and administration (Cornell et al., 2016). Support is related to whether the students perceive that teachers and administration care and have respect for them and that, when needed, students can approach their teachers for help (Cornell et al., 2016). Cornell et al. (2016) suggested that campus climate improvement efforts can be approached from these two domains; high levels of structure and support of a campus are associated with high levels of student engagement and student aggression for both middle and high school students.

The term dimensions have been used by researchers in describing the components or characteristics of school climate, yet there are many configurations of similar and interrelated constructs that occupy the list of dimensions of school climate. Loukas (2007) referred to school climate as a multidimensional construct that can be described through physical, social, and academic dimensions. Chirkina & Khavension (2018) interpreted school climate dimensions found across multiple studies of school climate as physical, cultural, social, and individual dimensions. In a review of school climate research, Thapa et al., (2013) identified five

dimensions of school climate: safety, relationships, teaching and learning, institutional environment, and school improvement process. Chirkina and Khavension (2018) argued that despite the multiple factors that emerge from the various approaches to school climate, it is possible to identify core attributes of school climate:

a. school climate cannot be solely described using objective school characteristics,
b. school climate cannot be measured directly but is evident by the manifestation of certain indicators, and
c. school climate is difficult and takes a long time to transform as it is deeply entrenched in the institution and requires drastic action for any change to manifest.

For this study, the four factors of school climate that are of particular interest are connectedness, classroom environment, safety and belongingness, and academic optimism.

Connectedness

A critical dimension of school climate is connectedness, or the extent to which students feel attached to a caring and reliable adult in their school (Cohen et al., 2009). School connectedness is also defined as student perceptions of belongingness and closeness with other individuals at the school (Loukas, 2007). Student feelings of connectedness to their schools affect student outcomes (Loukas, 2007; Thapa et al., 2013). Connectedness can be described as the quality of relationships between students and school staff, including teachers, administrators, and support staff. A school that is perceived as a safe environment will also be perceived as an environment with high-quality relationships between and among stakeholders and lower rates of school violence (Loukas, 2007). Research has shown that effective schools have supportive teacher and student relationships (Cornell et al., 2017). Psychologically, relationships are defined as how people relate not only to others but also to themselves (Thapa et al., 2013). Cohen et al. (2007)

described the following characteristics of positive relationships in the context of school climate: positive relationships among adults; positive relationships among students and adults; positive relationships among students; shared decision-making; common planning opportunities; diversity is valued; students participate in learning and discipline. Cornell et al. (2017) used the following descriptors for positive relationships in the students' perspectives: teachers want students to do well, care about all students, treat students with respect, with students being able to report that there is at least one school employee who wants them to do well and there is at least one school employee who they can approach with a personal problem.

Daily et al. (2019) established that academic performance was associated with student-teacher relationships to middle school students while teacher support in academic tasks was important to high school students. Conversely, the study by Bocchi et al., (2015) found that the significance of teacher support for students decreases in high school. Fatou and Kubiszewski (2018) found that healthy student-teacher relationships are linked to academic engagement and drop-out prevention. Reyes, Brackett, Rivers, White, and Salovey (2012) studied classroom emotional climate and determined that classrooms with "warm, respectful, and emotionally supportive relationships" (p. 710) generate better student academic performance due to a higher emotional investment in the learning process. Also, a healthy school culture is indicative of character development and a culture of connectedness (Loukas, 2007). These findings should be taken into account when designing school climate improvement efforts. Teacher professional development must include cultivating positive student-teacher relationships to improve school climate, student achievement, and student character development.

Micari and Pazos (2006) examined the relationships among instructor connectedness, peer alignment, and self-efficacy in 135 second-year university students. In this study, instructor

connectedness was defined as the sense that students know and look up instructors in the engineering department, self-efficacy was defined as the student's confidence in successfully completing the coursework, and peer alignment was defined as the sense of similarity in important ways with peers. Micari and Pazos (2006) found that increased level of connectedness with both the instructor and peers has a positive effect on student self-efficacy.

Classroom Environment

Teaching and learning are critical dimensions of school climate (Thapa et al., 2013). Strong collaborative learning communities are indicative of a positive school climate, which promotes student learning (Cohen et al., 2009; Thapa et al., 2013). Oder and Eisenschmidt (2018) determined that traditional, teacher-centered instruction is not associated with positive school climate. A cooperative and collegial classroom climate has teachers who use learner-centered, learner-independent techniques and support students in cross-curricular connections (Oder & Eisenschmidt, 2018). Thus, students engaging in relevant and challenging academic tasks provided by competent and dynamic teachers contribute to a positive school climate.

At the classroom level, studies have been conducted to link climate to classroom environment. Koth, Bradshaw, and Leaf (2008) conducted a quantitative study on climate and classroom features and found that the characteristics of the teacher, class size, and the number of behavioral cases in the classroom were significant in predicting the perceptions of school climate. High incidences of behavioral problems negatively affected climate which indicates that students are particularly sensitive to the lack of discipline and order in the classroom which affects their willingness to learn (Koth et al., 2008). Rathman, Herke, Hurrelmann, and Richer (2018) determined that classroom climate, specifically in the context of teacher care and monitoring and student autonomy reporting, was positively related to schoolchildren's self-

reported life satisfaction. Students who have a perception of teachers who are caring, supportive, attentive and involve students in class generally reported greater wellbeing (Rathman et al., 2018). Also, students who perceived greater opportunities for autonomy in the classroom also reported greater well-being. Student autonomy, as defined in this study, is the perceived support, acknowledgment, and availability of opportunities for peer collaboration from the teacher (Rathman et al., 2018). However, students who reported higher rates of classmates' disengagement from classwork also reported lower rates of life satisfaction. In both studies, key classroom environment factors affected student overall perceptions of school experiences.

The quality of school facilities can be related to the quality of the classroom environment. A positive correlation was found between the quality of the school facilities, school climate, and student achievement (Chirkina & Khavension, 2018). Chirkina and Khavension (2018) determined that certain improvements in the physical structure of a school may influence school climate and student achievement. Uline and Tschannen-Moran (2006) found that the quality of school facilities is associated not only with student achievement but also with school climate. Specifically, a school that is inadequate and shabby in appearance is disadvantageous to student achievement and engagement in teaching and learning. Uline and Tschannen-Moran (2006) state that "the manner in which a school building is designed, managed, and maintained sends a message to its occupants and the community beyond, speaking volumes about the value placed on activities transpiring within its walls (p. 67)." Well-designed, managed, and maintained facilities support powerful teaching and learning, and consequently student achievement.

Classroom environment has also been studied relative to academic efficacy. Dorman (2001) examined the responses of 1,055 secondary mathematics students and found that classroom environment relates positively with academic efficacy. Dorman (2001) assessed

classroom environment as a measure of 10 dimensions, specifically, student cohesiveness, teacher support, investigation, task orientation, cooperation, equity, involvement, personal relevance, shared control, and student negotiation. Of the 10 classroom environment dimensions studied, task orientation had the strongest effect on academic efficacy. Task orientation was defined in his study as "the extent to which it is important to complete activities planned and to stay on the subject matter" (p. 257). The results from this study were confirmed by a study by Daemi, Tahriri, and Zafarghandi (2017) on a sample of 200 advanced English as a Foreign Language (EFL) learners where it was found that task orientation was the classroom environment dimension that had the strongest relationship to the EFL learners' academic self-efficacy.

Safety and Belongingness

Student physical and emotional safety in schools has been tested by breakdowns in personal, interpersonal, and school variables that define a school's climate (Thapa et al., 2013). In the wake of the Parkland school shooting, parents began confronting concerns on the ability of schools to keep students safe (Blad & Superville, 2018). Recent school shootings have challenged societal expectation that school is a safe place for students to learn. Violence in schools, such as school shootings and bullying, may impair student outcomes (Beland & Kim, 2016). School shootings were found to significantly decrease enrollment of ninth-grade students and standardized test scores in math and English (Beland & Kim, 2016). Standardized test scores decrease for up to three years following a school shooting, but researchers suggest that this may be due to a change in the student composition, as some parents may choose to move some students out of the school following a shooting (Beland & Kim, 2016). Adolescent exposure to violent crime may cause post-traumatic stress disorder (PTSD) and mental health issues that may decrease student achievement and long-term mental health (Beland & Kim, 2016). School

shootings may also have long-term consequences for students since educational outcomes will likely determine college acceptance and earning potential (Beland & Kim, 2016).

Safety includes social, emotional, intellectual and physical well-being (Thapa et al., 2013). Research has shown that many students do not feel physically and emotionally safe due to a lack of clarity in rules and norms (Thapa et al., 2013). One of the most important norms in schools in the context of safety relates to student behavior when witnessing an act of bullying, where students are expected to directly or indirectly address instances of bullying instead of being passive bystanders (Thapa et al., 2013). School violence in the form of bullying affects student achievement and long-term mental health (Beland & Kim, 2016). Teasing and bullying are associated with negative school outcomes, such as lower performance on standardized tests, lower engagement, and higher drop-out rates (Cornell et al., 2017).

Belongingness, or the student's perception of the school's sense of community, was found to be predicted by the perception of a democratic school climate (Veino et al., 2005). Personal acceptance and having a valued place in the school's social context is important in a student's sense of community in their schools and classrooms (Veino et al., 2005). Vieno et al. (2005) suggested that increased student involvement in developing rules and organizing events may increase a school's sense of community.

Related to a student's sense of belongingness is student engagement. Fatou and Kubiszewski (2018) approached student engagement as independent from dimensions of school climate and found that student engagement was associated with shared decision making, high expectations and academic rigor, student-initiated learning, and respect for diversity. Perceptions of injustice or lack of safety were linked to decreased behavioral student engagement, particularly by students with a higher socio-economic background (Fatou & Kubiszewski, 2018).

Schools that adhere to an authoritative school climate, with high expectations and high support, is a school that facilitates student engagement (Cornell et al. 2017). In a state-wide study on school climate, Cornell et al. (2017) determined that there are two subscales of student engagement: affective engagement and academic engagement. Affective engagement included whether students liked their school, were proud to be in their school and felt like they belong, while academic engagement included whether students finished their homework, wanted to learn as much as they can and valued getting good grades (Cornell et al. 2017).

The complexity of social and cultural dimensions in the context of school produces increasingly abstract constructs and variables that are difficult to operationalize across studies (Anderson, 1982). Outcomes predicted by the school climate cannot definitively be assigned to the nature of the school as an entity or the nature of the students as individuals. (Anderson, 1982). A composite of the attributes of a school is what creates a climate that may explain the variance in student outcomes (Anderson, 1982). In studying school climate, most researchers will study no more than two output variables, although there is a wide variety of output variables that may be investigated (Anderson, 1982). Anderson (1982) suggested that since schools are expected to produce multiple outcomes, the holistic measurement of educational outcomes should be explored.

Tellhed, Backstrom, and Bjorklund (2017) investigated self-efficacy, defined as beliefs in personal competence, and social belongingness, or perceptions of socially fitting in, as mediators of gender differences in student interest in pursuing a science, technology, engineering, or math (STEM) degrees or in pursuing a health care, elementary education, or domestic (HEED) degrees a sample of 1327 Swedish high school students. The researchers found that the lack of female interest in STEM careers were more strongly related to lower self-efficacy for STEM than

belongingness, however, self-efficacy was not an important mediator of gender differences in student interest in HEED careers. Social belongingness was found to be a more important mediator of gender difference in student interest in HEED careers. Tellhed et al. (2017) explained that the perception of competence is more associated with males than with females, which lowers self-efficacy in females. In order to increase females who pursue STEM majors, intervention efforts should focus on increasing self-efficacy of female students.

Academic Optimism

Academic optimism is an empowerment of school stakeholders regardless of historically hindering factors, such as socio-economic status. There are several studies that examine academic optimism in teachers but there are limited studies of academic optimism in students. For teachers, academic optimism is formed from three major interdependent dimensions, which are academic emphasis, collective efficacy, and faculty trust (Hoy, Tarter, & Hoy, 2006; Smith & Hoy, 2007; Wu et al., 2012). Wu, Hoy and Tarter (2012) define academic optimism as the "collective properties of schools that describes school culture in terms of emphasis on academic achievement, the degree to which the faculty trust parents and students, and the extent of collective efficacy of the faculty" (p. 176). Hoy et al. (2006) chose the term academic optimism because optimism is a construct that can be learned and developed; academic pessimism can be shifted towards optimism in a school. Academic optimism "reflects beliefs about the dispositions and behavior in schools" (Smith & Hoy, 2007, p. 560). Hoy et al. (2006) emphasized the importance of principal behaviors that foster academics, celebrate student faculty academic achievements, cultivate a culture of learning from successful practices, and promote meaningful interactions between teachers and parents. Wu et al. (2012) examined the relationship between academic optimism of schools and student achievement in elementary schools in Taiwan and

found similar results to the earlier research of Hoy et al. (2006) that academic optimism mediates the effect of socio-economic status on academic achievement. Wu et al. (2012) also found that school structure where teachers view the principal and the organization of the school as helpful and positive, the resulting culture is one of academic optimism.

Student trust in teachers, student academic press, and student identification with school were constructs found to be related to academic optimism (Tschannen-Moran et al., 2012). Tschannen-Moran et al. (2012) defined trust as "a willingness to be vulnerable based on confidence that the other party is benevolent, honest, open, reliable, and competent. Academic press, also referred to as academic emphasis, is considered by the school's focus, or lack thereof, on learning and academics" (Tschannen-Moran et al., 2012). Schools with high academic press are characterized by high academic and behavioral expectations (Tschannen-Moran et al., 2012). Student identification with school is described by the students sense of affiliation and involvement with school, where students place a value on school and align themselves to collective school goals (Tschannen-Moran et al., 2012).

Tschannen-Moran et al. (2012) studied over 34,000 K-12 students to examine how the constructs of academic optimism (student trust in teachers, student academic press, and student identification with school) contribute to student achievement. Tschannen-Moran et al. (2012) found that these three constructs were strongly related to teach other. Additionally, these three constructs were strongly related to a composite measure of English and math achievement. Thus, Tschannen-Moran et al. (2012) recommended that in order to attain the benefits of student achievement, teachers and schools must foster a culture that values academics and encourage student identification with school.

Teacher self-efficacy was examined by Sezgin and Erdogan (2015) using academic optimism, hope, and zest for work as predictors. The researchers found positive and significant relationships between these constructs and suggested that increased levels of academic optimism, along with hope and zest for work, produces greater levels of self-efficacy among teachers. Sezgin and Erdogan (2015) recommend that schools employ strategies that increase teacher levels of academic optimism, hope, and zest for life to improve the quality of educational experiences for students.

Student Academic Self-Efficacy

Among the facets of personal agency, nothing is more powerful than the belief that individuals can "exercise control over their level of functioning and environmental demands" (Bandura et al. 1996, p. 1206). Student academic self-efficacy is the student's belief that he/she has sufficient academic skills to accomplish academic tasks. Efficacy beliefs shape career goals during early formative years, and with greater efficacy in more academic interests, the earlier children can purposefully prepare themselves for their desired career through academic and experiential choices (Bandura et al., 1996).

Individuals form efficacy beliefs from a variety of sources, including performance mastery experiences, vicarious experiences, verbal persuasion and social influences, and physiological attributes (Bandura, 1989). Successful experiences increase self-efficacy while failure decreases it, although, a few failures after much success or a few successes after multiple failures do not change self-efficacy by much (Schunk, 2012). Individuals also obtain information about their capabilities vicariously or from their observation of others, however, increased self-efficacy from observing peers succeed can be invalidated if followed by failure. Social persuasion from credible sources will lead individuals to believe in their propensity for success.

Physiological and emotional states also affect an individual's efficacy beliefs in that negative emotions, such as when under increased anxiety, lower self-efficacy and positive emotions, such as when experiencing less anxiety, increase self-efficacy (Schunk, 2012).

Bandura, Barbaranelli, Caprara, and Pastorelli (2001) found that socio-economic factors affect a child's self-efficacy indirectly; socio-economic factors inflict economic stress on families that undercut parental efficacy beliefs and academic aspirations for their children. A child's sense of academic self-efficacy and aspirations are built on parental beliefs and aspirations for their child and parental appraisal of their child's academic capabilities (Bandura et al., 1996). Thus, efficacy beliefs have implications for a child's academic and career trajectory.

A study conducted by Bouffard-Bouchard (1990) demonstrated that external factors can affect self-efficacy and consequently, academic performance. The two-part experiment began with sixty-four Canadian college students who were subjected to one of two experimental conditions, one designed to induce a perception of high self-efficacy and the other to induce a perception of low self-efficacy. The students were first given the task of providing a target word in a set of six sentences where the target word was replaced by a nonsense word. In all six sentences, only one target word was able to appropriately replace the nonsense word. The students were allowed to respond to three of the sentences and had to specify how certain or uncertain they were in the correctness of their answer. The students were then given positive or negative feedback. Positive feedback involved relaying to the student how much better their performance in the task was when compared to the rest of the group. Negative feedback involved providing information on how much worse their performance was in relation to the rest of the group.

The second part of the experiment immediately following the described conditions required each student to indicate whether they believed that would succeed in completing the task and how confident they would be in their success when given all of the sentences. Students had to relay their expectation for success and level of confidence before they were given each sentence. Bouffard-Bouchard (1990) found that these manufactured performance conditions had a significant effect on the students' belief that they could solve and their anticipated success. Students constantly receive positive or negative messages from their parents, school employees, and peers who may improve or diminish their perception of self-efficacy and their resulting academic performance.

The interplay of environment and efficacy beliefs is based on Bandura's social cognitive theory where individuals are "partly the products of their environment, but by selecting, creating, and transforming their environmental circumstances, they are producers of environments as well" (Bandura, 2000, p. 75). Social cognitive theory assumes that individuals are capable of human agency, defined as the "intentional pursuit of courses of action" (Henson, 2001, p. 4). Human agency and the resulting change in behavior exists in a "triadic reciprocal causation" (p. 4) among three interdependent forces: environmental influences, behavioral factors, and personal factors, such as cognitive and affective abilities. However, high self-efficacy without the required skills will not produce competence, but individuals who place a high value on an outcome will exhibit motivated behavior (Schunk, 1991). Otherwise, individuals routinely eliminate tasks they believe are beyond their capabilities, however attractive the perceived outcomes may be (Bandura, 2002).

Grounded in Bandura's social cognitive theory is the self-efficacy theory which associates student self-efficacy with academic achievement (Olivier et al., 2019). Academic self-efficacy is

often studied by asking students to rate their abilities in different courses and skills, such as mathematics, reading, writing, science, and social studies (Bandura et al., 1996; Bandura et al., 2001). Academic self-efficacy survey items may also ask students to rate their ability given descriptions of specific tasks (Bong & Slaavic, 2003). Academic self-efficacy items focus on future performance and expectations and responses to academic self-efficacy items represent the students' judgment of what they can do with the skills they possess for accomplishing specific tasks (Bong & Slaavic, 2003). Researchers relate academic self-efficacy to variables such as gender and ethnicity (Cheema & Kitsantas, 2014), academic achievement (Chemers et al., 2001; Hoigaard et al., 2014), organizational citizenship behavior (Hoigaard et al., 2015), persistence (Chemers et al., 2001; Lent et al., 1984), correct responses to mathematics problems (Bouffard-Bouchard, 1990; Cheema & Kitsantas, 2014), career choices (Bandura et al., 1996, 2001; Zimmerman, Bandura, Martinez-Pons, 1992), parental efficacy and aspirations (Bandura et al., 1996; Zimmerman et al., 1992) socio-economic status (Bandura et al., 1996; Cheema & Kitsantas, 2014), prosocial behavior (Bandura et al., 1996), academic expectations, stress, health, and optimism (Chemers et al., 2001), and emotional engagement and teacher-reported math achievement (Olivier et al., 2019). Studies on self-efficacy are also concerned with the role of self-efficacy in certain behaviors, such as persistence or self-regulation (Maddox, 2016).

Researchers continue to investigate the link between self-efficacy and student achievement although other relationships have also been studied. Domenech-Betoret, Abellan-Rosello, and Gomez-Artiga (2017) studied the responses of 797 secondary students to examine the relationships among student academic self-efficacy, student achievement, and student course satisfaction. Domenech-Betoret et al. (2017) found that student academic self-efficacy predicted student achievement and satisfaction. Fernandez, Cecchini, Méndez-Gimenez, Mendez-Alonso,

and Prieto (2017) studied 2,519 secondary students who were part of a network of campuses that have been employing cooperative learning for at least one year. Fernandez et al. (2017) investigated the relationships among student academic self-efficacy, cooperative learning, and self-regulated learning, characterized by the students' internal ability to contemplate about their learning. Students were divided into four clusters based on their responses to their levels of cooperative learning and self-regulated learning (Fernandez et al., 2017). Fernandez et al. (2017) found that students who reported high levels of cooperative learning and high levels of self-regulated learning were found to also have high levels of self-efficacy, but self-regulated learning had greater influence on student academic self-efficacy than cooperative learning.

Academic self-efficacy has also been linked to academic resilience or the ability to sustain positive academic efforts in the face of adversity, and its relationship (Cassidy, 2015). Cassidy (2015) studied the responses of 435 undergraduate students who first answered a self-efficacy survey and then reported on an academic resilience survey after being exposed to either a personal scenario or a vicarious scenario of an academic setback. Both scenarios were identical except that the vicarious scenario was framed as a scenario that happened to a fictional student, John (Cassidy, 2015). Cassidy (2015) determined that there were significant positive relationships between academic self-efficacy and academic resilience, although the effect size was greater for the students exposed to personal scenarios than to vicarious scenarios.

Cross, Marchland, Medina, Villafuerte, and Rivas-Drake (2018) examined the relationship among student perceptions of parental academic expectations, parent academic socialization messages, and student academic self-efficacy. They studied the responses of 148 Latino students, with ages 13 or14 years old, and their parents. The students responded to surveys on parental academic expectations and academic self-efficacy, while the parents

responded to surveys on academic socialization methods, or the tendency of parents to pressure their children to achieve in school and shame their children if they do not (Cross et al., 2018). Cross et al. (2018) found a significant positive relationship between parental academic expectations and student academic self-efficacy, but also found a significant negative relationship between parental academic socialization messages and student academic self-efficacy. In other words, students whose parents reported greater infliction of shame and pressure directed to their children reported lower academic self-efficacy (Cross et al., 2018).

Theoretical Framework

The construct of self-efficacy is founded on social cognitive theory. Bandura (2002) argued that without self-efficacy, there is little motivation or incentive to persevere in the face of challenging circumstances. Self-efficacy is the belief that the individual has the power to generate desired outcomes through self-regulation of cognitive and affective processes (Bandura, 2002). An individual's self-efficacy influences and is influenced by the social system where the individual interacts; thus, the individual is both the producer and the product of the social system (Bandura, 2002). Bandura (2002) stated that "in everyday social relationships, perceived self-efficacy is not antithetical to communality." Thus, social cognitive theory is an applicable theoretical framework to study perceived self-efficacy in academic settings, where the individual spends much of their life within this setting and both the individual and the academic community collectively maneuver towards positive academic and behavioral outcomes.

