

The impact of self-efficacy and acculturation on the mathematics performance of immigrant students or minority students with an immigrant background in an urban high school

by

Evangeline Li

B.B.S., Temple University, 2011

M.Ed., Lehigh University, 2018

AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Curriculum & Instruction
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2024

Abstract

This dissertation investigated the academic performance of immigrant high school students in urban settings, focusing specifically on mathematics. Drawing on Bandura's self-efficacy theory and Zea and colleagues' acculturation framework, the study explored the complex interplay between sources of self-efficacy, acculturation dimensions, and other factors in relation to academic outcomes. The research encompassed urban high school students in a U.S. northeastern region, employing regression analysis for quantitative insights. The findings revealed and underscored the significant impact of particular sources of self-efficacy on academic performance, emphasizing their pivotal role. Acculturation dimensions displayed varied correlations, urging educators to recognize and integrate students' cultures of origin. The study also indicated the importance of tailored support, cultural responsiveness, and awareness of potential biases in various aspects. This dissertation contributed theoretical, methodological, research, and practical insights that deepen academic understanding and guide educators, administrators, and policymakers in fostering a more equitable and supportive learning environment for immigrant students.

The impact of self-efficacy and acculturation on the mathematics performance of immigrant students or minority students with an immigrant background in an urban high school

by

Evangeline Li

B.B.S., Temple University, 2011
M.Ed., Lehigh University, 2018

A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

Department of Curriculum & Instruction
College of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2024

Approved by:

Major Professor
Spencer Clark, Ph.D.

Copyright

© Evangeline Li 2024.

Abstract

This dissertation investigated the academic performance of immigrant high school students in urban settings, focusing specifically on mathematics. Drawing on Bandura's self-efficacy theory and Zea and colleagues' acculturation framework, the study explored the complex interplay between sources of self-efficacy, acculturation dimensions, and other factors in relation to academic outcomes. The research encompassed urban high school students in a U.S. northeastern region, employing regression analysis for quantitative insights. The findings revealed and underscored the significant impact of particular sources of self-efficacy on academic performance, emphasizing their pivotal role. Acculturation dimensions displayed varied correlations, urging educators to recognize and integrate students' cultures of origin. The study also indicated the importance of tailored support, cultural responsiveness, and awareness of potential biases in various aspects. This dissertation contributed theoretical, methodological, research, and practical insights that deepen academic understanding and guide educators, administrators, and policymakers in fostering a more equitable and supportive learning environment for immigrant students.

Table of Contents

List of Figures	xi
List of Tables	xii
List of Equations	xiii
Acknowledgements	xiv
Dedication	xvi
Preface.....	xvii
Chapter 1 Introduction	1
1.1 Self-Efficacy	3
1.1.1 Mastery Experiences	4
1.1.2 Vicarious Experiences	4
1.1.3 Verbal Persuasion	5
1.1.4 Physiological and Emotional States	5
1.2 Acculturation	6
1.3 Understanding the Problem	7
1.3.1 Research Question 1	7
1.3.2 Research Question 2	7
1.3.3 Research Question 3	7
1.4 Significance	7
Chapter 2 Literature Review	10
2.1 Theoretical Framework.....	10
2.1.1 Social Cognitive Theory	11
2.1.2 Self-Efficacy Theory.....	12
2.1.2.1 Four Sources of Self-Efficacy.....	13
2.1.3 Acculturation Theory	14
2.1.3.1 Multidimensional Acculturation	16
2.1.4 Age and Grade Level	18
2.1.5 Gender	19
2.1.6 Age at Arrival	20
2.1.7 Immigrant Generation	21

2.2 An Overview of Immigrant Legislations and Educational Reforms	23
2.2.1 Social Acceptance	26
2.2.2 School & Curriculum Improvements	29
2.2.3 Individual Struggles	31
2.2.4 Cultural Gaps	32
2.2.5 School Social Involvement	34
2.2.6 Academic Performance	35
2.2.7 Higher Education Opportunity	36
2.3 Factors Affecting Immigrant Student Self-efficacy and Academic Performance	36
2.3.1 Language Barriers	37
2.3.2 Prior Education	38
2.3.3 Early Experience with Math Learning	39
2.3.4 Cultural Differences	40
2.3.5 Socio-Economic Family Background and Resources	42
2.3.6 Parental Education and Involvement	43
2.3.7 Societal and Education System	44
2.3.8 Student Agency	46
2.3.9 School Infrastructure and Safety	48
2.3.10 Class Size and Student Teacher