Bandura (1989) discussed the link between self-efficacy beliefs and the cognitive process, through which individuals are able to predict the likelihood of events and to influence the components of those events that they have control over. In determining the likelihood of their prediction of the occurrence of an event, individuals:

> draw on their state of knowledge to generate hypothesis about predictive factors, to weight and integrate them into composite rules, to test their judgements against outcome information, and to remember which notions they had tested and how well they had worked (p. 1176).

Social cognitive theorists recognize key environmental influences that change an individual's perception of self-efficacy (Zimmerman, 1989). Firstly, modeling of desired behavior especially if the student observes the behavior from a peer combined with verbal elaboration of the peer was found to be effective in increasing perceived self-efficacy (Zimmerman, 1989; Schunk, 2012). Secondly, the student's willingness to initiate assistance from teachers, peers, or other adults and to access to both linguistic and non-linguistic forms of information, such as diagrams, pictures, and charts were indicative of student academic achievement (Zimmerman, 1989). Lastly, the context of the task and the academic setting can affect student learning (Zimmerman, 1989). Students with high self-efficacy will be more aware of a detrimental learning environment and inappropriately leveled tasks and will draw upon their strategies and behaviors to improve their situation and persist in completing their task.

A major challenge of education is to equip students with the knowledge, skills, strategies, and behaviors that allow students to pursue success beyond the walls of academic institutions (Bandura, 2002). A high sense of self-efficacy supports the student's ability to adapt to rapidly changing technologies and expanding knowledge. with many social and organizational activities mediated by computers and the Internet (Bandura, 2002). Students who have high self-efficacy are able to visualize positive outcomes which will guide positive behaviors while students with low self-efficacy are able to visualize failure and in turn undermine their potential for success (Bandura ,1989). Students who believe in the control that they hold over their learning and

mastery will achieve success in future academic endeavors (Bandura et al., 1996). Educational leaders have an opportunity to influence the school climate in order to create academic environments that improve academic self-efficacy. Academic environments that deliberately employ practices that improve student self-efficacy will affect the students who will, in turn, improve the academic environment itself.

School Climate and Academic Self-Efficacy

Multiple studies have investigated the constructs of school climate and academic student efficacy separately as related to student academic performance, but few have examined the relationship between climate and academic student efficacy. The research conducted by Cheema and Kitsantas (2014) and Hoigaard et al., (2014) examined the relationship that exists between climate and academic self-efficacy in the context of academic achievement.

The relationship between classroom climate, math self-efficacy, and math achievement was investigated by Cheema and Kitsantas (2014). They analyzed the responses of 4,199 ninth, tenth, and eleventh-grade students on an 85-item multiple-choice, close-constructed response, and open-constructed response assessment, 5 questions on student perceptions on disciplinary climate, and 8 questions on student confidence in solving math problems. The predictors of disciplinary classroom climate, enrollment in mathematics courses, math self-efficacy was investigated. Math achievement was based on the student scores on 85-item test measured across a continuum. Math self-efficacy was obtained from 8 questions about the student's confidence in their math skills. Math courses were student-selected from Algebra 1, Geometry, Algebra 2, Pre-Calculus, and Calculus. Disciplinary climate was reported by students from questions that address the classroom management behaviors of the teacher and how conducive the environment is for learning. Additionally, demographic variables (gender, race, socio-economic factor, and

level of math courses enrolled) were included in the study. Cheema and Kitsantas (2014) found that the disciplinary climate in math classrooms was a significant predictor of math achievement. They also found that self-efficacy was the most important predictor of academic achievement. Cheema and Kitsantas (2014) also found a significant interaction effect between disciplinary classroom climate and math self-efficacy in that disciplinary classroom climate improved math achievement in high and medium self-efficacy groups but did not make a different in low self-efficacy groups. Thus, a disciplinary classroom climate does not improve math achievement for all self-efficacy groups.

Hoigaard et al., (2014) investigated the effects of multiple factors, including academic self-efficacy, on academic achievement. Hoigaard et al. (2014) used convenience sampling of Norwegian schools whose principals elected to participate in the study. For this study, the participants were 482 ninth- and tenth-grade students who responded to a questionnaire that addressed organizational citizenship, school-goal orientation, academic self-efficacy, and academic achievement. Hoigaard et al. (2014) defined the variables as follows:

a. School goal orientation scale is defined as the student perceptions of the school's psychological climate and is composed of two subscales (perception of mastery orientation, or the student perception of the school emphasis on learning concepts, and perceived performance orientation, or the student perception of the school emphasis on getting answers right or getting good grades).
b. Organizational citizenship is defined as student behavior in class and is composed of three subscales (helping peers, civic virtue on the student's collective classroom behavior, sportsmanship in tolerating less than ideal classroom conditions without complaint).

c. Academic self-efficacy is defined as the level of confidence of the student if the student was given enough time and exerted enough effort.
d. Academic achievement is described using a self-reported grade point average (Høigaard et al., 2014).

Hoigaard et al. (2014) found positive correlations between student perception of mastery orientation, academic self-efficacy, and academic achievement, and negative correlations between perceived performance orientation, academic self-efficacy, and academic achievement. Additionally, Hoigaard et al. (2014) found that organizational citizenship subscales of helping behavior and civic virtue were positively correlated to academic self-efficacy and academic achievement and sportsmanship was not related to academic self-efficacy and negatively correlated to academic achievement. In analyzing the results of this study, the researchers also determined that academic self-efficacy positively predicted student academic achievement, which implied that academic self-efficacy has an important role in academic achievement. Teachers should consider the learning environment, specifically adopting a mastery orientation, which is known to positively influence academic achievement by increasing academic self-efficacy (Hoigaard et al., 2014).

There is a limited number of studies on the relationship between school climate and academic self-efficacy, and the effects of self-efficacy on the relationship between school environmental factors and academic achievement (Cheema & Kitsantas, 2014; Hoigaard et al., 2014). Cheema and Kitsantas (2014) suggested that more empirical research is needed to confirm such findings and establish connections between these two constructs.

Climate, Culture, and Educational Leadership

Research on effective schools has consistently found that effective schools have effective leadership (Lezotte & Snyder, 2011; Leithwood & Riehl, 2003). Lezotte and Snyder (2011) describes three important domains of effective educational leadership. Firstly, the educational leader should determine and support the mission and vision of the school. Secondly, the educational leader should be adept at managing the disciplinary climate of the school. Thirdly, the educational leader should have the ability to manage the mission and employ the allocation of both material and human resources and by determining the effective use of time (Lezotte & Snyder, 2011).

Leadership is an important component in developing and maintaining school climate (Lewis, Asberry, DeJarnett, & King, 2016). Instructional leaders can either enact change or hinder change (Lewis et al., 2016). Transformational leadership has been used by researchers to explain how leader behavior influences culture formation and consequently, school improvement (Dumay, 2009; Lewis, et al, 2016). Transformational leadership facilitates building culture because of the willingness of transformational leaders to foster closer relationships with subordinates which provides greater opportunities for sharing and clarifying perceptions and interpretations of common experiences and modeling desired thinking and behaviors (Dumay, 2009).

Effective school leaders make building student self-efficacy, the student belief that academic and personal goals can be accomplished with individual effort and self-improvement, an important focus on their campuses (Desravines, Aquino, & Fenton, 2016). Effective principals consistently reinforce the "importance of learning from mistakes, persisting at difficult tasks, and seeking frequent feedback and help in the learning journey" (p115). Effective principals also

consistently reinforce the culture of belief in the potential of the students with the adults in the campus (Desravines et al., 2016). Principals use questions to select staff that best demonstrates this belief during applicant interviews, asking questions that elicit responses which reveal an applicant's willingness to work with difficult students (Desravines et al., 2016). By asking such questions, principals can exclude applicants who are complacent with historical barriers to achievement such as poverty (Desravines et al., 2016).

The National Policy Board for Educational Administration, or NPBEA (2015), released the Professional Standards for Educational Leaders (formerly known as the Interstate School Leaders Licensure Consortium, or ISLLC, Standards in 2008) which contained references within its standards to the role of the educational leader in fostering the school climate. Standards for educational leaders were first published in 1996 and modestly updated in 2008 by the Council of Chief State School Officers (NPBEA, 2015). The 2015 Professional Standards for Educational Leaders, or PSEL, were developed in response to the changing challenges and opportunities of school leaders to provide the most beneficial educational environment for students (NPBEA, 2015).

Standard 1 of the PSEL is focused on the *Mission, Vision, and Core Values*. Specifically, Standard 1.c states that:

> Effective leaders articulate, advocate, and cultivate core values that define the school's culture and stress the imperative of child-centered education; high expectations and student support; equity, inclusiveness, and social justice; openness, caring, and trust; and continuous improvement (p. 9).

Standard 7 of the PSEL is focused on the *Professional Community for Teachers and Staff*. Specifically, Standard 7.c states that:

> Effective leaders establish and sustain a professional culture of engagement and commitment to shared vision, goals, and objectives pertaining to the education of the whole child; high expectations for professional work; ethical and equitable practice; trust and open communication; collaboration, collective efficacy, and continuous individual and organizational learning and improvement (NPBEA, 2015, p. 15).

These particular standards are specific to building school culture, and many of the remaining standards directly or indirectly contribute to establishing a healthy school culture. For example, Standard 7.e states that effective leaders foster "trusting working relationships among leaders, faculty, and staff to promote professional capacity and the improvement of practice" (NPBEA, 2015, p. 15). Faculty perceptions of a school environment where favoritism or unjust practices towards faculty negatively contribute to school climate and may result in teacher ineffectiveness (Lewis et al., 2016; Ozen, 2018).

To support the PSEL, the National Educational Leadership Preparation (NELP) Building-Level Program Standards were designed for the accreditation of educational leadership preparation and credentialing programs. NELP Standards, formerly the Educational Leadership Constituent Council, or ELCC standards, were developed in 2015 by a committee of stakeholder communities to be aligned to the PSEL such that the NELP standards define "the performance expectations for beginning-level building and district leaders…what novice leaders and preparation program graduates should know and be able to do after completing a high-quality educational leadership preparation program" (National Policy Board for Educational Administration, 2018, p. 3). Standard 3 of the NELP Standards, focused on *Equity, Inclusiveness, and Cultural Responsiveness*, asserted that program completers must be able to use data to cultivate a supportive and inclusive school culture, advocate for equitable access to school

resources and opportunities, and to facilitate culturally responsive practices among teachers and staff (NPBEA, 2018).

Chapter 149 of the Texas Administrative Code, or TAC, lists the administrator standards aligned with the "training, appraisal, and professional development of principals" (TEA, 2014). Standard 4 is focused on School Culture and addressed the responsibility of principals in building a shared vision and fostering a culture of high expectations for students and staff (TEA, 2014). Standard 4 describes schools with effective culture leaders as follows.

> In schools with effective culture leaders, staff believe in and are inspired by the school vision and have high expectations for all students. Staff take responsibility for communicating the vision in their classrooms and for implementing behavioral expectations throughout the building, not only in their own classrooms. Teachers regularly communicate with the families of their students to provide updates on progress and actively work with families to support learning at home. Members of the broader community regularly engage with the school community (TEA, 2014).

Prospective campus principals and assistant principals are required to undergo a principal preparation program, pass a principal certification exam, and submit artifacts (TEA, 2019). Like the NESL, Chapter 241 of the TAC declared the standards required for the principal certificate that must be used by a principal preparation program to obtain the standard principal certification (TEA,2019). These standards, adopted in 2016, were used to design the principal certification assessment (TEA,2019). The first domain of the principal certification assessment is *School Culture*; the first competency under Domain 1 stated that "The entry-level principal knows how to establish and implement a shared vision and culture of high expectations for all stakeholders (students, staff, parents, and community)" (p. 10). Under Competency 1, TEA (2019) included

the following most critical responsibilities for an entry-level principal, in the context of building a campus culture characterized by high expectations and with the ability to accomplish identified campus goals.

a. Creates a positive, collaborative, and collegial campus culture that sets high expectations and facilitates the implementation and achievement of campus initiatives and goals.
b. Establishes and communicates consistent expectations for all stakeholders, providing supportive feedback to promote a positive campus environment.
c. Implements effective strategies to systematically gather input from all campus stakeholders, supporting innovative thinking and an inclusive culture.
d. Creates an atmosphere of safety that encourages the social, emotional, and physical well-being of staff and students (p. 10).

The second competency in Domain 1 described how the entry-level principal partners with stakeholders in supporting student learning with the following most critical responsibilities (TEA, 2019).

a. Uses consensus-building, conflict-management, communication, and information-gathering strategies to involve various stakeholders in planning processes that enable the collaborative development of a shared campus vision and mission focused on teaching and learning.
b. Ensures that parents and other members of the community are an integral part of the campus culture (p. 11).

An additional requirement to obtain the Texas Principal Certification and demonstrate the potential of a principal candidate to improve school culture is the Performance Assessment for

School Leadership (PASL), an assessment test that is aligned to the PSEL and NELP. The PASL is an assessment that consists of artifacts, required documents, written commentary, and a video of the candidate facilitating a collaborative team (Educational Testing Service, 2019). The last requirement, the video and narrative of the candidate's efforts to improve school culture, specifically asks the principal candidate to execute the following process:

a. Identify the collaborative team.
b. Develop a plan to improve instruction, student learning, and school culture.
c. Implement the plan to improve instruction, student learning, and school culture.
d. Reflect on the collaborative team and school culture (ETS, 2019).

School culture and climate are important components of the rhetoric of school improvement both in the national and statewide educational arenas. National and state agencies require principals to focus on establishing school culture and climate by integrating research-based practices within the campus leadership standards and certification requirements that promote positive culture and climate (NPBEA, 2015, 2018; TEA, 2014, 2019). National and state standards promote a transformational leadership style, with less importance in eliciting cooperation and more importance on collaboration amongst stakeholders and building capacity in subordinates to address the ever-changing challenges that face principals today.

External Pressures

District, state, and federal mandates and community issues affect school climate (Cohen et al., 2009). Overall patterns in the last decades show increasing state authority over local school policies (Cohen et al., 2009). Policymakers have a demonstrated a half-hearted interest in school improvement through school climate, despite educational research showing that understanding school climate will contribute to the understanding of and prediction of student behavior and

outcomes (Anderson, 1982). State and federal policies use accountability metrics to label schools instead of students or student groups as "failing," thus recognizing that improvements must be made school-wide (Cohen et al., 2009). These school accountability measures force schools to make decisions on how to support the students or student groups that are most at-risk (Cohen et al., 2009).

In a review of educational policy in thirty-six states, Cohen et al. (2007) found that only six states partially included climate policy in their school improvement and accreditation systems, and 22 states relegated school climate within a health, special education, or safety context. State response to low student academic achievement largely ignores school climate improvements and instead focus on increased assessment, teacher training in math and literacy, and increased academic resources (Cohen et al., 2009). Educational policy practice is based on what is state and federal accountability metrics which are predominantly math and reading achievement, and due to recent events, school safety (Cohen et al., 2009). Instead, school climate programs find a place in health, special education, and safety fields which has been incorporated into school improvement efforts (Cohen et al., 2009). School climate research need to be bolstered by assessing all if not most of the factors that contribute to school climate, and including the three major stakeholders: students, parents, and school staff in school improvement efforts through school climate (Cohen et al., 2009).

As ESSA (2015) requires each state educational agency to hold schools accountable for "at least one indicator of school quality or student success" (ESSA, P.L. 114-95), districts like Border ISD respond beyond the metrics of student performance, attendance, and graduation rates by routinely collecting school climate data from multiple stakeholders. In the redesigned principal certification, TEA (2019) placed an increased emphasis on school culture comprising

22% of the principal certification test. On the other end, schools that do not meet accountability metrics are provided targeted support using the Effective Schools Framework, or ESF, for school improvement through technical assistance providers such as local regional service centers and private technical assistance providers. One of the five components of the ESF thought to leverage powerful learning and teaching is positive school culture. State-designated technical assistance providers require districts of struggling schools to provide systems to monitor school culture data, including campus climate, by administering "regular campus climate surveys assess and measure progress on student and staff experiences" (TEA, 2018, p. 4). Results from campus climate surveys are used to design school improvement plans to meet or exceed accountability requirements.

School Climate and Stakeholders

Because individual perceptions make up the collective perception of school climate, schools will often assess how stakeholders feel about their school (Loukas, 2007). The perceptions of students, teachers, and staff regarding their school climate reveal the attitudes, behaviors, and the perceived group norms of each individual (Loukas, 2007). Stakeholder testimonies suggest that changing a school's culture is the first step towards sustainable change (MacNeil et al., 2009). Stakeholders who affect and are affected by the local school climate include students, teachers, school staff, administration, parents, and the immediate community members who surround the school.

School climate primarily influences student outcomes. Students benefit from a positive school climate because school climate plays a protective role against negative student outcomes. A common outcome measured against perceptions of school climate is student achievement, through standardized test scores (MacNeil et al., 2009) Positive school climate has been

associated with a variety of positive outcomes beyond student academic achievement such as child development, risk prevention, student health, student learning, graduation rates, and teacher retention (Thapa et al., 2013).

A positive school climate may counteract the negative effects of student behavioral and emotional problems and is more valuable for students who are at-risk for negative behaviors (Loukas, 2007). Students with behavioral problems, such as tendencies towards confrontation, academic dishonesty, or negative responses toward authority figures, may be mitigated by a positive school climate (Loukas, 2007). Students with emotional problems are more difficult to observe but include depression and anxiety brought about by feelings of sadness, hopelessness, loneliness, or worthlessness (Loukas, 2007).

School climate also affects teacher retention (Cohen et al., 2009; Thapa et al., 2013). Teacher perceptions of injustice from administrators and lack of opportunities for collaboration and involvement contributed to a negative school climate (Ozen, 2018). School leadership is second only to teachers in influencing school climate and determining the expectations of behavior in schools (Cohen et al., 2009). School leaders who used school climate surveys in designing school improvement plans realized positive school improvement change (Cohen et al., 2009). However, the efforts of principals who strive to improve school climate can be stymied by the teachers and staff depending on the principal's administrative style (Ozen, 2018). On the other hand, ineffective school leaders do not contribute to a school's progress and instead undermines school from accomplishing their goals (Amanchukwu et al., 2015).

Trusting relationships in schools, especially between parents and teachers, communicate a shared commitment to student achievement (Hoy et al., 2002). Undue influence by a few outspoken parents or groups diminish teacher trust between parents and colleagues and

negatively affect school climate (Hoy et al., 2002). Often, it is up to the principal to pursue positive interactions and negotiate negative interactions to establish productive relationships among stakeholders (Leithwood & Riehl, 2003).

School climate reflects the various aspects of student, school staff, and parent experiences of school life (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013) and is "the total environmental quality within a given school building" (Anderson, 1982, p 369). School climate refers to the quality and character of school life (Cavrini, Chianes, Bocchi, & Dozza, 2015; Cohen et al., 2009). School climate is grounded on the common experiences of individuals in a school, representing the "norms, goals, values, interpersonal relationships, teaching and learning practices and organizational structures" (Cohen et al., 2009, p. 182). Yet, school climate goes beyond the individual experience; it is a collective phenomenon that encompasses one individual's experience (Cohen et al., 2009). Each stakeholder collectively contributes to the social, emotional, and physical safety of the students as well as the operation of the school and the care of the environment (Cohen et al., 2009). Students, parents, faculty, support staff, and administrators contribute towards a cohesive school vision and their interactions with students and with each other will affect the overall climate of a school (Cohen et al., 2009).

Chapter Summary

Each research study on school climate attempts to standardize constructs to compare school climate across students, classrooms, schools, districts, regions, and states. State and federal mandates hint at a growing awareness of school climate affecting school outcomes but timidly approach school climate improvement as part of school improvement efforts. It is not a lack of raw data that prevents responsive school climate improvement but the opposite. There is an inordinate amount of data present in local, national, and global contexts. School climate

instruments do not always encompass student academic self-efficacy. If both constructs are highly associated with student academic achievement, then both can be utilized for their potential to improve the state of schools. This study hopes to contribute to the limited body of knowledge on the relationship between school climate and student academic self-efficacy. The results of this research may have implications for school improvement, educational leadership, teacher preparation, and school-community relations.

School climate and self-efficacy are both associated with academic and behavioral outcomes. School climate is defined as "the quality and character of school life" (Cohen et al., 2009; Cohen, 2014; Zullig, et. al, 2010; Cornell et al., 2016; Rudasill et al., 2018). In contrast, self-efficacy is an individual belief that determines behavior and influences outcomes (Bandura et al., 1996). Researchers have largely focused on school climate and academic achievement, school climate and behavioral outcomes, school climate and school effectiveness, and academic self-efficacy and academic achievement. However, there is limited research on the relationship between school climate and academic self-efficacy and on which factors of school climate are most important in student academic self-efficacy. The goal of this study was to investigate which student-perceived school climate factors best predict self-reported student academic self-efficacy. An overview of the quantitative approach that will be employed on the empirical secondary data set is provided in Chapter 3.

Chapter 3: Methodology

Prior chapters introduced the proposed area of research and provided the problem statement, purpose, research questions, and significance of the problem that will help guide data analysis. A review of relevant literature related to the study was also included. The purpose of this chapter is to introduce the research methodology for this quantitative study regarding which factors of school climate best predict student academic self-efficacy. The research plan, study participants, procedures, as well as the pilot study that defined the factors of school climate in this study are also primary components of this chapter.

Research Design

The proposed study employed a prediction research design. A prediction research design anticipates outcomes by using a set of variables as predictors of a specific outcome (Creswell, 2012). This study utilized empirical secondary data about self-reported student academic self-efficacy as the outcome variable and student perceptions of school climate factors. These factors were connectedness, classroom environment, and safety and belongingness. The factors of school climate were derived from the composite of responses to items that emerged from a factor analysis conducted in a pilot study, which will be discussed later in this chapter.

The research questions that help drive this study were the following.

Research Question 1: How do the identified school climate factors contribute to the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 2: Which combination of school climate factors provide the strongest explanation of the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 3: Do relationships exist between the identified outcome and predictor variables (academic self-efficacy and school climate factors) and the factors of grade level, campus performance, and neighborhood affluence of secondary students?

In addition to investigating the research questions and due to the nature of the secondary data set used in this study, this study provided psychometric information about the school climate survey instrument, including instrument validity and reliability analyses and interpretations. Thus, an exploratory factor analysis was conducted on the secondary data set to determine the meaningful subscales in the data set and to verify if the subscales are identical to those that emerged from the factor analysis conducted in the aforementioned pilot study.

Population and Sample

Border Independent School District is a large, urban, public school district situated by the border of the United States and Mexico that served over 46,000 students from pre-Kindergarten to 12th grade during the 2018-2019 academic school year. At the time of the study, the Border ISD student population was characterized as 71.4% economically disadvantaged, 92.4% Hispanic, with 21.5% of the students designated English Learners (ELs). The target population for this study is the 6th to 12th-grade students in the six K-8 combination schools, nine middle schools, and seven high school campuses, comprised of approximately 25,000 students enrolled in a total of 22 campuses. High schools will provide ninth to twelfth-grade student responses, and middle schools and K-8 combo schools will provide sixth to eighth-grade responses. Border ISD has two additional non-traditional 9th to 12th-grade campuses, a credit recovery high school and an alternative high school, which will be excluded from the study because of the transient nature of their student population. Approximately 20,000 sixth to twelfth grade students who participated in the locally developed school climate survey will comprise the sample for this

study, which represents about an 80% response rate. The approximate number of participants meet the required sample size of $N \geq 104 + m$, where m is the number of independent variables (Tabachnick & Fidell, 2013), or $N \geq 107$. Based on this estimation, the study sample exceeds this minimum requirement.

This research investigated school climate predictors, including connectedness, classroom environment, and safety and belongingness, that are evident in the direct interaction of the student with the school environment and collectively contribute to perceived school climate. The outcome variable, self-reported academic self-efficacy, is a student belief that may be influenced by the environment but also influences student outcomes (Bandura, 2002) and while research has shown that academic self-efficacy is a stronger predictor of academic achievement than other presumed factors (Lent et al., 1984; Pajares & Miller, 1994), academic performance data for each participant was not available in this data set due to the common practice of administering anonymous climate surveys. The data set in this study was used with permission, and upon the condition that the district not be identified. Thus, the pseudonym Border Independent School District was used for all references to the district in this study.

Ethical Considerations

There is little to no risk involved for the participants because there was no identifying information collected from the participants other than their grade level, school name, and an assigned participant number. The district assigned a participant number but did not provide the student names that correspond to each participant. The online climate survey administered to the students also contained a "Comments" field, and in order to avoid any specific information that may inadvertently identify the participants, the researcher requested that the district omit any participant comments before providing the data set through an open records request. Prior to

analysis, the original data set was processed to removed school identifiers by replacing school names with an assigned number, which was later replaced by categories. For example, with respect to grade level, the participants were categorized as either grade 9-12 or grade 6-8.

Instrument

The instrument in the study is the Border Independent School District Secondary Student School Climate Survey, or BISD-SSSCS, was locally developed by Border ISD leadership and administered to students, parents, and staff during the spring semester of 2019, a practice conducted by the district every two years. The school climate survey, like the staff and parent climate survey, was administered in both English and Spanish and was made available online. Although parent and staff climate surveys were also administered, the students are the primary stakeholders who are directly affected by school climate and by whose outcomes schools are deemed effective. Additionally, the administration of the student climate survey was supervised by classroom teachers using only school computers and completed within a one-month window for high school students and within a two-week window for middle school students.

According to a former Border ISD superintendent, Border ISD has been routinely conducting school climate surveys since in the late 1990s, when district leadership were determined to establish Border ISD as a learning organization and were inspired by the work of John Goodlad, author of "A Place Called School," and the research of Ronald Edmonds and Lawrence Lezotte on the Correlates of Effective Schools. Their first climate survey commissioned by district leaders was a staff survey designed, administered, and analyzed with the assistance of an independent consultant for the purpose of informing district and campus leadership on areas of strength and improvement. District leadership expanded their study of

school climate by initiating a staff, student, and parent school climate survey guided by district advisory committees.

According to the Border ISD Chief Technology Officer, a key participant in the development and implementation of the current Border ISD School Climate Survey, the questions in the current survey were developed by the current Border ISD superintendent with feedback from all district cabinet members. The Border ISD cabinet members consisted of five assistant superintendents and six chief division officers. The feedback on the survey instrument was gathered through weekly cabinet meetings. The driving circumstances for developing a climate survey was to reach out to stakeholders and gather honest and timely feedback on their thoughts on how to improve service to the school communities, thus, data was gathered from the community of students, staff, and parents. The development of the climate survey that would be used in this study began in 2012 and took approximately 3 months to complete, and through much discussion among the Border ISD superintendent and the district cabinet members, a two-year cycle of data collection was deemed the most beneficial data collection cycle for the district and its stakeholders.

Border ISD identified the following five goals of the BISD-SSSCS for the 2018-2019 academic school year.

1. Provide Border ISD and schools with data on student, staff, and parent perceptions of school safety, order, engagement, and climate that will help them measure progress and impact on efforts to build a positive and respectful school culture.
2. Provide Border ISD and school with data on students' social and emotional competencies to help counselors meet the needs of our students.

3. Provide Border ISD and schools with data on parent, student, and staff perceptions of home and school relationships, parent satisfaction, support for academics, and response to informational needs of families.
4. Provide Border ISD and schools with useful resources to help them review climate data and develop strategies and plans to improve school climate based on their data.
5. Provide Border ISD and schools with data on parent, student, and staff perceptions on safety and order that will serve as a comparison to a district-adopted bullying prevention survey.

The BISD-SSSCS instrument administered online in both English and Spanish to the students consisted of two sections as shown in Appendix A. The first section asked the participants to identify their campus and grade level. The next five sections asked the participants to respond to 40 questions about their school, teachers, readiness for the real world, what their classroom work is like, and the type of academic activities they liked best. Participants responded to statements along a 5-point scale with 1 = strongly disagree, 2 = disagree, 3 = not applicable, 4 = agree, and 5 = strongly agree. Although these responses are categorical in nature and lack a precise metric, common practice is that these responses be analyzed as numerical data. As stated previously, "not applicable" was assigned a value of 3, which may be problematic for participants who respond "not applicable" in all survey items. Participants who demonstrate this response pattern will be removed from the data set, along with outliers. The climate survey was designed by the district to require a response to all questions thus no missing values are expected.

For students in grades 9-12, the BISD-SSSCS was completed online in school computers throughout the month of February 2019. For students in grades 6-8, the survey was also

completed online in school computers during the first two weeks of February 2019. Parent and campus employee surveys were also administered online in both English and Spanish. Although a staff and parent survey were also administered, this study was focused on the student as the unit of analysis. The quality of adult efforts in providing a positive school climate is best demonstrated by student outcomes. State and federal metrics imposed on schools are based on student performance, which research has shown is linked to school climate.

A comparison between BISD-SSSCS and publicly available school climate surveys administered in the United States yielded some similarities in the items and language used by Border ISD and the California School Climate, Health, and Learning Surveys, or Cal-SCHLS, specifically the High School Student Core Survey (Voight and Hanson, 2012). Some items were similar, such as, "I feel like I belong at this school" or "I feel like I am a part of this school" (California Department of Education, 2019, p. 5) and "My teachers expect students to do their best" or "At my school, there is a teacher or some other adult who always wants me to do my best" (p. 6). However, the most notable difference between these two surveys was that in the Border ISD School Climate Survey there was limited demographic information requested from the student participants whereas, in the Cal-SCHLS High School Student Core Survey, the items required responses on gender and sexual orientation, race and ethnicity, home environment, highest level of parental education, military parental employment, participation in free or reduced lunch program, home language, participation in afterschool programs, grades, attendance (CDE, 2019). The Cal-SCHLS High School Student Core Survey also included questions on use and availability of substances, such as cigarettes, vape products, alcohol, and marijuana, driving under the influence, student experiences of school violence, peer harassment, bullying, depression, suicidal ideation, and sleep deprivation (CDE, 2019). The student survey

was administered during the fall of 2019, and eventually in the spring of 2020 by the California Department of Education, or CDE (2019), and may have been modified according to statewide goals of the CDE.

Pilot Study

In order to assess the validity and reliability of the BISD-SSSCS, an exploratory factor analysis was conducted on a representative sample of the data set. The sample represented the responses of students in ninth to twelfth grade in one of the representative campuses from the target population. Participants who responded "not applicable" to all questions or self-reported as grade levels other than ninth through twelfth grade were considered ineligible for analysis and removed from the data set. Multivariate outliers were also removed from the data set. No missing values were detected. After removing outliers and ineligible cases, the total number of cases for participating students was 1,714. A Kaiser-Meyer-Olin (KMO) measure of sampling adequacy test on the data set generated a value 0.960, greater than 0.7 indicating that it is an appropriate sample size for conducting a factor analysis. Bartlett's test of sphericity is significant (alpha < 0.05) thus the correlation matrix of the data set can be inverted, and the assumption of sphericity is met (Field, 2018).

Using IBM SPSS, principal axis factoring using oblique rotation (promax) techniques was conducted. Non-loading and cross-loading items were systematically removed. Principal axis factoring generated five (5) subscales that were labeled as connectedness, classroom environment, academic self-efficacy, safety and belongingness, and academic rigor. Although there were five subscales that emerged from the exploratory factor analysis, there were only two items that represented the subscale of academic rigor. The decision to remove the two items ("The work at this school is challenging" and "I feel challenged at this school") was because

these items appeared redundant. The remaining subscales were academic self-efficacy and the three school climate factors, connectedness, classroom environment.

Table 3.1

Pilot Study Results of Exploratory Factor Analysis

Items	Loadings	α
Connectedness		0.900
My teachers care about me.	0.763	
My teachers have confidence in me.	0.762	
I am treated with respect by teachers.	0.743	
My teachers are excited by the subject they teach.	0.659	
My teachers expect students to do their best.	0.655	
My teachers challenge me to do better.	0.647	
My teachers make learning fun. [a]	0.612	
Teachers encourage me to assess the quality of my own work.	0.608	
I am treated with respect by school administrators.	0.529	
My teachers set high standards for achievement in their classes.	0.508	
Classroom environment		0.783
In my classes, time is spent in whole class discussion.	0.690	
In my classes, time is spent working in small groups.	0.654	
In my classes, time is spent working on projects or research.	0.605	
In my classes, time is spent doing work I find meaningful.	0.600	
I work well when I am working in a small group.	0.412	
I work well when the teacher is leading a discussion with the whole class	0.390	
I work well when I am working on projects or research.	0.335	
Academic self-efficacy		0.729
I am ready for the real world in reference to my ability to read.	0.765	
I am ready for the real world in reference to my ability to write.	0.697	

I am ready for the real world in reference to my ability to present information.	0.664	
I am ready for the real world in reference to my technology skills.	0.469	
I work well when I am working by myself.	0.366	
I am ready for the real world in reference to my ability with mathematics.	0.343	
Safety and belongingness		0.781
I feel like I belong at this school.	0.704	
I feel safe at this school.	0.590	
I think this is a good school. [b]	0.475	
I am treated with respect by other students at this school.	0.442	
I feel successful at school.	0.310	

Notes: [a] Item was cross loaded at 0.324 with Factor 2: Classroom Environment. [b] Item was cross loaded at 0.329 with Factor 1: Connectedness.

N = 1714

Data Collection

Border Independent School District provided the secondary data set collected to provide feedback to campuses on school climate for the school year 2018-2019. The data set contains the anonymous responses of approximately 20,000 secondary students to 40 items related to school climate as well as the students' self-reported campus and grade level. For the secondary student sample, Border ISD had a response rate of 80% when compared to the population during the school year 2018-2019 of approximately 25,000 secondary students enrolled. Border ISD's Research and Evaluation, and Technology Services, Human Resources Departments granted access to the data set through an open records request, thus a sampling technique was not needed.

Procedure

A standard multiple regression was performed between student academic self-efficacy as the outcome variable and school climate factors, which are connectedness, classroom environment, and safety and belongingness, as the independent variables. Multiple regression can be used, firstly, to determine the strength of the relationship between the outcome variable and the independent variables, and secondly, to identify which independent variables are important in the equation and which are not (Tabachnick & Fidell, 2013). However, to ensure that all meaningful factors are included in the multiple regression analysis, an exploratory factor analysis was conducted on the secondary data set using the same procedures in the aforementioned pilot study.

Multiple Regression

As previously discussed, a multiple regression analysis was applied to academic self-efficacy (Y'_i) as the outcome variable and school climate factors, which included connectedness (X_1), classroom environment (X_2), and safety and belongingness (X_3) as the independent variables. The prediction equation for the independent variables of school climate factors to compare to the outcome variable of student academic self-efficacy is shown below.

$$Y'_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \qquad (3.1)$$

where β_0 = Constant or intercept, β_1 = Standardized coefficient for X_1, β_2 = Standardized coefficient for X_2, β_3 = Standardized coefficient for X_3, β_4 = Standardized coefficient for X_4, and ε = random error.

Routine data screening will be conducted before analysis (Tabachnick & Fidell, 2013). Values for each subscale will be transformed into composites of the items, reported as sums for this study (Field, 2018). Tests for assumptions of normality, linearity, homoscedasticity of

residuals and independence of errors and tests for multicollinearity and singularity were conducted as routine in multiple regression analyses (Tabachnick & Fidell, 2013). Results from the multiple regression using IBM SPSS were analyzed to address the following research questions.

Research Question 1: How do the identified school climate factors contribute to the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 2: Which combination of school climate factors provide the strongest explanation of the amount of variance observed in self-reported academic self-efficacy in secondary students?

Data Screening

Tabachnick and Fidell (2013) discussed the following data screening practices before conducting a standard multiple regression.

Ratio of Cases to IVs. In order to determine the desired number of cases to conduct a multiple regression, Tabachnick and Fidell (2013) provided two equations to use and recommended using both and selecting the solution with the greater number. The first and simpler equation is $N \geq 50 + 8m$, where N is the number of cases and m is the number of predictors. In this study, there are three predictors, thus $N = 74$ is the minimum number of cases required when using the equation above. The second equation assumes a medium effect size between the independent variables and the dependent variable. The second equation is $N \geq 104 + m$ for testing individual predictors. Thus, $N = 107$ is the minimum number of cases required when utilizing the second equation. Using the larger solution of the two, the approximate sample size exceeds this requirement.

Outliers, Missing Values, and Other Practical Issues. Outliers can affect the generalizability of the regression solution; hence, outliers should be remedied before a regression run by either deleting or rescoring or by transforming the variable with the outliers (Tabachnick & Fidell, 2013). An initial screening using IBM SPSS ANALYZE→ FREQUENCIES output along with examining boxplots using IBM SPSS GRAPHS→CHART BUILDER will allow for the detection of univariate outliers. A secondary screening for univariate outliers will be conducted using z-scores obtained using IBM SPSS ANALYZE→DESCRIPTIVES and inspecting for z-score values greater than 3.29. However, because this study has a very large N, a few z-scores greater than 3.29 is expected (Tabachnick & Fidell, 2013). The identified univariate outliers were removed from the data set.

Multivariate outliers were revealed by using the Mahalanobis distance. Mahalanobis distance is "the distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables" (Tabachnick & Fidell, 2013, p. 74). This means that in a multivariate space, a multivariate outlier is a case that is far removed, and thus has a greater Mahalanobis distance, from the centroid compared to all other cases. The criterion for multivariate outliers is the Mahalanobis distance at $p < 0.001$ with degrees of freedom equal to the number of variables, which in this study is four. Using the value obtained from Table of Critical Values of Chi-Square (p. 952), any case with a Mahalanobis distance greater than 18.467 was identified as multivariate outlier and consequently removed from the data set.

Due to the design of the online school climate survey provided to the students, there are no expected missing values. There were cases where students responded with a "not applicable" to some questions. The response of "not applicable" was replaced with a numerical value of 3 as

indicated in the assumptions, limitations, and delimitations section in Chapter 1. There were also cases where students responded with "not applicable" to all questions and was removed before inspection for outliers, with the assumption that the student who answered "not applicable" to all of the questions was not the target respondent in this survey. Once univariate and multivariate outliers have been resolved and problematic cases have been removed, the composites for each variable was obtained by calculating the sum of the responses for each subscale that was identified in the previously conducted exploratory factor analysis, as shown in Table 3.1. IBM SPSS TRANSFORM→COMPUTE VARIABLE was used to create the composite value for each of the subscales which are the three independent school climate variables, including connectedness, classroom environment, and safety and belongingness, and the dependent variable, self-reported academic self-efficacy. The use of a composite variable is a common practice to control Type 1 error rate, resolve multicollinearity, and provide meaning to multiple related variables (Song, Lin, Ward, & Fine, 2013).

Tests of Assumptions

The assumptions of normality, linearity, and homoscedasticity underlie the standard multiple regression test. The assumption of normality was tested for very large N as in the case of this study by examining kurtosis and skewness. IBM SPSS ANALYZE →FREQUENCIES will provide the values for kurtosis and skewness and, if specified, allows for the inspection of histograms with the normal curve superimposed to determine normality (Tabachnick & Fidell, 2013). The assumption of linearity was tested by assessing bivariate scatterplots and superimposing a trend line for all possible pairs. Bivariate scatterplots are generated using IBM SPSS GRAPHS→CHART BUILDER and selecting Simple Scatter with Fit Line under Scatter/Dot which can be found in Gallery. The assumption of homoscedasticity of residuals

was similarly tested by inspection of bivariate scatterplots of residuals generated using IBM SPSS ANALYZE→REGRESSION→LINEAR and assigning *ZRESID for Y and *ZPRED for X and selecting Normal Probability Plots in Plots. Bivariate scatter plots that exhibit homoscedasticity should be of roughly the same width across with some bulging in the middle of the graph (Tabachnick & Fidell, 2013).

The assumption of independence of errors was also tested through residuals analysis using the Durbin-Watson statistic (Tabachnick & Fidell, 2013). A Durbin-Watson statistic can have a value of 0-4, with a value of 2 indicating independence of errors (Field, 2018). Field (2018) recommends an acceptable range of greater than 1 and less than 3 for the Durbin-Watson statistic. The Durbin-Watson statistic is obtained as part of the regression run from IBM SPSS ANALYZE→REGRESSION→ LINEAR by selecting Durbin-Watson from the Statistics option.

Multicollinearity and singularity occur when variables are highly correlated. When multicollinearities and singularities are detected, this means that these variables are not needed in the analysis since these variables contribute the same information to the analysis (Tabachnick & Fidell, 2013). Multicollinearity was assessed by the use of the Variance Inflation Factor (VIF) values obtained within the linear regression output. VIF values below 10 are acceptable and indicate that the assumption of the absence of multicollinearity was met. The assumption of independence of errors was tested using the Durbin-Watson statistic to determine whether the statistic was within the acceptable range of greater than 1 and less than 3 (Field, 2018).

Standard Multiple Regression

Multiple regression was the statistical test selected to address Research Questions 1 and 2 due to the nature of the data set and the goals of this study. While there are a few other tests that can relate variables, only multiple regression can test two or more independent variables

(Creswell, 2012). A standard multiple regression, also known as forced or simultaneous multiple regression, is a type of regression where all predictors are entered into the model simultaneously (Field, 2018). Unlike hierarchal and stepwise multiple regression, a standard multiple regression does not enter the predictors in a certain order. The order of entry in hierarchal multiple regression by the researcher is based on previous research, however, random variations on data sets make obtaining the same results less likely on other data sets (Field, 2018). A standard multiple regression was used to address Research Question 1. Stepwise multiple regression uses mathematical criterion to retain predictors that improve the fit of the model by assessing the fit of a predictor based on the fit of the other predictors (Field, 2018). Stepwise regression was used to address Research Question 2.

A standard multiple regression is generated using IBM SPSS ANALYZE → REGRESSION → LINEAR. The composite values for the school climate factors were entered as independent variables in a single block and the composite values for student academic efficacy are entered as dependent variables. A stepwise regression is similarly achieved, but instead of forcing all predictors into the regression equation simultaneously, predictors were entered sequentially. The path representation of the standard multiple regression for the identified independent and dependent variables is shown in Figure 3.1 below.

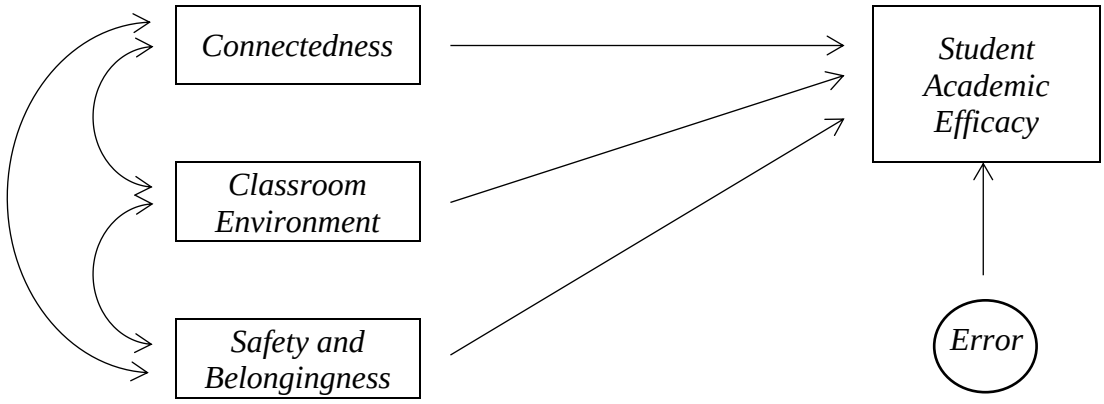

Figure 3.1 *Path Representation of the Proposed Standard Multiple Regression of Academic Self-Efficacy and the School Climate Factors*

Multivariate Analysis of Variance

A multivariate analysis of variance (MANOVA) is an appropriate analysis for situations where there are multiple dependent variables and one or more categorical independent variables (Tabachnick & Fidell, 2013). The dependent variables in this analysis were academic self-efficacy and school climate factors, including connectedness, classroom environment, and safety and belongingness. The independent variables in this analysis are the categorical variables of grade level, campus performance, and neighborhood affluence. The independent variables will be categorized as shown in Table 3.2 below. These data for each of these categories were dichotomized to ensure that the case sizes are as similar as possible.

Table 3.2

Independent Variable Descriptors for 2 X 2 X 2 MANOVA

Factors	Level	
Grade Level	1	High School
	2	Middle School
Campus Performance	1	High Campus Performance
	2	Low Campus Performance
Neighborhood Affluence	1	More Affluent Neighborhood
	2	Less Affluent Neighborhood

Data Screening. Prior to analysis, the following considerations were examined to ensure that the MANOVA can be conducted. Tabachnick and Fidell (2013) discussed the following data screening practices before conducting a MANOVA.

Sample Sizes, Power, and Outliers. In a MANOVA, Tabachnick and Fidell (2013) stressed the importance of having more cases than dependent variables in every cell to ensure that the assumption of homogeneity of variance-covariance can be tested. Also, when the number of cases in each cell is less than the number of dependent variables, the statistical power is lowered . This result may produce a non-significant multivariate F, but several significant univariate Fs. To ensure that the cases per category approaches as similar case sizes as possible, coding for each level will be designated after examining the full data set. MANOVA is also highly sensitive to outliers. Tabachnick and Fidell (2013) recommends testing for both univariate and multivariate outliers for each level of each independent variable. Testing for univariate and

multivariate outliers can be done as described in the previous analysis after employing Split File in IBM SPSS to test the cases in each level of each independent variable.

Tests of Assumptions. The assumptions of multivariate normality, homogeneity of variance-covariance matrices, linearity, and the absence of multicollinearity and singularity underlie the MANOVA test. As previously indicated, the assumption of multivariate normality can be tested for very large N as in the case of this study by examining kurtosis and skewness. IBM SPSS ANALYZE →FREQUENCIES will provide the values for kurtosis and skewness and, if specified, allows for the inspection of histograms with the normal curve superimposed to determine normality (Tabachnick & Fidell, 2013). The assumption of linearity can be tested by assessing bivariate scatterplots and superimposing a trend line for all possible pairs. Bivariate scatterplots are generated using IBM SPSS GRAPHS→CHART BUILDER.

Multicollinearity and singularity were tested using of the Variance Inflation Factor (VIF) values obtained within the linear regression output. VIF values below 10 are acceptable and indicate that the assumption of the absence of multicollinearity was met. The decision to transform composite values of subscales or to conduct additional statistical tests to remedy other unforeseen issues was made based on the outcomes of the tests of assumptions.

MANOVA. Results from the MANOVA using IBM SPSS ANALYZE→GENERAL LINEAR MODEL→MULTIVARIATE was analyzed to address the research question below.

Research Question 3: Do relationships exist between the identified outcome and predictor variables (academic self-efficacy and school climate factors) and the factors of grade level, campus performance, and neighborhood affluence of secondary students?

The outcome and predictor variables were entered as dependent variables and grade level, campus performance, and neighborhood affluence were entered as independent variables, Results were analyzed for significance.

Chapter Summary

Although there is extensive separate research in school climate and student academic self-efficacy, there is limited research that studies these two constructs together. The results of this research may have implications for change efforts through leadership behaviors, campus improvement strategies, and professional development. The goal of this chapter was to outline the research methodology to this study's research questions. This chapter provided a discussion of the sample, instrumentation, data collection, and statistical procedures in this study. The pilot study that defined the school climate factors of connectedness, classroom environment, and safety and belongingness that were investigated in this study was also discussed. Participants contributed to this study by sharing their perceptions on school climate and student academic self-efficacy. The goal of Chapter 4 will be to provide the results of this study using the methodology described in this chapter.

Chapter 4: Results

The purpose of this study was to better understand the role of the factors of school climate on academic self-efficacy. Hoigaard et al. (2015) studied academic self-efficacy as an outcome predicted by a school's psychological climate qualities. Hoigaard et al. (2015) found that the distal quality of perceived ability goal structure and the proximal quality of sportsmanship inversely predicted academic self-efficacy while the proximal quality of civic virtue positively predicted academic self-efficacy. However, few studies have been conducted to further examine the relationship between school climate and academic self-efficacy. The focus of this study is to determine which school climate factors, including connectedness, classroom environment, safety and belongingness, along with an added factor, academic optimism, best predict academic self-efficacy. In order to address to these questions, a secondary data set consisting of about 20,000 secondary student responses on the Border Independent School District School Climate Survey for Secondary Student (BISD-SCSSS) was analyzed using a quantitative research methodology.

The research questions that help drive this study were the following.

Research Question 1: How do the identified school climate factors contribute to the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 2: Which combination of school climate factors provide the strongest explanation of the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 3: Do relationships exist between the identified outcome and predictor variables (academic self-efficacy and school climate factors) and the factors of grade level, campus performance, and neighborhood affluence of secondary students?

To effectively answer these research questions, a quantitative research methodology was employed in the study to make predictions and measure relationships. This chapter is organized into five sections. The first section describes the participants of the study and the initial data screening process. In the second section, an exploratory factor analysis was conducted to identify the items that comprise the subscales of school climate and academic self-efficacy. In the third section, a weighted least squares regression was used to determine how each factor of school climate contribute to the amount of variance observed on self-reported academic self-efficacy. In the fourth section, a weighted least squares regression was used to determine which combination of school climate factors exhibits the strongest explanation to the amount of variance observed on self-reported academic self-efficacy. In the last section a multiple analysis of variance, or MANOVA, was used to determine if relationships exist between the subscales (school climate factors and academic self-efficacy) and the factors of grade level, campus performance, and neighborhood affluence. The chapter closes with a summary of the results.

Participants and Data Screening

The participants of this study were the secondary school students enrolled in the Border ISD during the 2018-2019 academic school year. Border ISD is a large, urban, public school district situated by the border of the United States and Mexico. During the 2018-2019 academic school year, Border ISD's student population was characterized as 71.4% economically disadvantaged, 92.4% Hispanic, and 21.5% English Learners (ELs). High schools provided the 9^{th} to 12^{th} grade student responses, and middle schools and K-8 combo schools provided the 6^{th} to 8^{th} grade student responses. 19,904 responses were collected.

Prior to analysis, routine data screening and removal of outliers was conducted on the 40 items in the BISD-SSSCS instrument. The following data screening was conducted, resulting in the removal of 3,953 cases.

a. Removal of discrepancies in reported grade level and response patterns of "not applicable" across all items
b. Removal of univariate outliers, identified using z-scores of each item outside of |3.29|
c. Removal of multivariate outliers, identified using Mahalanobis Distance values at $p <$ .001 criterion

A total of 15,951 valid cases remained after this initial screening. No cases had missing data.

Exploratory Factor Analysis

An exploratory factor analysis was utilized to extract the school climate factors for this study. Factor analysis require the sample size to be large enough in order to generate reliable estimate correlations; minimum sample sizes of 500 cases are needed under the worst conditions of low communalities and weak factors (Tabachnick & Fidell, 2013; Field, 2018). Univariate and multivariate outliers will influence factor loadings and were removed from the data set, as detailed earlier in this chapter.

Assumptions

An initial check for the absence of multicollinearity and singularity and factorability of the correlation matrix R were determined prior to analysis, as required in factor analysis (Field, 2018).

Multicollinearity and singularity. The absence of multicollinearity and singularity was checked by inspection of the correlation matrix. No R values were greater that .8 and the

correlation matrix determinant was less than .00001 (|R| = .00000299), thus this assumption was met.

Factorability of R. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy, or KMO test, is an appropriate test to determine the factorability of R when sample sizes are greater than 300 cases (Field, 2018). The KMO test yielded a value of .951, greater than the required .6 to run a factor analysis (Tabachnick & Fidel, 2013), thus this assumption is met.

Results

The same steps were followed as was used in the pilot study described in Chapter 3 but using the screened data set (N = 15,558). The factor analysis conducted on the representative sample during the pilot study generated a subscale for Academic Self-Efficacy and three subscales for school climate factors, which are Connectedness, Classroom Environment, and Safety and Belongingness. Factor analysis was conducted using principal axis factoring with promax rotation. Only 29 items were identified for analysis. Eleven out of the 40 items were removed from analysis as these items did not load into the meaningful factors from the previously mentioned exploratory factor analysis and were systematically removed. After removing non-loading and cross loading items, this process yielded a fourth subscale of school climate, Academic Optimism. Loadings of items into factors and their communalities are shown in Table 4.1 below.

Table 4.1

Pattern Loadings and Communalities Based on a Principal Axis Factoring with Promax Rotation for 29 Items from the Border ISD School Climate Survey for Secondary Students

Item	Pattern Matrix Factor					Communalities
	1	2	3	4	5	
My teachers care about me.	**0.812**	0.008	-0.01	0.02	-0.082	0.578
My teachers have confidence in me.	**0.755**	-0.07	-0.024	0.071	0.03	0.568
My teachers challenge me to do better.	**0.628**	0.053	-0.124	0.034	0.131	0.497
I am treated with respect by teachers.	**0.619**	-0.099	0.231	-0.041	-0.083	0.424
My teachers give me individual attention when I need it.	**0.618**	0.141	0.018	-0.007	-0.104	0.414
My teachers expect students to do their best.	**0.59**	-0.086	-0.027	0.115	0.117	0.447
My teachers are excited by the subject they teach.	**0.569**	0.196	-0.015	-0.03	-0.041	0.425
My teachers make learning fun.	**0.492**	0.297	-0.038	-0.084	0.015	0.447
I am treated with respect by school administrators.	**0.436**	-0.084	0.246	-0.068	0.05	0.342
Teachers encourage me to assess the quality of my own work.	**0.435**	-0.002	-0.004	-0.018	0.255	0.401
In my class, time is spent working on projects or research.	-0.042	**0.681**	0.04	0.052	-0.074	0.423
In my class, time is spent working in small groups.	0.067	**0.598**	0.047	-0.031	-0.051	0.381
In my class, time is spent in whole-class discussions.	0.054	**0.545**	-0.029	0.026	0.049	0.371
In my class, time is spent doing work that I find meaningful.	0.079	**0.519**	-0.078	-0.107	0.274	0.486
In my class, time is spent using technology.	0.011	**0.49**	0.109	0.048	-0.092	0.262
I am working on projects or research.	-0.087	**0.417**	-0.016	0.181	0.09	0.265

I feel like I belong at this school.	-0.078	0.007	**0.643**	0.027	0.1	0.459
I feel safe at this school.	0.047	0.032	**0.59**	0.028	-0.046	0.376
I think this is a good school.	0.101	0.017	**0.52**	-0.065	0.154	0.473
I am treated with respect by other students at this school.	0.039	0.09	**0.512**	0.03	-0.1	0.276
I am ready for the real world in reference to my ability to read.	0.109	-0.086	0.001	**0.723**	-0.04	0.521
I am ready for the real world in reference to my ability to write.	0.007	0.011	-0.024	**0.665**	0.025	0.457
I am ready for the real world in reference to my ability to present information.	-0.066	0.164	0.03	**0.515**	0.056	0.369
I am ready for the real world in reference to my technology skills.	-0.032	0.226	0.076	**0.373**	0.004	0.275
I understand how to apply what I learn at school to real-life situations.	-0.028	0.131	0.002	-0.049	**0.566**	0.377
I feel successful at school.	0.039	-0.055	0.141	0.081	**0.539**	0.46
I am doing my best in school.	0.061	-0.034	-0.075	0.067	**0.534**	0.297
This school is preparing me well for what I want to do after middle/high school.	0.044	0.083	0.102	-0.101	**0.534**	0.425
Doing well in school makes me feel good about myself.	0.143	-0.12	0.07	0.111	**0.402**	0.308

Note: N = 15951
Extraction Method: Principal Axis Factoring
Rotation Method: Promax with Kaiser Normalizations
For the purpose of this study, factors 1 to 5 were determined to be Connectedness, Classroom Environment, Safety and Belongingness, Academic Self-Efficacy, and Academic Optimism, respectively.

All of the loadings, except in one of the items (*I am ready for the real world in reference to my technology skills*, .373) have values greater than .40. Only two items yielded communalities greater than .50 (*My teachers care about me*, .578, and *My teachers have confidence in me*, .568). Due to the large sample size, despite the low communalities, these subscales provide a very stable factor solution and can thus be interpreted (Field, 2018).

In sum, the five factors extracted from the BISD-SCSSS for this data set are connectedness, classroom environment, safety and belongingness, academic self-efficacy, and academic optimism. Scale reliability was tested using Cronbach's alpha, with alpha values of .874, .759, .704, .700, and .729, respectively. These subscales comprised the four predictor variables, or school climate factors, which are connectedness, classroom environment, safety and belongingness, and academic optimism, and the outcome variable, academic self-efficacy, for the subsequent multivariate analyses.

Research Question 1: How Do the Identified School Climate Factors Contribute to The Total Amount of Variance Observed in Self-Reported Academic Self-Efficacy in Secondary Students?

From the original 40 questions in the BISD-SCSSS, only 29 items were identified for analysis. Eleven items were removed from analysis as these items did not load into the meaningful factors from the previously mentioned exploratory factor analysis. To prepare the data set for multiple linear regression, the 29 items in the BISD-SCSSS instrument were combined into five composites generated by calculating the sum of the items according to subscales extracted from the exploratory factor analysis described earlier in this chapter. A secondary screening for univariate and multivariate outliers in the composite scores removed 393 additional cases. This data screening process produced a final sample size of 15,558 cases. No cases had missing data.

Assumptions for Regression

The assumptions of linearity, normality, homoscedasticity, and independence of errors and the absence of multicollinearity were tested, as required in a multiple regression analysis (Tabachnick & Fidell, 2013). The assumption of linearity was tested using bivariate correlations

among the outcome and predictor variables. Bivariate correlations yielded significant values at the 0.01 level (2-tailed) indicating that the assumption of linearity was met across all variables. The assumption of normality was assessed by inspection of the histogram of the outcome variable (Figure 4.1). A visual inspection of the histogram indicates that the data appears to meet the normality assumption; however, the central limit theorem explains that in larger sample sizes, the assumption of normality is less important because the sampling distribution will be normal (Field, 2018). The normality of the sampling distribution is also evident in the P-P plot (probability-probability plot) shown in Figure 2.

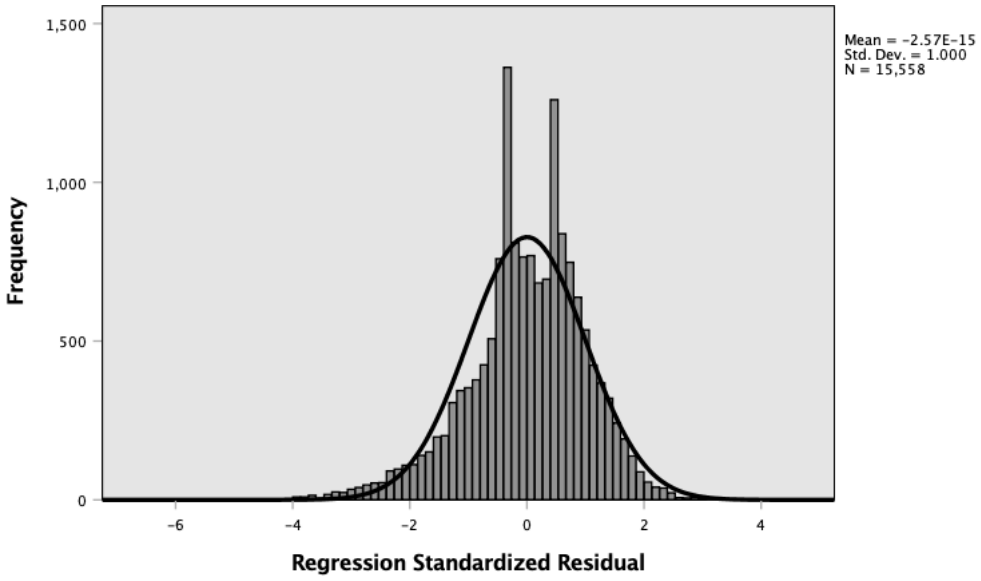

Figure 4.1 *Frequency Distribution of Self-Reported Student Academic Self-Efficacy*

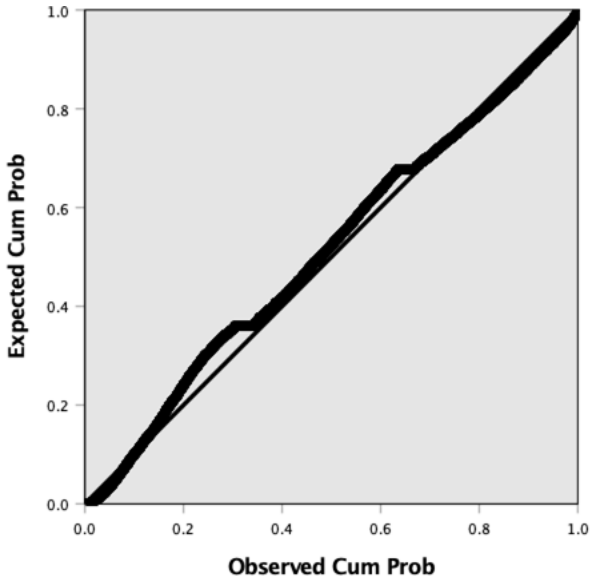

Figure 4.2 *Regression Standardized Residuals*

The assumption of homoscedasticity was assessed by inspecting the scatterplot of residuals against the predicted values for the outcome variable (Figure 2). Inspection of the scatterplot shows a distinct pattern and may indicate that while no outliers are evident in the solution the assumption of homoscedasticity was not met. In order to verify whether the data set violated the assumption of homoscedasticity, a more robust test was employed.

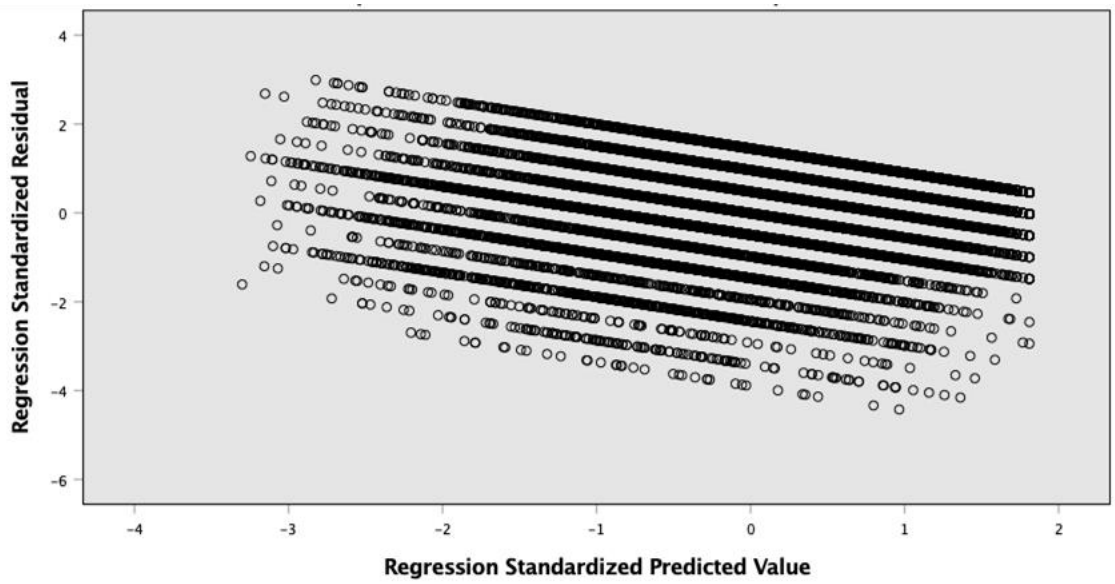

Figure 4.3 *Scatterplot of Residuals Versus Predicted Values for Academic Self-Efficacy*

The assumption of homoscedasticity was again tested using the Breusch-Pagan test for homoscedasticity which performs better with larger data sets. A significant Breusch-Pagan test ($p < .05$) infers the presence of heteroscedasticity, which will affect the precision of the model. In order to adjust for the violation of the assumption of heteroscedasticity, weighted least square values were applied to the model. Weighted least square values were generated by transforming unstandardized predictor values into the inverse of its squares. Applying the weighted least square values to the linear regression reduced the standard error of estimate from 2.05 to 1.27.

Table 4.2

Variance Inflation Factor (VIF) Values for Academic Self-Efficacy

Predictors	VIF Values
Connectedness	2.14
Classroom Environment	1.66
Safety and Belongingness	1.66
Academic Optimism	2.07

Multicollinearity was assessed by the use of the Variance Inflation Factor (VIF) values obtained within the linear regression output. The absence of multicollinearity was evident in the VIF values obtained for each variable, all of which were below 10, as shown in Table 4.2.The assumption of independence of errors was tested using the Durbin-Watson statistic, which yielded a value of 1.70, within the acceptable range of greater than 1 and less than 3 (Field, 2018).

In sum, the assumptions of linearity, independence of errors and the absence of multicollinearity were met, but the assumptions of normality and homoscedasticity were violated. For a large sample size, such as in this study, assumption of normality can be overlooked as explained by the central limit theorem (Field, 2018). The assumption of heteroscedasticity was also violated, thus weighted least square values were applied to the linear regression.

Results

A weighted least squares regression was conducted to determine which factor(s) of school climate is best related and best predict academic self-efficacy. The predictors used in the

multiple regression equation are connectedness (X_1), classroom environment (X_2), safety and belongingness (X_3), and academic optimism (X_4). The outcome variable used in the multiple regression equation is academic self-efficacy (Y'_i). Thus, the model tested for the solution to this research question follows.

$$Y'_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (1)$$

where β_0 = Constant or intercept, β_1 = Standardized coefficient for X_1, β_2 = Standardized coefficient for X_2, β_3 = Standardized coefficient for X_3, β_4 = Standardized coefficient for X_4, and ε = random error. All predictor values were entered simultaneously in order to determine which variables were significant predictors of academic self-efficacy. Weighted least square values were applied to the linear regression analysis to combat heteroscedasticity. The means and standard deviations for the regression equation variables are reported in Table 4.3.

Table 4.3

Means and Standard Deviations for Factors of School Climate and Academic Self-Efficacy

Variable	M	SD
Academic Self-Efficacy	17.339	1.49
Connectedness	38.713	3.21
Classroom Environment	24.906	2.42
Safety and Belongingness	16.971	1.48
Academic Optimism	21.61	1.76

Note: N = 15,558

Pearson correlations were used to examine the associations between the independent and dependent variable as shown in Table 4.4. No values are greater than 0.8, reinforcing the absence

of multicollinearity. All four school factors were statistically significant at the .01 level. From the correlation matrix, the school climate factor with highest correlation to academic self-efficacy is classroom environment (.450) followed by academic optimism (.441). These intercorrelations hint at the forthcoming results of the linear regression. Among school climate factors, connectedness and academic optimism have the highest correlation (.651).

Table 4.4

Intercorrelations for Factors of School Climate and Academic Self-Efficacy

Variable	Y	1.	2.	3.	4.
Y = Academic Self-Efficacy	1.0				
1. Connectedness	.416*	1.0			
2. Classroom Environment	.450*	.586*	1.0		
3. Safety and Belongingness	.365*	.564*	.438*	1.0	
4. Academic Optimism	.441*	.651*	.549*	.578*	1.0

Note: N = 15,558
*$p < .01$

About twenty seven percent of the variability in the responses for academic self-efficacy can be explained by the combination of predictor variables ($R^2 = .269$, $N = 15558$). The linear combination of the variables explained a significant part of the variance as indicated in the regression analysis summary (Table 4.5).

Table 4.5

Standard Regression Analysis Summary for Factors of School Climate Predicting Academic Self-Efficacy

Variable	B	SE	Beta	t	*p*	R^2	F	*p*
						. 269	1431.92	.000
Connectedness	.043	.005	.093	9.278	.000			
Classroom Environment	.154	.005	.251	28.491	.000			
Safety and Belongingness	.093	.009	.093	10.482	.000			
Academic Optimism	.160	.008	.189	19.172	.000			

Note: N = 15,558

The adjusted R^2 was also .269 which provides a sense of how well the model generalizes to other similar contexts. Stein's formula can be used to cross-validate the model in smaller sample sizes (R^2 = .269, k = 4, n = 200). The calculated value of the adjusted R^2 for 200 cases is 0.236, with a difference from the model of 0.0341. This reduction of adjusted R^2 means that if 200 cases were derived from the population rather than the sample, the model would account for approximately 3.41% less variance in the outcome.

The weighted least squares regression applied to the sample showed that while all predictors were significant (R = .519, F (4, 15,553) = 1,431.926, $p < .01$), academic optimism and classroom environment has a greater contribution to the prediction of academic self-efficacy than connectedness and safety and belongingness. For every unit increase in academic optimism, increase of .160 units in academic self-efficacy is predicted, holding all other variables constant.

For every unit increase in classroom environment an increase of .154 units in academic self-efficacy is predicted, holding all other variables constant.

Research Question 2: Which Combination of School Climate Factors Provide the Strongest Explanation of the Amount of Variance Observed in Self-Reported Academic Self-Efficacy in Secondary Students?

A weighted least squares regression was conducted to determine the model that provides the strongest explanation of the amount of variance observed in self-reported academic self-efficacy. The weighted least squares regression was used address the violation of the assumption of homoskedasticity, as previously tested. The predictors used in the multiple regression equation are connectedness, classroom environment, safety and belongingness, and academic optimism. The outcome variable used in the multiple regression equation is academic self-efficacy. Predictor variables were entered sequentially in order to determine the change in variance when predictors were added to the regression model in a systematic order. Weighted least square values were applied to the linear regression analysis to combat heteroscedasticity. Table 4.6 displays the regression analysis summary for school climate factors predicting academic self-efficacy.

Table 4.6

Sequential Regression Analysis Summary for Factors of School Climate Predicting Academic Self-Efficacy

Model	Predictors	B	SE	Beta	t	*p*	R^2	R^2 Change	F	*p*
1							.203	.203	3958.85	.000
	Classroom Environment	.28	.004	.45	62.92	.000				
2							.257	.054	1126.91	.000
	Classroom	.18	.005	.30	36.01	.000				
	Environment	.24	0.007	.28	33.57	.000				
	Academic Optimism									
3							.265	.008	117.64	.000
	Classroom	.17	.005	.28	33.28	.000				
	Environment	.19	.008	.22	24.18	.000				
	Academic	.11	.009	.11	13.32	.000				
	Optimism									
	Safety and Belongingness									
4							.269	.004	86.07	.000
	Classroom	.15	.005	.25	28.49	.000				
	Environment	.16	.008	.19	19.17	.000				
	Academic	.09	.009	.09	10.48	.000				
	Optimism	.04	.005	.09	9.28	.000				
	Safety and Belongingness									
	Connectedness									

Note: N = 15,558

Results

The observed R-squared change was significantly different from zero at the end of each step. After step 1, with only classroom environment, $R^2 = .203$, $F(1, 15{,}556) = 3958.85$, $p < .01$. The addition of academic optimism results in a significant increment in R^2. The addition of safety and belongingness in step 3 and connectedness in step 4 slightly improved R^2. This pattern of results suggests that over a quarter of the variability in academic self-efficacy is solely predicted by school climate factors of classroom environment and academic optimism. The school climate factors of safety and belongingness and connectedness contributes modestly to the prediction. Thus, a more efficient prediction model would include only classroom environment (X_1) and academic optimism (X_2) in the multiple regression equation. With the outcome variable used in the multiple regression equation being academic self-efficacy (Y'_i) the adjusted model for the solution to this research question would be as follows.

$$Y'_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \qquad (2)$$

where β_0 = Constant or intercept, β_1 = Standardized coefficient for X_1 (classroom environment), β_2 = Standardized coefficient for X_2 (academic optimism), and ε = random error.

Research Question 3: Do Relationships Exist Between the Identified Subscales (School Climate Factors and Academic Self-Efficacy) and the Factors of Grade Level, Campus Performance, and Neighborhood Affluence of Secondary Students?

A multivariate analysis of variance was used to determine the relationships between the identified subscales (school climate factors and academic self-efficacy) and the factors of grade level, campus performance, and neighborhood affluence of secondary students. Grade level, campus performance, and neighborhood affluence are designated as categorical variables with values of 1 or 2. Grade Level is differentiated as either High School (grades 9th to 12th) or Middle

School (grades 6th to 8th). Neighborhood Affluence is differentiated as either More Affluent (student is attending a school where less than 70% of students enrolled in the neighborhood school is economically disadvantaged) or Less Affluent (student is attending a school where 70% or more of students enrolled in the neighborhood school is economically disadvantaged). Campus Performance is differentiated as either Above Average Performance (student's campus performance is above the sample mean) or Average to Low Performance (student's campus performance is at or below the sample mean). Thus, a 2 x 2 x 2 MANOVA was conducted for this research question. Table 4.7 shows the sample sizes of each level of the fixed factors.

Table 4.7

Fixed Factors Sample Sizes

Factors	Level	N
Grade Level	High School	8622
	Middle School	6936
Campus Performance	Above Average Performance	7504
	Average to Low Performance	8054
Neighborhood Affluence	More Affluent Neighborhood	8373
	Less Affluent Neighborhood	7183

Assumptions of Multivariate Analysis of Variance

Sample sizes were sufficient and relatively close in size for each of the levels of the independent variables. The assumptions testing for each categorical level was conducted for linearity, multivariate normality, multicollinearity. The absence of multicollinearity was tested using VIF values for each category. All VIF values for each sample set were less than 10, which

indicates that the assumption for the absence of multicollinearity was met. Box's Test, included in the output for MANOVA, was significant ($p < 0.01$), indicating that the assumption of homogeneity of variance-covariance matrices was not met. However, inspection of the descriptives of each categorical level and dependent variable indicated revealed very similar values of standard deviations, Levene's test of equality of errors indicate that equal variance assumption was met for academic self-efficacy but was violated for the dependent variables of connectedness, classroom environment, safety and belongingness, and academic optimism. The assumptions of normality, homogeneity of covariance matrices, and homogeneity of error variances were violated. However, large sample sizes such as in this study make this procedure more robust to violations of normality (Tabachnick & Fidell, 2013). MANOVA is also robust against homogeneity of variance-covariance with similar sample size for each cell (Field, 2018).

Multivariate Analysis of Variance

A three-way factorial 2 x 2 x 2 between-subjects MANOVA was performed on five dependent variables: academic self-efficacy, connectedness, classroom environment, safety and belongingness, and academic optimism. Independent variables were grade level (high school and middle school), campus performance (above average and average to low), and neighborhood affluence (more affluent and less affluent). Total N was 15,558. There were no univariate or multivariate within-cell outliers at $p < .001$. Results of the evaluation of assumptions of normality, linearity, and multicollinearity was met, however, the homogeneity of variance-covariance matrices assumption was violated. It is recommended that when this contidion is observed, rather than using Wilk's Lambda criterion, the Pillai's criterion is recommended, (Tabachnick & Fidell, 2013).

Multivariate tests yielded significance with the use of Pillai's criterion (F (5,15546) = 4.368, p = .001; Pillai's Trace = .001, partial η^2 = .001). The multivariate tests were significant for connectedness (p=.000), safety and belongingness (p=.003), and academic optimism (p=.000). Results of the follow-up univariate ANOVA are summarized in Table 4.8. there is no need to conduct post-hoc multiple comparisons given that all factors are two levels.

Table 4.8

Tests of Grade Level, Neighborhood Affluence, Campus Performance, and Their Interaction

IV	DV	df	F	*p*	Partial η^2	Observed Power
Grade Level	Academic Self-Efficacy	1	1.973	0.160	0.000	0.290
	Connectedness	1	291.248	0.000	0.018	1.000
	Classroom Environment	1	30.626	0.000	0.002	1.000
	Safety and Belongingness	1	0.936	0.333	0.000	0.162
	Academic Optimism	1	321.877	0.000	0.020	1.000
Campus Performance	Academic Self-Efficacy	1	2.273	0.132	0.000	0.326
	Connectedness	1	13.261	0.000	0.001	0.954
	Classroom Environment	1	2.991	0.084	0.000	0.409
	Safety and Belongingness	1	8.600	0.003	0.001	0.835
	Academic Optimism	1	19.033	0.000	0.001	0.992
Neighborhood Affluence	Academic Self-Efficacy	1	51.045	0.000	0.003	1.000
	Connectedness	1	12.164	0.000	0.001	0.937
	Classroom Environment	1	0.849	0.357	0.000	0.151
	Safety and Belongingness	1	124.173	0.000	0.008	1.000
	Academic Optimism	1	12.673	0.000	0.001	0.945

Grade Level by Campus Performance	Academic Self-Efficacy	1	3.530	0.060	0.000	0.468
	Connectedness	1	0.383	0.536	0.000	0.095
	Classroom Environment	1	4.251	0.039	0.000	0.541
	Safety and Belongingness	1	8.734	0.003	0.001	0.840
	Academic Optimism	1	11.971	0.001	0.001	0.933
Grade Level by Neighborhood Affluence	Academic Self-Efficacy	1	0.781	0.377	0.000	0.143
	Connectedness	1	0.860	0.354	0.000	0.153
	Classroom Environment	1	6.134	0.013	0.000	0.697
	Safety and Belongingness	1	34.716	0.000	0.002	1.000
	Academic Optimism	1	0.061	0.805	0.000	0.057
Campus Performance by Neighborhood Affluence	Academic Self-Efficacy	1	0.300	0.584	0.000	0.085
	Connectedness	1	0.413	0.521	0.000	0.098
	Classroom Environment	1	5.776	0.016	0.000	0.671
	Safety and Belongingness	1	0.528	0.468	0.000	0.112
	Academic Optimism	1	7.262	0.007	0.000	0.769
Grade Level by Campus Performance by Neighborhood Affluence	Academic Self-Efficacy	1	0.419	0.517	0.000	0.099
	Connectedness	1	26.359	0.000	0.002	0.999
	Classroom Environment	1	0.919	0.338	0.000	0.160
	Safety and Belongingness	1	31.865	0.000	0.002	1.000
	Academic Optimism	1	26.967	0.000	0.002	0.999

Note: N = 15,558

Main Effects

Nine of the 15 main effects were found to be statistically significant ($p < .05$). Univariate analyses indicated that high school students generally reported significantly lower levels of connectedness, less favorable classroom environments, and lower levels of academic optimism than middle school students. Students enrolled in higher performing campuses reported significantly lower levels of connectedness, safety and belongingness and academic optimism than students enrolled in lower performing campuses. Students enrolled in schools situated in more affluent neighborhoods reported significantly higher levels of connectedness, safety and belongingness, academic optimism, and academic self-efficacy when compared to students enrolled in schools situated in less affluent neighborhoods.

Main Effects on Connectedness

Secondary school students' responses for survey items on connectedness significantly differ when responses were controlled for grade level, campus performance and neighborhood affluence ($p < .05$). Figures 4.4, 4.5, and 4.6 show the plots of grade level, campus performance and neighborhood affluence on connectedness.

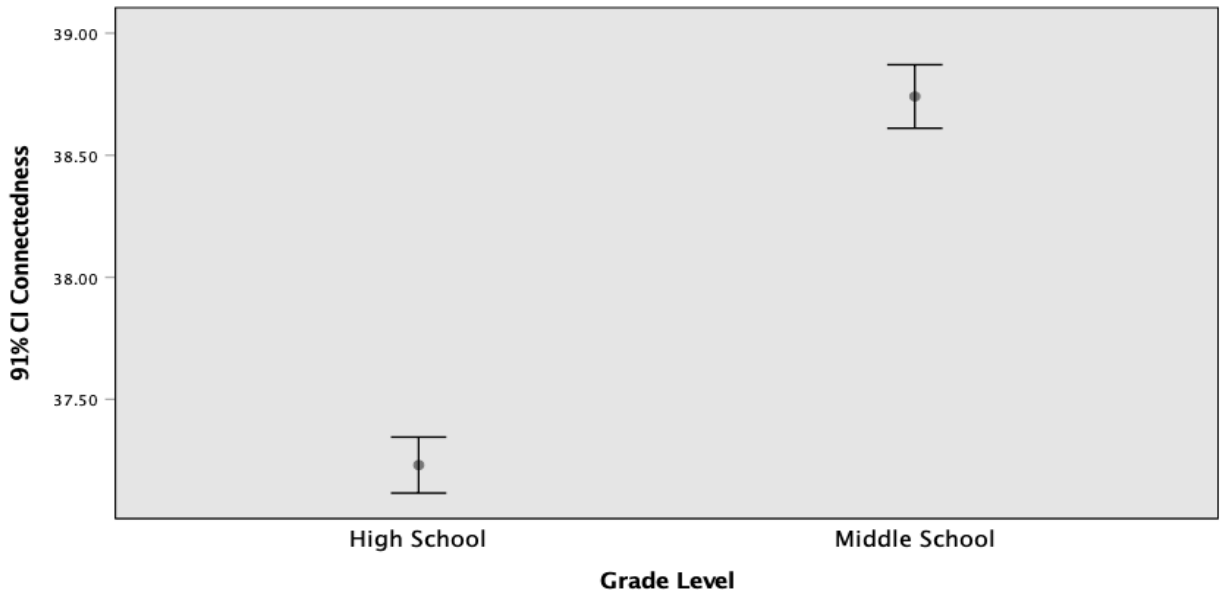

Figure 4.4 *Estimated Marginal Means of Connectedness by Grade Level*

Students in high school reported lower levels of connectedness (M = 37.23) than students in middle school (M = 38.61), with a statistically significant difference between responses of high school and middle school students ($p < .05$). This result confirms the results of Whitlock (2005) who found that secondary students in lower grades were more likely to feel connected to school that higher grades. Typically, high schools have larger school populations composed of the combination of two or more feeder middle schools which may lead students to feel less connected to the campus and the staff.

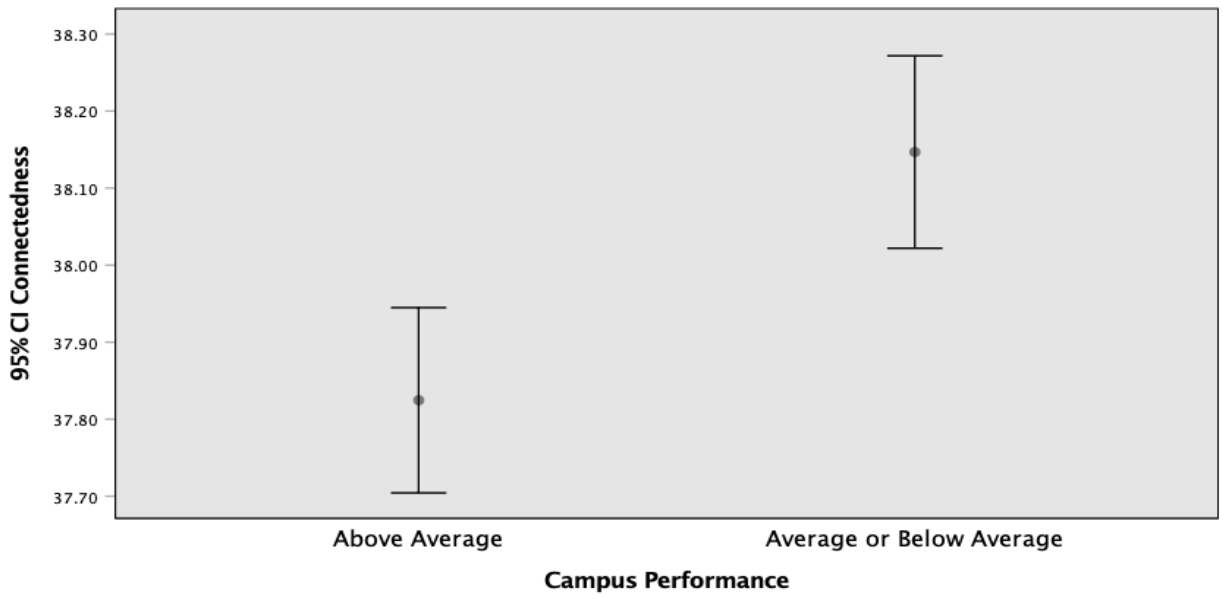

Figure 4.5 *Estimated Marginal Means of Connectedness by Campus Performance*

Students enrolled in campuses that performed above the average performance of the district reported lower levels of connectedness (M = 37.82) than students enrolled in campuses that with average to low campus performance (M = 38.15), with a statistically significant difference between responses of these two groups of students ($p > .05$). Schools with higher accountability ratings have students who report greater levels of connectedness, this result is indicative of the findings by Angus and Hughes (2017). Angus and Hughes (2017) determined that in schools that sustainably implemented a program that promotes mentorship between students and staff to increase the sense of connectedness, students reported a higher confidence in their academic success. In addition, Osher, Spier, Kendzoira and Cai (2009) found a positive relationship between school connectedness and academic achievement.

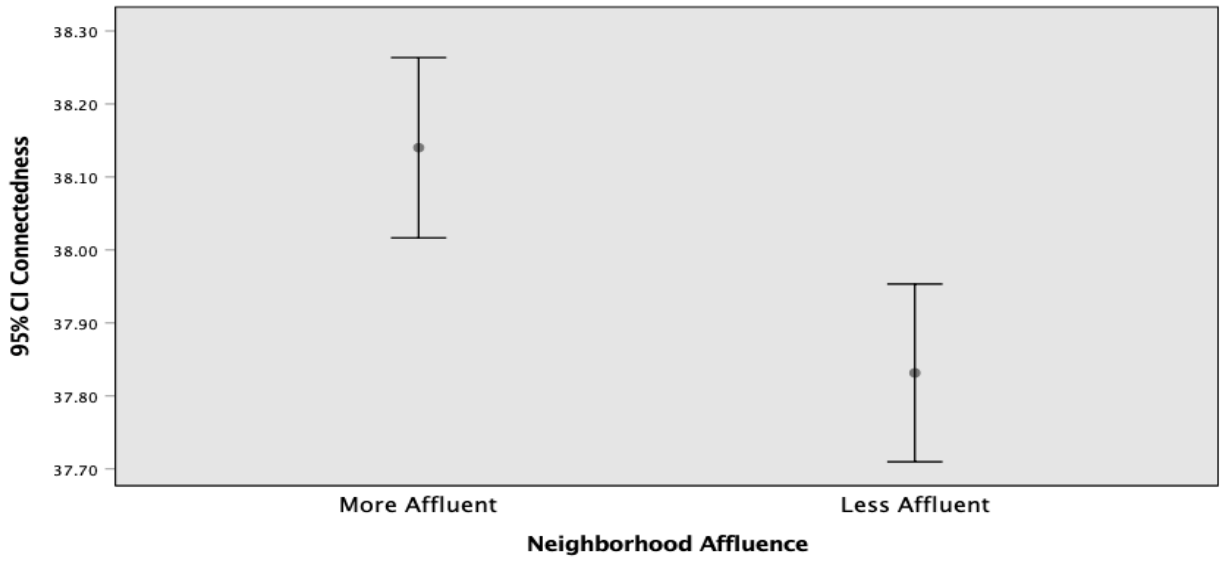

Figure 4.6 *Estimated Marginal Means of Connectedness by Neighborhood Affluence*

Students enrolled in campuses situated in more affluent neighborhoods reported higher levels of connectedness (M = 38.14) than students enrolled in campuses in less affluent neighborhoods (M = 37.83), with a statistically significant difference between the responses of these two groups of students ($p < .05$). This result corresponds to the results of Sampasa-Kanyinga and Hamilton (2016) in that high socio-economic status, which is relative to neighborhood affluence, is associated with high levels of school connectedness.

Main Effects on Classroom Environment

Secondary school students' responses for survey items on classroom environment were significantly different when responses were controlled for grade level ($p < .05$). Figure 4.7 shows the plot of grade level on classroom environment.

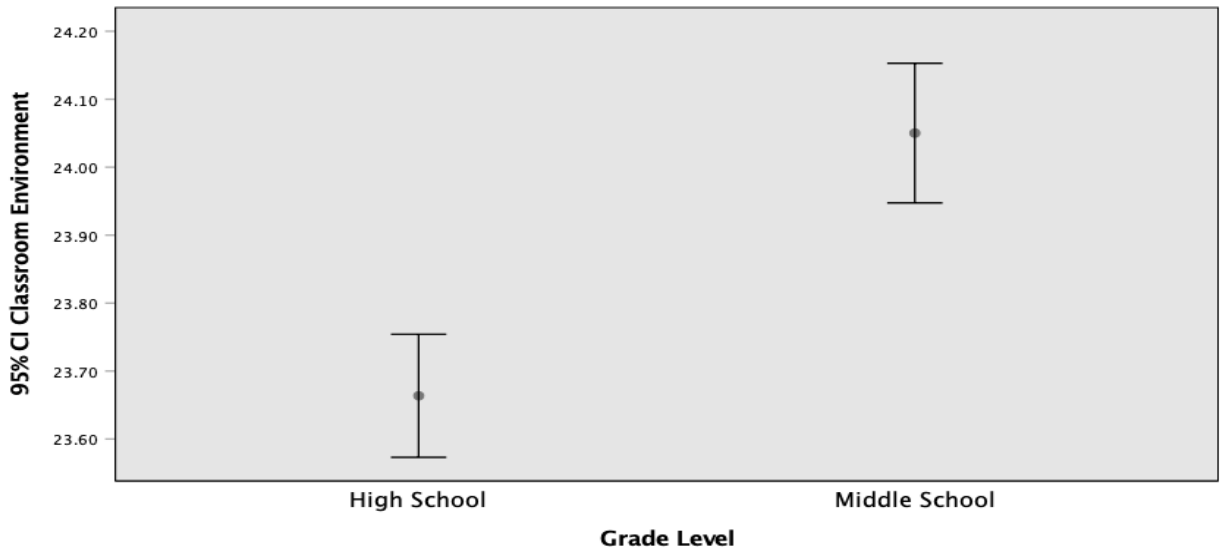

Figure 4.7 *Estimated Marginal Means of Classroom Environment by Grade Level*

Students in high school reported less favorable perceptions towards classroom environment (M= 23.66) than students in middle school (M = 24.05), with a statistically significant difference between responses of high school and middle school students ($p < .05$). This result confirms the study of Hoang (2008) where some classroom envrionment scales were found to have significant differences across gradel levels in some dimensions of classroom envionment, specifically teacher support, task orientation, and student self efficacy.

Main Effects on Safety and Belongingness

Secondary school students' responses for survey items on safety and belonginess significantly differ when responses were controlled for campus performance and neighborhood affluence ($p < .05$). Figures 4.8 and 4.9 show the plots of campus performance and neighborhood affluence on safety and belongingness.

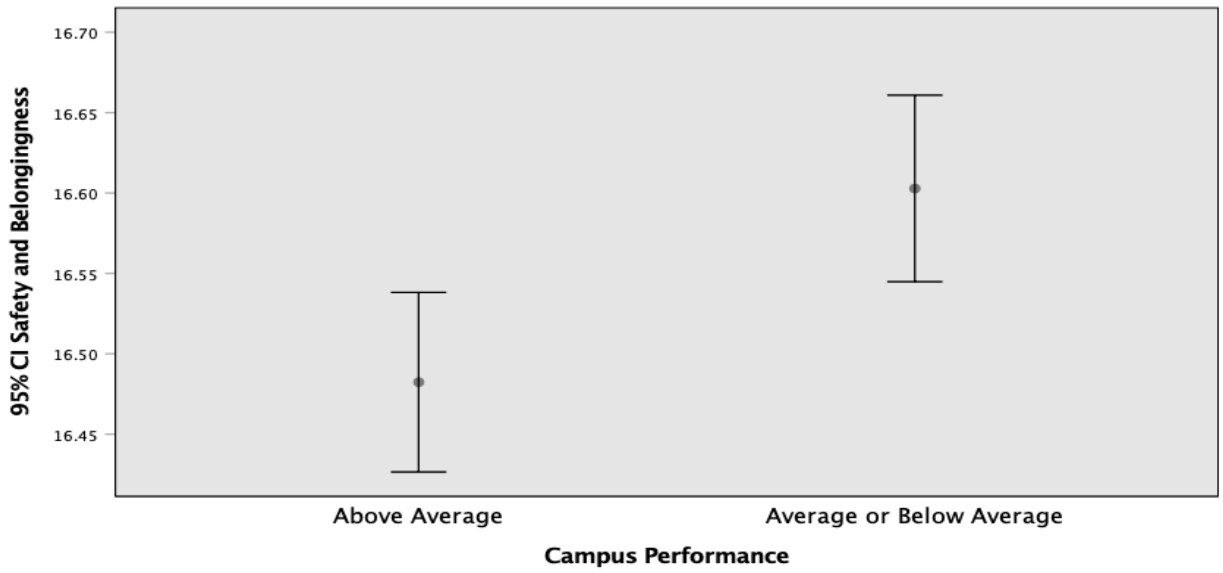

Figure 4.8 *Estimated Marginal Means of Safety and Belongingness by Campus Performance*

Students enrolled in campuses that performed above the average performance of the district reported lower levels of safety and belongingness (M = 16.48) than students enrolled in campuses that with average to low campus performance (M = 16.60), with a statistically significant difference between the responses of these two groups of students ($p < .05$). This result refutes the findings of Capps (2003) that there is no relationship between the sense of belonging of students and the level of performance of the school. In terms of safety, this result confirms the findings of Milam, Furr-Holden, and Leaf (2010) in that student perceptions of school safety are associated with academic achievement, which is related to campus performance.

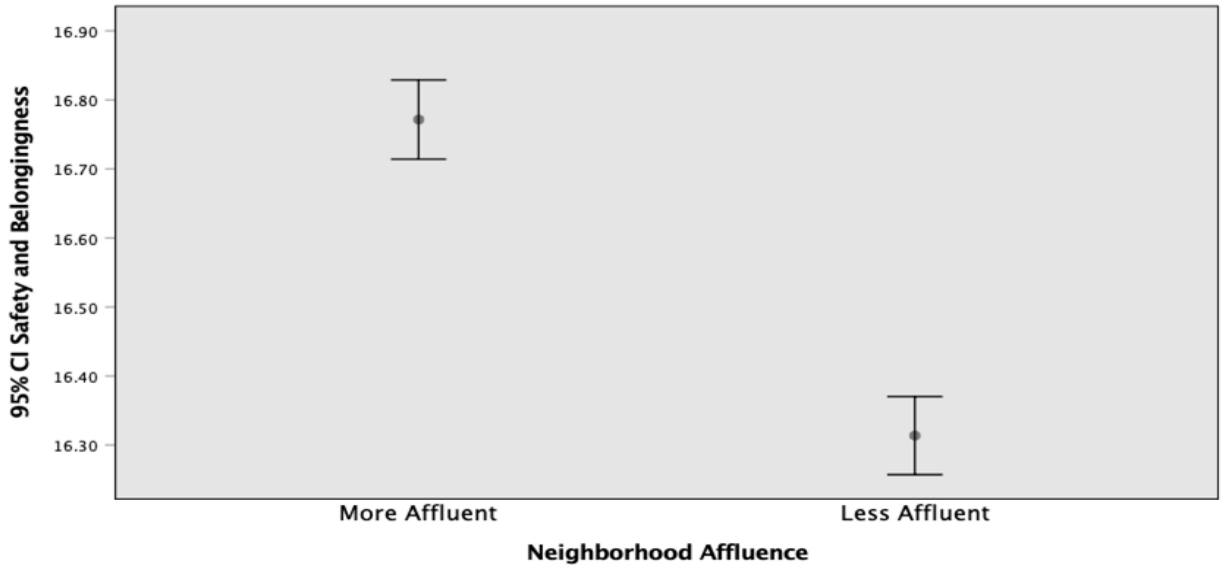

Figure 4.9 *Estimated Marginal Means of Safety and Belongingness by Neighborhood Affluence*

Students enrolled in campuses situated in more affluent neighborhoods reported higher levels of safety and belongingness (M= 16.77) than students enrolled in campuses in less affluent neighborhoods (M = 16.31), with a statistically significant difference between the responses of these two groups of students ($p < .05$). This result is consistent with the findings of Ahmadi, Hassani, and Ahmadi (2020) where students with lower socio-economic status, which is related to neighborhood affluence, is associated with a decreased sense of belongingness.

Main Effects on Academic Optimism

Secondary school students' responses for survey items on academic optimism were significantly different when responses were controlled for grade level, campus performance and neighborhood affluence. Figure 4.10, 4.11, and 4.12 show the plots of grade level, campus performance and neighborhood affluence on academic optimism.

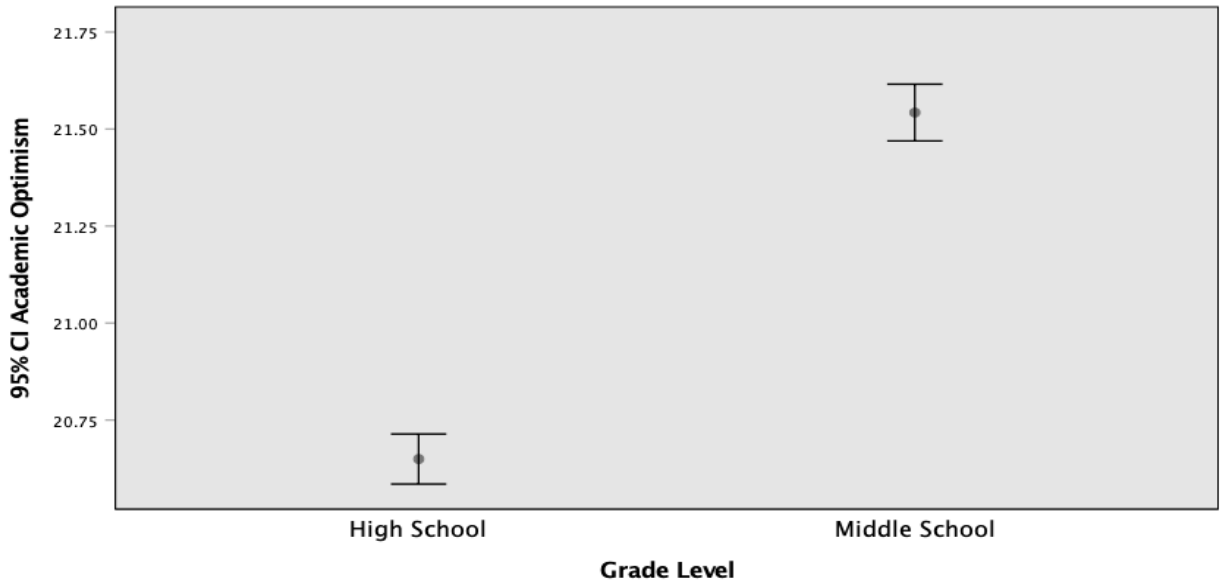

Figure 4.10 *Estimated Marginal Means of Academic Optimism by Grade Level*

Students in high school reported lower levels of academic optimism (M = 20.65) than students in middle school (M = 21.54), with a statistically significant difference between responses of high school and middle school students ($p < .05$). High school student learning experiences may not have reflected an emphasis on the value of academic tasks as much as middle school learning experiences. Further research is needed in this area to explain the link between student academic optimism and student grade level.

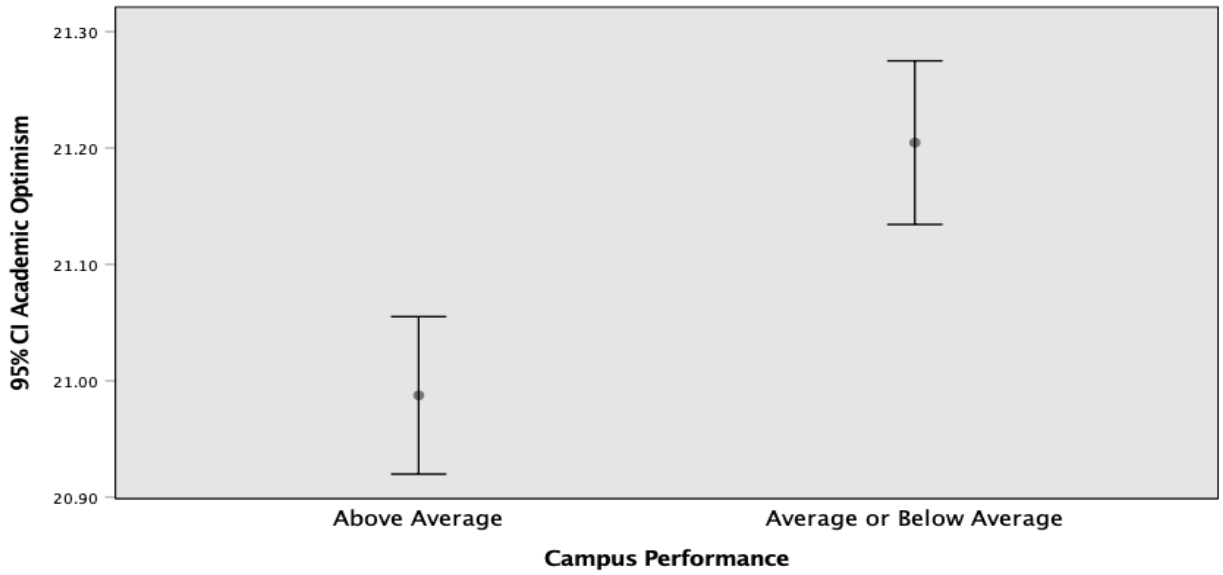

Figure 4.11 *Estimated Marginal Means of Academic Optimism by Campus Performance*

Students enrolled in campuses that performed above the average performance of the district reported lower levels of academic optimism (M = 20.99) than students enrolled in campuses that with average to low campus performance (M = 21.20), with a statistically significant difference between the responses of these two groups of students ($p < .05$). These results are comparable to the findings of Tschannen-Moran et al. (2013), where student academic optimism was found to have a significant effect on student academic achievement.

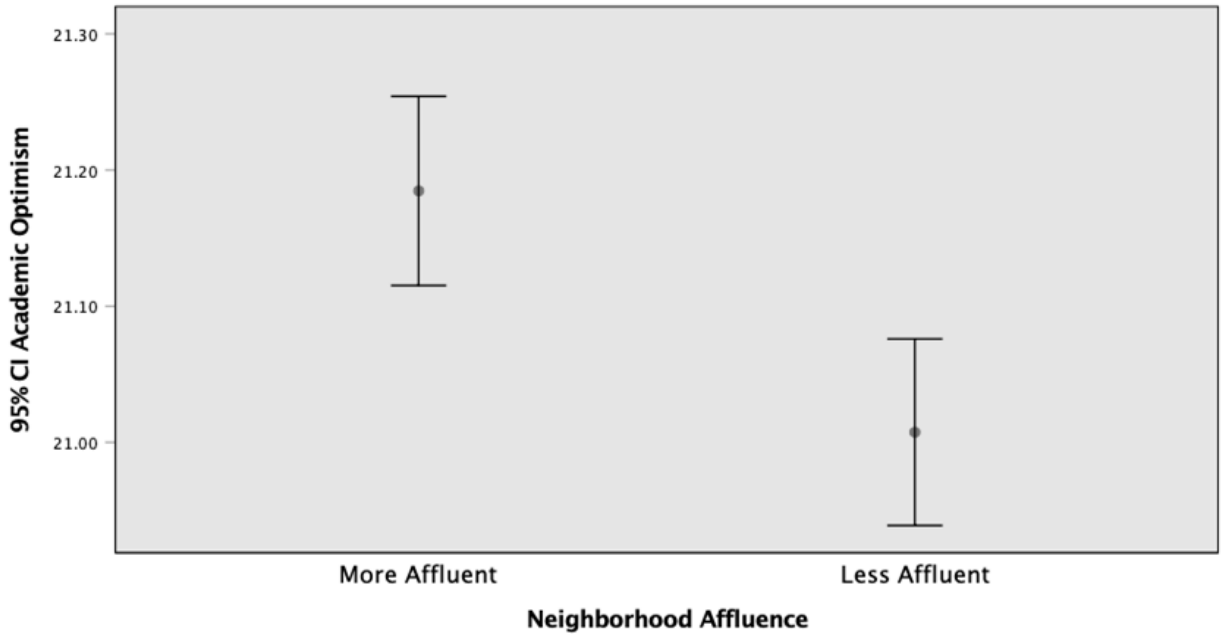

Figure 4.12 *Estimated Marginal Means of Academic Optimism by Neighborhood Affluence*

Students enrolled in campuses situated in more affluent neighborhoods reported higher levels of academic optimism (M= 21.18) than students enrolled in campuses in less affluent neighborhoods (M = 21.00), with a statistically significant difference between the responses of these two groups of students ($p < .05$). These results differ from the findings of Tschannen-Moran et al. (2013), where student academic optimism was found to have no significant effect on student socio-economic status.

Main Effects on Academic Self-Efficacy

Secondary school students' responses for survey items on academic self-efficacy only significantly differ when responses when controlled for neighborhood affluence ($p < .05$). Figure 4.13 show the plot of neighborhood affluence on academic self-efficacy.

Figure 4.13 *Estimated Marginal Means of Academic Self Efficacy by Neighborhood Affluence*

Students enrolled in campuses situated in more affluent neighborhoods reported higher levels of academic efficacy (M= 17.167) than students enrolled in campuses in less affluent neighborhoods (M = 16.870), with a statistically significant difference between the responses of these two groups of students ($p < .05$). When compared to college-level respondents, these results are consistent with Satici and Can (2016) who determined that students with higher socio-economic status have a higher level of academic self-efficacy.

Between-Group Interaction Effects

Seven of the 15 between-group interactions were found to be statistically significant ($p < .05$). The between-group interaction effects between grade level and campus performance yielded significant effects on classroom environment, safety and belongingness, and academic optimism. However, inspecting the partial eta squares, or effect sizes indicated that significant dependent variables register effect sizes ranging from 0.001 to 0.018, indicating small to very

small effect, which may be explained by the relatively homogeneous responses of the participant groups.

Figures 4.13, 4.14, and 4.15 show the plots of the between-group interaction effects on classroom environment.

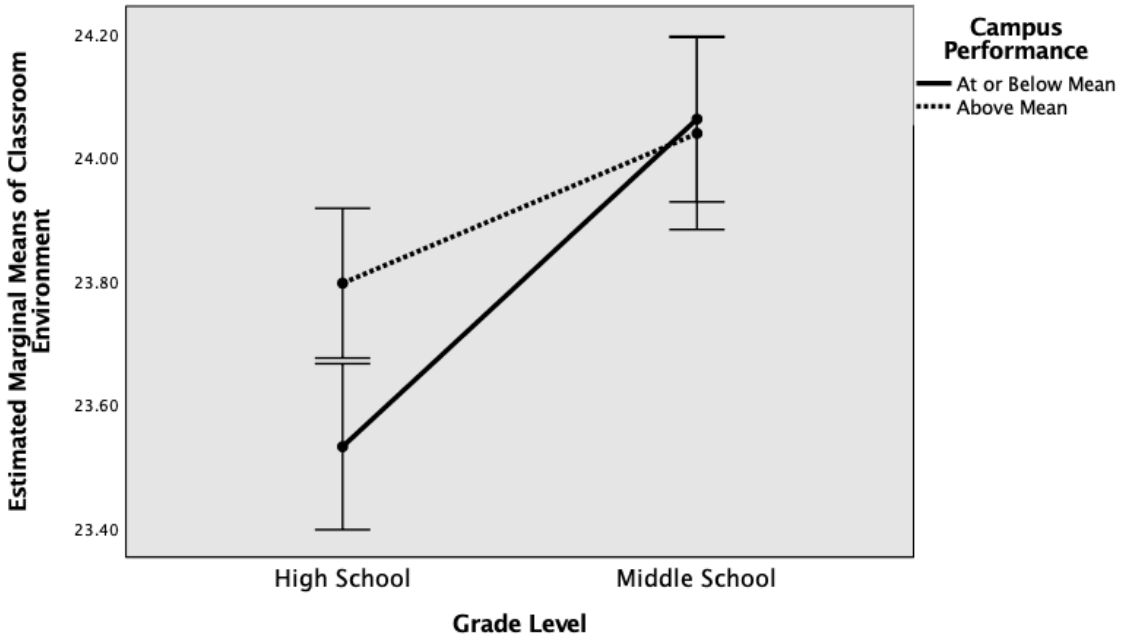

Figure 4.13 *Estimated Marginal Means of Classroom Environment by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction – Classroom Environment

There was a significant difference in how high school and middle school students in higher or lower performing campuses responded with respect to classroom environment. High school students enrolled in lower performing schools reported lower levels of classroom environment (M=23.53) than high school students enrolled in higher performing campuses (M=23.80). However, middle school students responded similarly with respect to classroom

environment regardless of whether they were in a higher performing school (M=24.06) or a lower performing school (M=24.04).

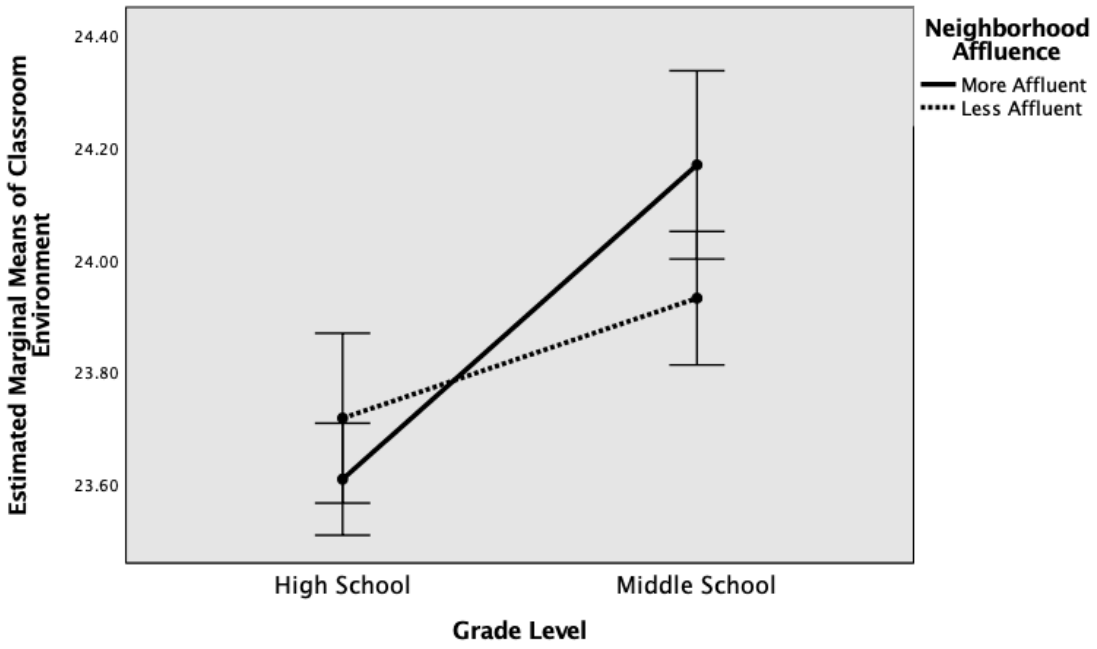

Figure 4.14 *Estimated Marginal Means of Classroom Environment by Grade Level and Neighborhood Affluence*

Grade Level X Neighborhood Affluence Interaction – Classroom Environment

There was a significant difference in how high school and middle school students enrolled in schools situated in more affluent and less affluent neighborhoods responded with respect to classroom environment. Middle school students enrolled in schools situated in more affluent neighborhoods (M=24.17) reported higher levels of classroom environment than middle school students enrolled in schools situated in less affluent neighborhoods (M=23.93). However, high school students responded similarly with respect to classroom environment regardless of whether they were enrolled in schools situated in more affluent (M=23.61) or less affluent neighborhoods (M=23.72).

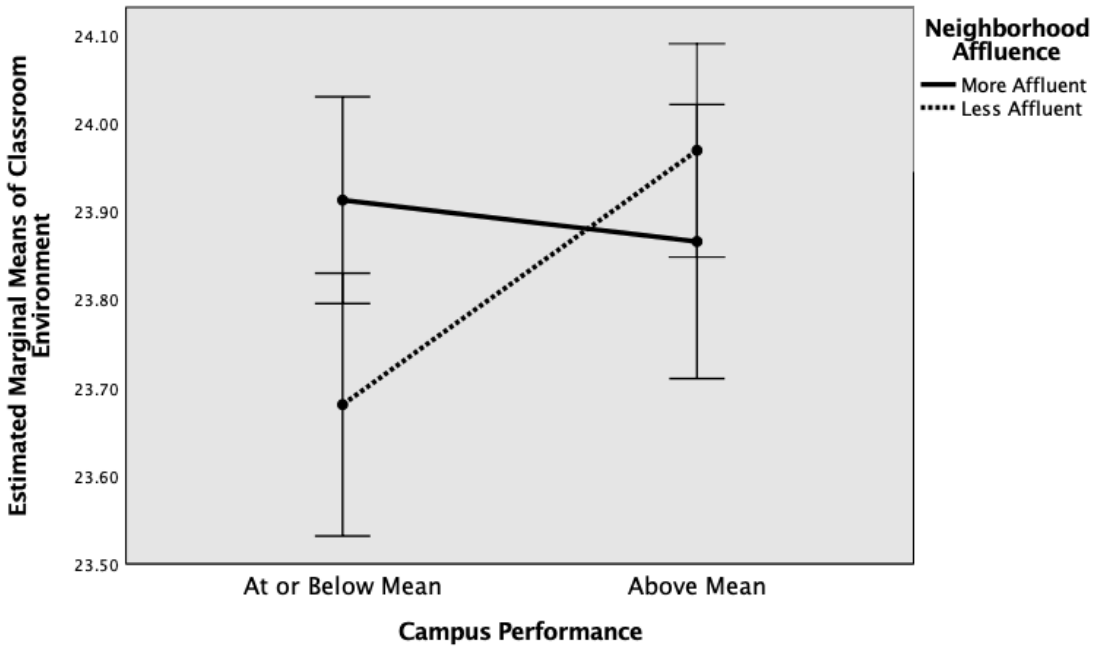

Figure 4.15 *Estimated Marginal Means of Classroom Environment by Campus Performance and Neighborhood Affluence*

Campus Performance X Neighborhood Affluence Interaction – Classroom Environment

There was a significant difference in how secondary students enrolled in higher or lower performing schools situated in more affluent and less affluent neighborhoods responded with respect to classroom environment. Secondary students enrolled in lower performing schools situated in more affluent neighborhoods (M=23.91) reported higher levels of classroom environment than secondary students enrolled in lower performing schools situated in less affluent neighborhoods (M=23.68). However, secondary students enrolled in higher performing schools responded similarly with respect to classroom environment regardless of whether they were enrolled in schools situated in more affluent (M=23.89) or less affluent neighborhoods (M=23.97).

Figures 4.16 and 4.17 show the plots of the between-group interaction effects on safety and belongingness.

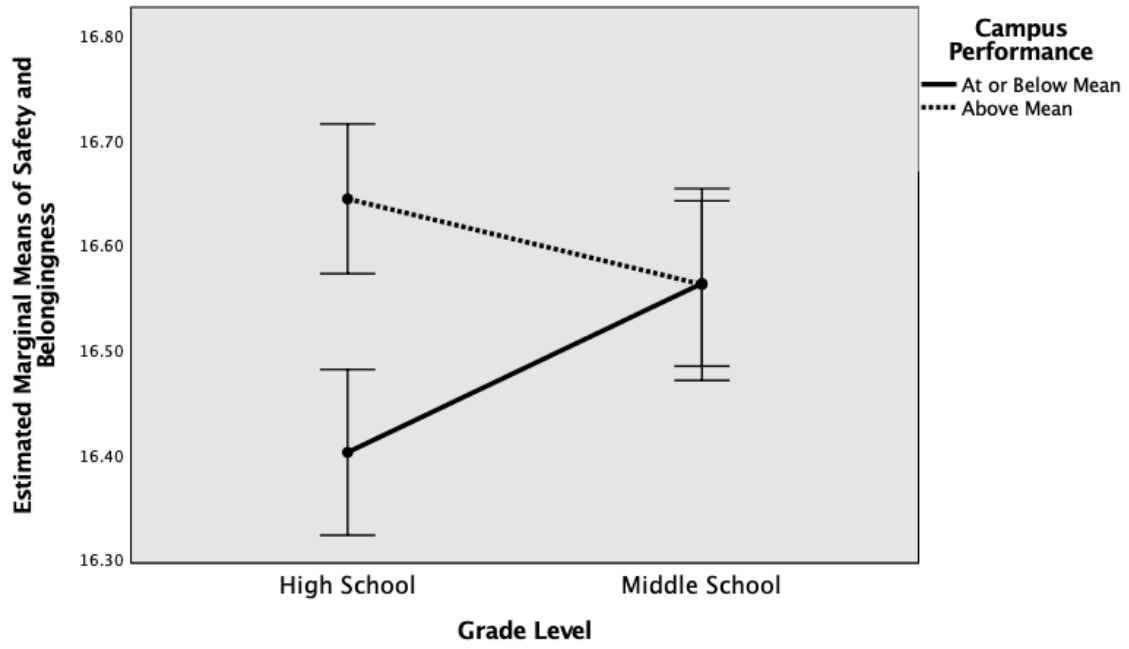

Figure 4.16 *Estimated Marginal Means of Safety and Belongingness by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction – Safety and Belongingness

There was a significant difference in how high school and middle school students in higher or lower performing campuses responded with respect to safety and belongingness. High school students enrolled in lower performing schools (M=16.40) reported lower levels of safety and belongingness than high school students enrolled in higher performing campuses (M=16.64). Middle school students responded similarly with respect to safety and belongingness regardless of whether they were in a higher performing school (M=16.56) or a lower performing school (M=16.56).

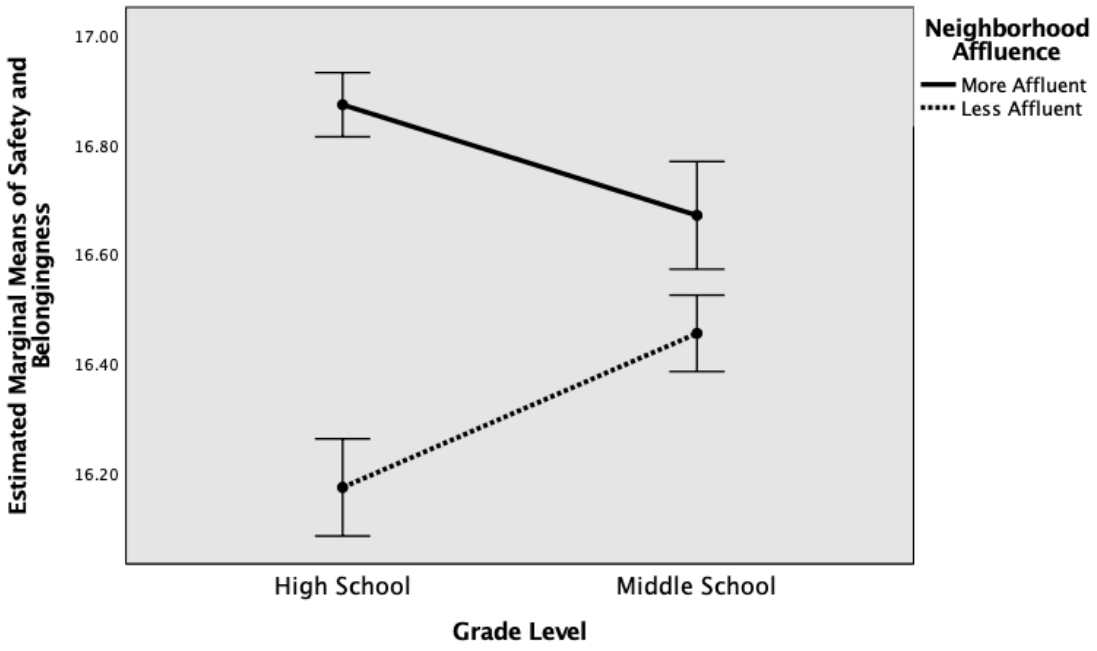

Figure 4.17 *Estimated Marginal Means of Safety and Belongingness by Grade Level and Neighborhood Affluence*

Grade Level X Neighborhood Affluence Interaction – Safety and Belongingness

There was a significant difference in how high school and middle school students enrolled in schools situated in more affluent and less affluent neighborhoods responded with respect to safety and belongingness. High school students enrolled in schools situated in more affluent neighborhoods (M=16.87) reported higher levels of safety and belongingness than high school students enrolled in schools situated in less affluent neighborhoods (M=16.17). Similarly, middle school students enrolled in schools situated in more affluent neighborhoods (M=16.67) reported higher levels of safety and belongingness than middle school students enrolled in schools situated in less affluent neighborhoods (M=16.46).

Figures 4.18 and 4.19 show the plots of the between-group interaction effects on academic optimism.

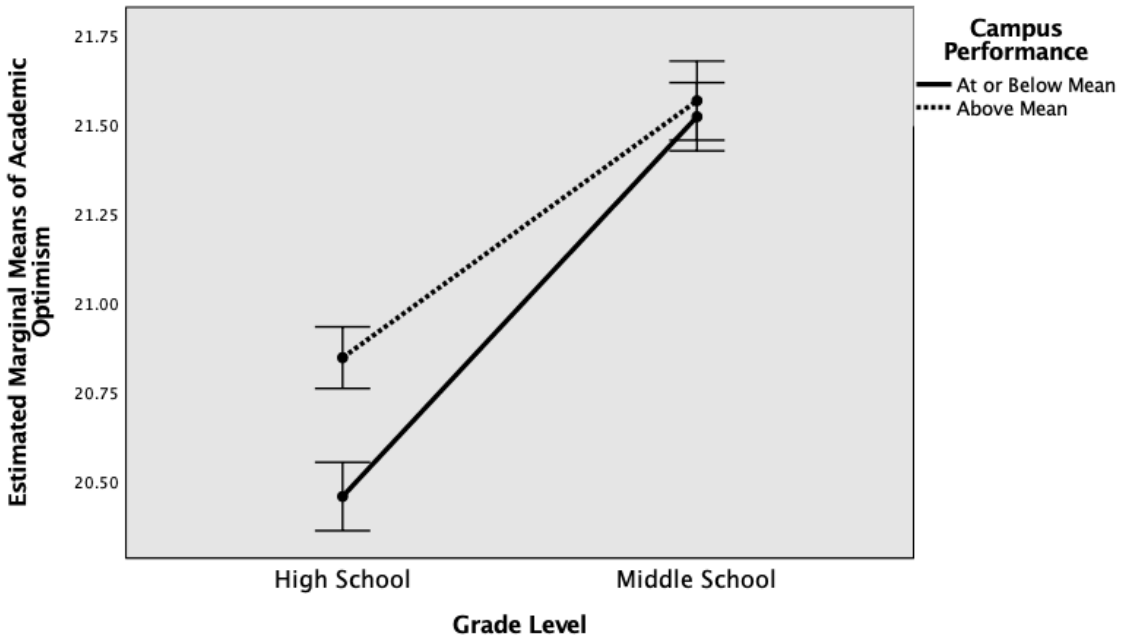

Figure 4.18 *Estimated Marginal Means of Academic Optimism by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction – Academic Optimism

There was a significant difference in how high school and middle school students in higher or lower performing campuses responded with respect to academic optimism. High school students enrolled in lower performing schools (M=20.45) reported lower levels of academic optimism than high school students enrolled in higher performing campuses (M=20.84). Middle school students responded similarly with respect to academic optimism regardless of whether they were in a higher performing school (M=21.52) or a lower performing school (M=21.56).

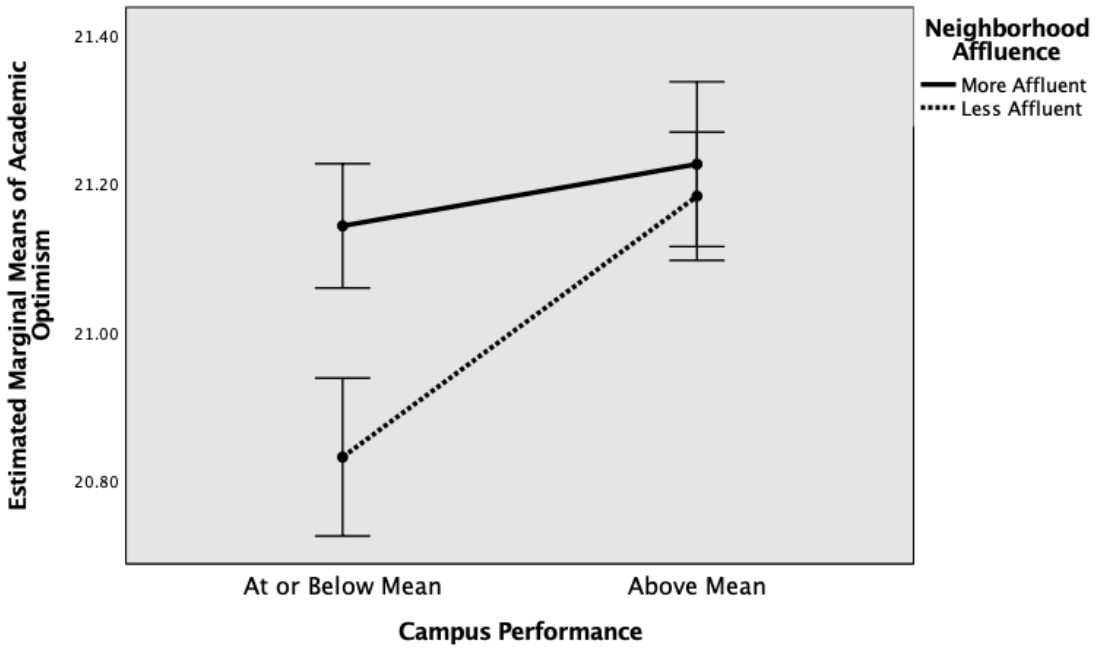

Figure 4.19 *Estimated Marginal Means of Academic Optimism by Campus Performance and Neighborhood Affluence*

Campus Performance X Neighborhood Affluence Interaction – Academic Optimism

There was a significant difference in how secondary students enrolled in higher or lower performing schools situated in more affluent and less affluent neighborhoods responded with respect to academic optimism. Secondary students enrolled in lower performing schools situated in more affluent neighborhoods (M=21.14) reported higher levels of academic optimism than secondary students enrolled in lower performing schools situated in less affluent neighborhoods (M=20.83). However, secondary students in higher performing schools responded similarly with respect to academic optimism regardless of whether they were in a more affluent neighborhood (M=21.23) or less affluent neighborhood (M=21.18).

Within-Group Interaction Effects on Connectedness

Three of the five between-group interactions were found to be statistically significant ($p < .05$). From inspection of the within-group interaction effects of grade level, campus performance, and neighborhood affluence, there are significant differences in students' responses for connectedness, safety and belongingness, and academic optimism. However, inspecting the partial eta squares, or effect sizes indicated that significant dependent variables register effect sizes of 0.002, indicating very small effect, which indicates the participants' relatively homogeneous responses. The within-group interactions of secondary student responses when holding neighborhood affluence constant are as follows.

Figures 4.20 and 4.21 show the plots of the within-group interaction effects on connectedness.

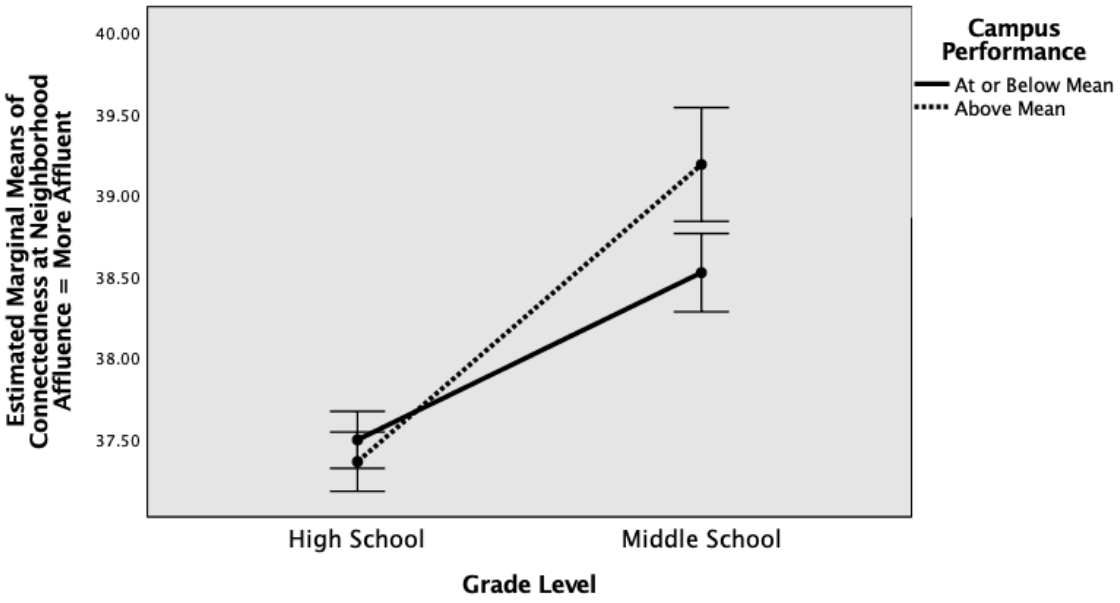

Figure 4.20 *Estimated Marginal Means of Connectedness in Schools Situated in More Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with More Affluent Neighborhood Group – Connectedness

For students enrolled in schools situated in more affluent neighborhoods, high school students responded similarly with respect to connectedness regardless of whether they were enrolled in a higher performing school (M=37.49) or a lower performing school (M=37.36). However, middle school students in lower performing schools (M=38.52) reported lower levels of connectedness than middle school students enrolled in higher performing schools (M=39.18).

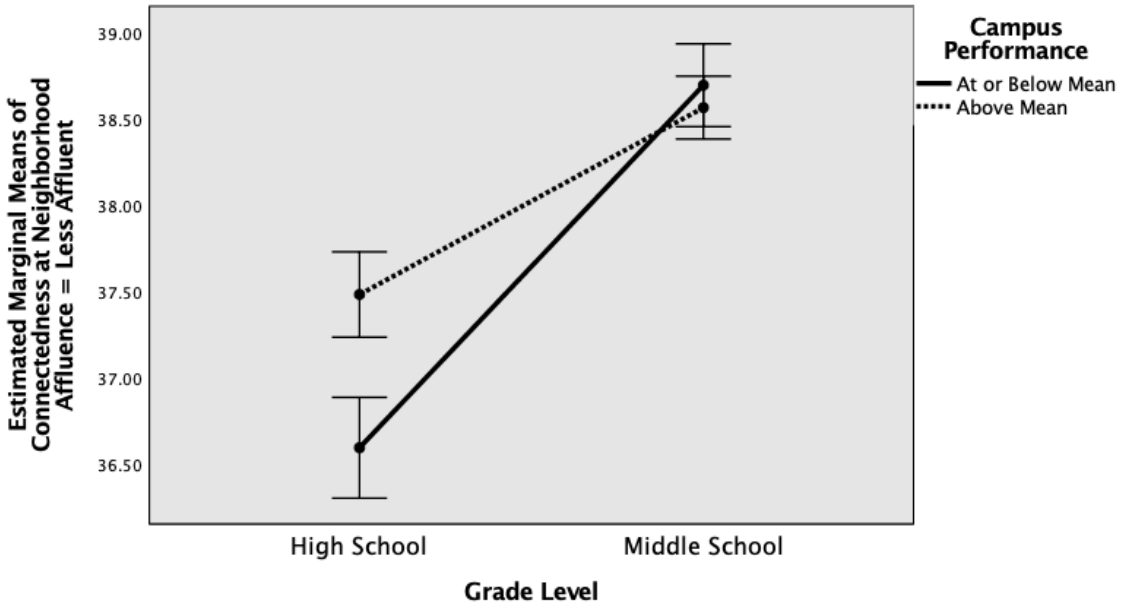

Figure 4.21 *Estimated Marginal Means of Connectedness in Schools Situated in Less Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with Less Affluent Neighborhood Group – Connectedness

For students enrolled in schools situated in less affluent neighborhoods, high school students in lower performing schools (M=36.59) reported lower levels of connectedness than

middle school students enrolled in higher performing schools (M=37.48). However, middle school students responded similarly with respect to connectedness regardless of whether they were enrolled in a higher performing school (M=38.69) or a lower performing school (M=38.56).

Within-Group Interaction Effects on Safety and Belongingness

Figures 4.22 and 4.23 show the plots of the within-group interaction effects on safety and belongingness.

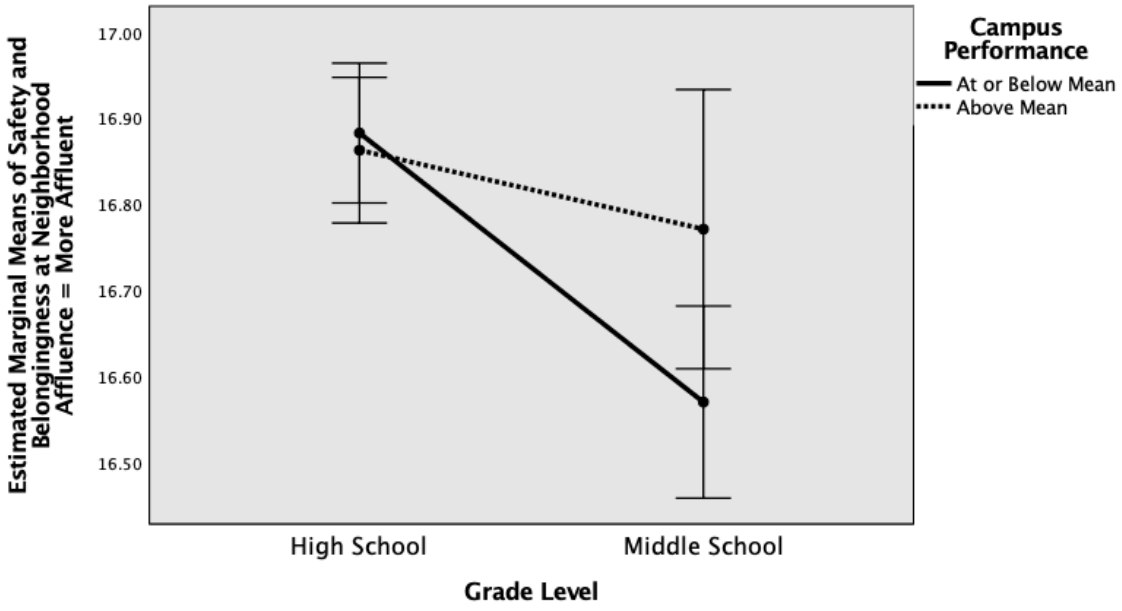

Figure 4.22 *Estimated Marginal Means of Safety and Belongness in Schools Situated in More Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with More Affluent Neighborhood Group – Safety and Belongingness

For students enrolled in schools situated in more affluent neighborhoods, high school students responded similarly with respect to safety and belongingness regardless of whether they

were enrolled in a higher performing school (M=16.88) or a lower performing school (M=16.86). However, middle school students in lower performing schools (M=16.57) reported lower levels of connectedness than middle school students enrolled in higher performing schools (M=16.77).

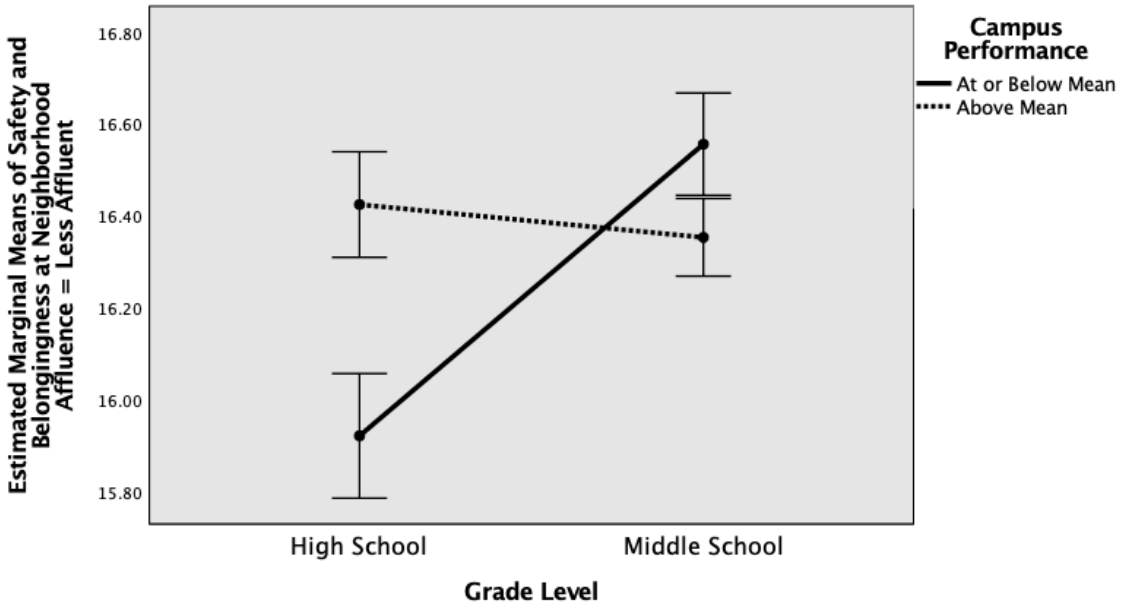

Figure 4.23 *Estimated Marginal Means of Safety and Belongingness in Schools Situated in Less Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with Less Affluent Neighborhood Group – Safety and Belongingness

For students enrolled in schools situated in less affluent neighborhoods, high school students in lower performing schools (M=15.91) reported lower levels of safety and belongingness than middle school students enrolled in higher performing schools (M=16.42). However, middle school students responded similarly with respect to connectedness regardless

of whether they were enrolled in a higher performing school (M=16.56) or a lower performing school (M=16.35).

Within-Group Interaction Effects on Academic Optimism

Figures 4.24 and 4.25 show the plots of the within-group interaction effects on academic optimism.

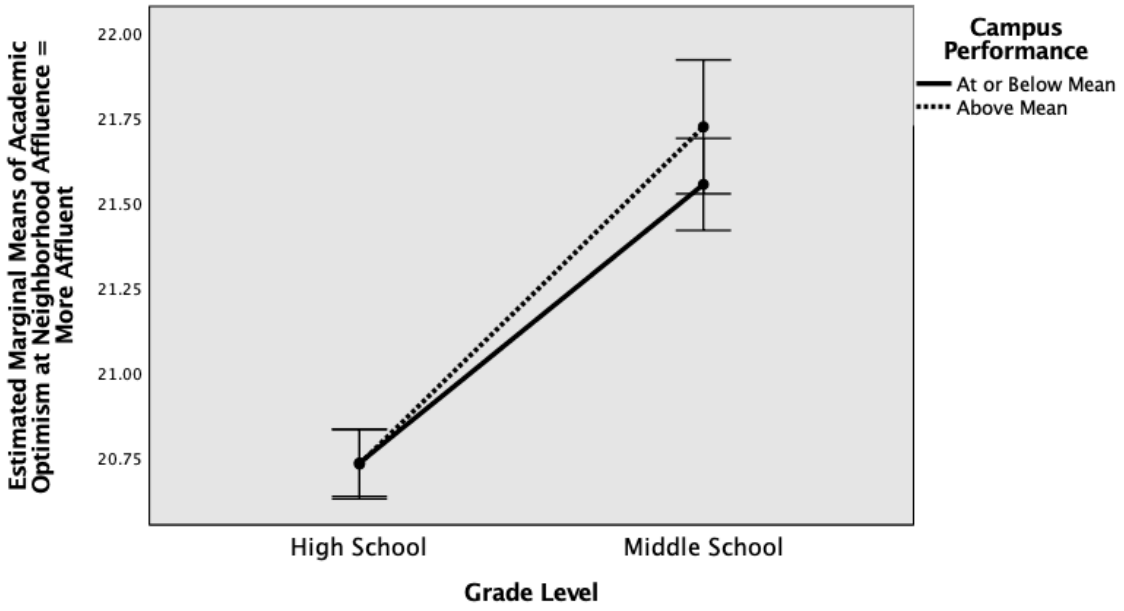

Figure 4.24 *Estimated Marginal Means of Safety and Belongness in Schools Situated in More Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with More Affluent Neighborhood Group – Academic Optimism

For students enrolled in schools situated in more affluent neighborhoods, high school students responded similarly with respect to academic optimism regardless of whether they were enrolled in a higher performing school (M=20.73) or a lower performing school (M=20.73).

However, middle school students in lower performing schools (M=21.55) reported lower levels of connectedness than middle school students enrolled in higher performing schools (M=21.72).

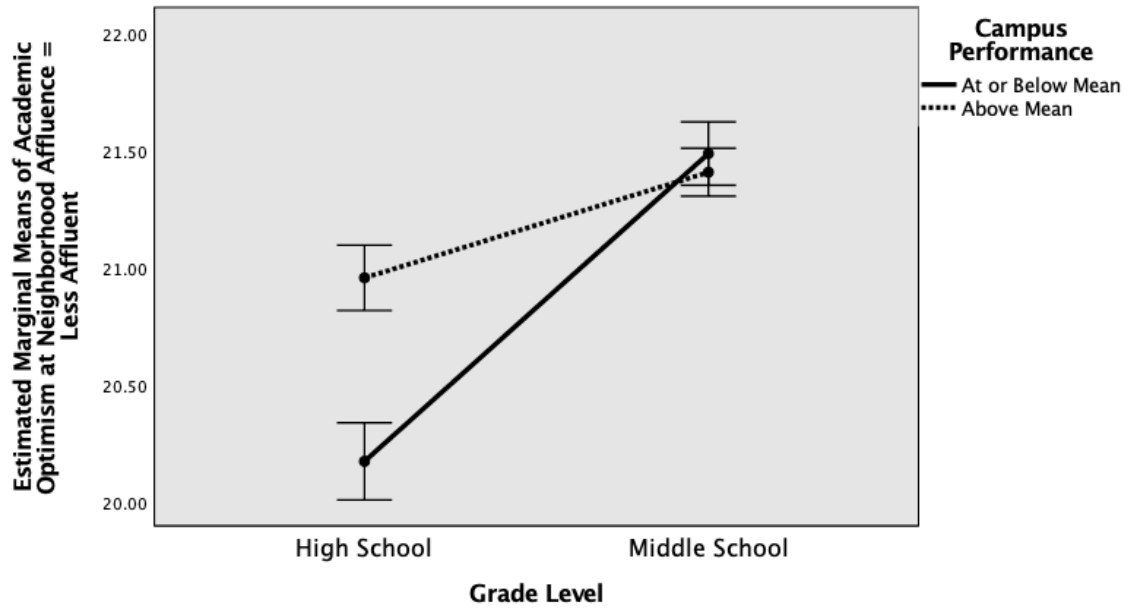

Figure 4.25 *Estimated Marginal Means of Safety and Belongingness in Schools Situated in Less Affluent Neighborhoods by Grade Level and Campus Performance*

Grade Level X Campus Performance Interaction with Less Affluent Neighborhood Group – Academic Optimism

For students enrolled in schools situated in less affluent neighborhoods, high school students in lower performing schools (M=20.18) reported lower levels of academic optimism than middle school students enrolled in higher performing schools (M=20.96). However, middle school students responded similarly with respect to connectedness regardless of whether they were enrolled in a higher performing school (M=21.48) or a lower performing school (M=21.41).

Chapter Summary

This quantitative study was designed to make predictions about perceptions of school climate factors and self-reported academic self-efficacy and measure other relationships that exist between these constructs and the characteristics of grade level, campus performance and neighborhood affluence. The results from the weighted least squares regression indicate that the school climate factors of connectedness, classroom environment, safety and belongingness, and academic optimism were all significant, however, academic optimism and classroom environment has the highest contribution to the amount of variance observed in academic self-efficacy in secondary students than connectedness and safety and belongingness.

The results from the weighted least squares regression with school climate factors entered sequentially in the order of classroom environment, academic optimism, safety and belongingness, and connectedness showed that the greatest portion of the variance can be explained by the school climate factors of classroom environment and academic optimism. The factors of safety and belongingness and connectedness each contributed less than 1% to the variance of the outcome variable. Academic self-efficacy can be more efficiently predicted using a regression model using the school climate factors of classroom environment, contributing 20.3% of the variance, and academic optimism, contributing 5.4%.

The results from the multivariate analysis of variance revealed that grade level, campus performance, and neighborhood affluence resulted in statistically significant differences across the dependent variables of connectedness and academic optimism. Only grade level produced significant effects in classroom environment in contrast to safety and belongingness, where only campus performance and neighborhood affluence produced significant differences in responses. Academic self-efficacy was not significant for the independent variables grade level and campus

performance but was significant for neighborhood affluence. Only nine of the 15 main effects were found to be statistically significant. Univariate analyses indicated that high school students generally reported significantly lower levels of connectedness, less favorable classroom environments, and lower levels of academic optimism than middle school students. Students enrolled in higher performing campuses reported significantly lower levels of connectedness, safety and belongingness and academic optimism than students enrolled in lower performing campuses. Students enrolled in schools situated in more affluent neighborhoods reported significantly higher levels of connectedness, safety and belongingness, academic optimism, and academic self-efficacy when compared to students enrolled in schools situated in less affluent neighborhoods. Only 10 of the 20 between-group and within-group interactions were significant. However, inspecting the partial eta squares, or effect sizes indicated that significant dependent variables register effect sizes of 0.020 to 0.001, indicating very small effect, which may be due to the homogeneous composition of the student sample. This chapter provided the results the methodologies outlined in Chapter 3. Chapter 5 includes a discussion of the results, connections to related literature, and recommendations practice and future studies.

Chapter 5: Discussion

The purpose of this quantitative study was to better understand the role of the factors of school climate on academic self-efficacy. This chapter includes a discussion on the major findings as related to the literature on school climate and academic self-efficacy, and connections to relevant research. Also included are recommendations for practice and for future research. This chapter concludes with the limitations and strengths of the study and a brief summary.

This study sought to answer the following research questions.

Research Question 1: How do the identified school climate factors contribute to the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 2: Which combination of school climate factors provide the strongest explanation of the amount of variance observed in self-reported academic self-efficacy in secondary students?

Research Question 3: Do relationships exist between the identified outcome and predictor variables (academic self-efficacy and school climate factors) and the factors of grade level, campus performance, and neighborhood affluence of secondary students??

Discussion

This study examines the school climate factors of connectedness, classroom environment, safety and belongingness, and academic optimism as predictors of academic self-efficacy. The school climate factors of connectedness, classroom environment, safety and belongingness, and academic optimism were significant in predicting academic self-efficacy. These four factors contribute to the variance observed in secondary students' self-reported academic self-efficacy. However, academic optimism and classroom environment contributed the most to the amount of variance observed in secondary students' self-reported academic self-efficacy. The school

climate factors of connectedness and safety and belongingness, while significant predictors of academic self-efficacy, only contributed to less than 1% of the amount of variance. The results obtained from the multiple regression analyses have a number of important implications but should be interpreted with caution due to the limitations which will be discussed later in this chapter.

Firstly, classroom environment was found to contribute the greatest amount of variance observed in self-reported academic self-efficacy in secondary students. Classroom environment was also significant in some main and between-group interaction effects. A learner-centered, learner-independent climate, in contrast to a teacher-centered climate, characterizes a cooperative and collegial classroom environment (Oder and Eisenschmidt, 2018). Collaborative learning environments are indicative of a school climate that promotes student learning (Cohen et al., 2009; Thapa et al., 2013). This teaching and learning environment is one that teachers and administrators should continuously strive for to improve student academic self-efficacy. Thapa et al. (2013) suggests that clearly defined norms, goals and values need to be established to promote a positive classroom environment. The results of this study confirm the findings of Dorman (2001) and Daemi et al. (2017) in that classroom environment was linked to student academic self-efficacy. Based on the results of this study, classroom environment as a factor of school climate is an important predictor of academic self-efficacy. When students are consistently provided opportunities for relevant and rigorous teaching and learning facilitated by capable and dynamic teachers, they will have a greater confidence in their academic knowledge and skills and will be able to persist when faced with challenging academic tasks. This result supports the research of Dorman and Adams (2004) that positive classroom environments, such

as those characterized by high levels of cooperation, collaboration, genuine teacher support, task orientation, and equity are more likely to improve student efficacy for high school students.

Secondly, academic optimism was found to be the next highest contributor to the amount of variance observed in self-reported academic self-efficacy in secondary students. Academic optimism was also significant in several main, between-group, and within-group interaction effects. There are several studies that examine academic optimism in teachers but there are limited studies of academic optimism in students. Hoy et al. (2006) identified academic optimism as a construct that can be learned and developed, in contrast to academic pessimism. Hoy et al. (2006) also found that academic optimism mediates the effect of socio-economic status on academic achievement. Principal and teacher behaviors are critical in cultivating academic optimism. Hoy et al. (2006) suggested that principals foster academics, celebrate student faculty academic achievements, cultivate a culture of learning from successful practices, and promote meaningful interactions between teachers and parents. Tschannen-Moran et al. (2012) noted that the benefits of student achievement is a consequence when teachers and schools place a high value on academics and encourage students to identify with their school. Based on the results of this study, academic optimism is the next most important predictor of academic self-efficacy. When students feel that their academic work is valuable and translates to future academic success, they have a greater belief that they have sufficient knowledge and skills and have the strategies to overcome more challenging academic tasks. This result confirms the significant positive relationship between self-efficacy and academic optimism observed from teachers (Sezgin & Erdogan, 2015) and first year college students (Chemers, et al., 2001). As academic optimism increases, higher levels of academic efficacy can be acquired by secondary students.

Thirdly, the results from the multivariate analysis of variance revealed that grade level and campus performance did not result in statistically significant differences in academic self-efficacy. However, neighborhood affluence resulted in statistically significant differences in academic self-efficacy. This result is comparable to the findings of Satici and Can (2016) who determined that college level students who reported lower socio-economic status have a lower level of academic self-efficacy. This result may be due to financial constraints which lead to family stress and reduced opportunities to extended learning experiences outside of school that may require a financial investment.

Of the twenty possible interactions among the three key factors, only 10 interactions produced significant results. For the most part these analyses involved typically the classroom environment, safety and belongingness, and the academic optimism variables as yielding significant results. In addition, these results indicated that high school students generally reported significantly lower levels of connectedness, less favorable classroom environments, and lower levels of academic optimism than middle school students. Students enrolled in higher performing campuses reported significantly lower levels of connectedness, safety and belongingness and academic optimism than students enrolled in lower performing campuses. Students enrolled in schools situated in more affluent neighborhoods reported significantly higher levels of connectedness, safety and belongingness, academic optimism, and academic self-efficacy when compared to students enrolled in schools situated in less affluent neighborhoods. However, the values of the effect sizes indicated that these significant dependent variables resulted in effect sizes of 0.020 to 0.001, indicating very small effect, which may be due to the homogeneous composition of the student sample.

Recommendations for Practice

The findings of this study have important implications for educational leaders seeking to improve academic self-efficacy in secondary students through school culture. In the least, it may be more efficient to require responses to questions on academic optimism and classroom environment when predicting academic self-efficacy of secondary students and campus intervention efforts should be focused on improving the classroom environment and fostering academic optimism. The following recommendations are made for educational leaders as a result of these findings.

Engage teachers in making deliberate efforts to build academic self-efficacy through engaging classroom environments that emphasize learning and understanding. Because academic self-efficacy is strongly related to academic outcomes, educational leaders should consider building capacity in teachers to intentionally build academic self-efficacy in secondary students. Desravines et al. (2016) suggested that principals foster academic self-efficacy by encouraging environments where students can take academic risks, make mistakes, and reflect on their learning.

For most states, districts and schools are guided by the content standards that determine what students need to know and be able to do. Districts and schools are held accountable by state assessments that measure student learning. This study found that classroom environment and academic optimism best predict academic self-efficacy. Hence, it is important for a principal to recognize that academic self-efficacy, a strong predictor of academic achievement, is not achieved through superficial instruction commonly associated with "teaching to the test." When students are able to actively engage with rigorous and relevant content they are able to achieve a deeper understanding of the content and practice critical thinking skills that can be applied to

other endeavors. In Texas, students receive one of three performance ratings for each state assessment: Approaches Grade Level, Meets Grade Level, and Masters Grade Level. Texas accountability measures ensure that schools are given more credit for students who not only achieve at the Masters level but are able to make gains from one level to the next, with the most points for students who make the greatest gains to achieve Masters level (TEA, 2019). Powerful instructional practices that engage and challenge each student can make a difference in promoting academic achievement and academic self-efficacy.

Cultivate a campus culture that celebrates academic achievements. A campus that emphasizes academic optimism cultivates a culture that celebrates the academic achievements students, faculty, and staff. Desravines et al. (2016) suggested that campuses publicly celebrate the academic achievements of students, faculty, and staff in order to energize their peers in pursuing their own academic goals. This action also highlights the importance of persisting in the face of adversity and viewing challenges as opportunities to learn and connect with people when needed. Students who see their peers and the adults in their school strive for academic success may be inspired by these individuals' efforts and are able to attach value to academic tasks that contributed to their peer's success, thereby increasing academic optimism.

Utilize campus climate surveys to provide a greater understanding of student voice. District and campus leaders have the opportunity to determine which factors are most relevant to students from the large amount of data provided by routine school climate surveys. Analysis of school climate data can provide a more targeted intervention to improve student outcomes. By analyzing data according to constructs rather than individual survey items, district and campus leaders can be more intentional in selecting strategies that can improve the quality of school experiences for secondary school students.

Recommendations for Future Research

There is a wealth of data that can be found in local districts in their efforts to measure school climate for continuous campus improvement. However, as in the case of Border ISD, the treatment of the data does not go far beyond descriptive statistics. Firstly, research can be conducted in constructs beyond school climate and academic efficacy with strategic adjustments to the instrument and/or to the administration of the survey. While there are many items that can be added to the instrument to measure a variety of constructs, the most important adjustment in the instrument would be to include academic outcome items in the student survey, such as most recent grade in each of their core classes, or whether the student passed their most recent state assessment because of accountability measures. Secondly, research can also be conducted on the school climate factors of connectedness, safety and belongingness, academic optimism, and classroom environment as outcomes when examined relative to each other or to other constructs. Lastly, because of the large amount of data systematically collected by districts like Border ISD, research can also be expanded to longitudinal study of school climate data to determine if strategic climate improvement efforts produce statistically significant differences between data collection cycles.

Limitations and Strengths

Findings from this study suggest that continued investigation of more diverse samples of students is worthy of further study. However, there are some limitations which restrict the generalization of these findings. Firstly, this investigation is based on a sample of a large urban school district with a specific student composition reporting on their perception of school climate and academic self-efficacy for the particular administrative, instructional, and support staff employed during the school year 2018-2019. Thus, the results of this study should be generalized

with caution. Secondly, the participants were children between the ages of 10 and 18 taking the survey in a school setting, so the participants may have responded in terms of what they perceived to be the desired answers. Thirdly, unexplained variance calls for the inclusion of other variables that might predict the academic self-efficacy of the secondary students, thus more research is required to determine which factors are able to better explain the variance in academic self-efficacy. Fourthly, in most school climate studies student achievement data, such as standardized tests scores, would be analyzed as the outcome variable. However. due to the anonymous nature of the climate survey the researcher did not have access to this data. Instead, only student perceptions of self-efficacy were examined. Finally, demographic information for participants was not available at the student level but was publicly available at the school level from the TEA website. Findings from the analysis of the demographic information with respect to the school climate factors and academic optimism should be interpreted with caution.

The strengths of this study are that it is of a large sample size, with a composition of predominantly Hispanic participants, with 22 schools, with students ranging from 10 to18 years old across the different grade levels, in a large, urban, border school. The results, when compared to other school climate survey results with similar constructs will permit future research on the topic.

Chapter Summary

The results of this study indicated that from the proposed model of key factors of school climate in relation to students' perceived levels of academic self-efficacy, the most significant factors, in relation to variance explained, observed for this sample of 22 secondary schools were classroom environment and academic optimism. This study has extended the literature of academic self-efficacy by linking it with school climate factors. Conceptually, these two

constructs are different in that academic self-efficacy is regarded as a personal belief and school climate is a perception of external factors. Research has provided compelling evidence that both academic self-efficacy and school climate are both strong predictors of academic and behavior outcomes and much research will be required to further examine the relationships between these two constructs. In a more practical view, campus intervention efforts that seek to improve self-efficacy, and consequently academic achievement, should be focused on engaging students through powerful classroom practices and intentional activities that improve academic optimism for students. Results from this study show that there is a means to improve student outcomes that go beyond standardized tests. Students' beliefs in their own abilities to overcome academic challenges is a belief that will impact outcomes not only in academic settings but also in their lives after school. It has always been the responsibility of all campus and district leaders to create the most conducive school climate conditions for their students to be able to successfully navigate their next endeavor, whatever the students deem it to be. Hopefully in future studies, the meaningful use of school climate data allows schools and districts to respond more intentionally to the needs of students.

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Appendix

Appendix A: Border Independent School District School Climate Survey

2018-2019 School Climate Survey for Secondary Students

A. Answer the following questions about your school.

1. School:_____
2. Grade:_____

B. Please answer the following about your school.

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
1. I feel safe at this school.					
2. I feel like I belong at this school.					
3. I feel challenged at this school.					
4. I understand how to apply what I learn at school to real-life situations.					
5. Teachers encourage me to assess the quality of my own work.					
6. This school is preparing me well for what I want to do after middle/high school.					
7. I am treated with respect by teachers.					
8. I am treated with respect by school administrators.					
9. I am treated with respect by other students at this school.					
10. The work at this school is challenging.					
11. I feel successful at school.					
12. I think this is a good school.					
13. Doing well in school makes me feel good about myself.					
14. I am doing my best in school.					
15. Students at this school have opportunities to learn from each other.					
16. Participating in extracurricular activities is important to me.					

C. My teachers:

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
17. Expect students to do their best.					
18. Set high standards for achievement in their classes.					
19. Have confidence in me.					
20. Care about me.					
21. Make learning fun.					
22. Are excited about the subject they teach.					
23. Give me individual attention when I need it.					
24. Challenge me to do better.					

D. I am ready for the real world in reference to:

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
25. My ability to write.					
26. My ability to read.					
27. My ability with mathematics.					
28. My ability to present information.					
29. My technology skills.					

E. In my classes, time is spent:

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
30. Listening to the teacher talk.					
31. In whole-class discussions.					
32. Working in small groups.					
33. Answering questions from a book or worksheet.					
34. Working on projects or research.					
35. Doing work that I find meaningful.					
36. Using technology.					

F. I work well when:

Statements	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Applicable
37. I am working on projects or research.					
38. The teacher is leading a discussion with the whole class.					
39. I am working in a small group.					
40. I am working by myself.					

G. Comments:

Vita

Marianne Arzadon Torales was born in Leyte, Philippines. She graduated from the Philippine Normal University in Manila, Philippines with a degree in Bachelor of Secondary Education Major in Physics. She started her career in education as a college instructor at the University of Makati, in Makati City, Philippines teaching physics and mathematics courses. In the fall of 2002, Marianne took a leap of faith and became a high school teacher in El Paso, Texas. Since then she has taught a variety of secondary science courses in the three largest school districts in El Paso, Texas. She has presented in local and state conferences including the American Association of Physics Teachers/American Physics Society/Society of Physics Students (AAPT/APS/SPS) 2009 Spring Meeting, Reading Opens Doors: 2nd Annual Regional Reading Conference, Conference for International Research on Cross-Cultural Learning and Education (CIRCLE), Conference for the Advancement of Science Teaching (CAST), and has conducted several teacher professional development sessions for science content, technology, and best practices. She has worked at the regional level as a professional development consultant, at the district level as an instructional specialist, and at the campus level as a teacher, curriculum coach, and intervention coach. She has also taught Curriculum in the Secondary Setting to future educators for the University of Texas at El Paso.

Marianne received her Master of Education in Instructional Specialist Science in 2009 and began her Doctor of Education in Educational Leadership and Administration in 2017. Marianne plans to continue her work in cultivating meaningful and relevant educational experiences for all K-12 students by effecting student-centered campus and district practices.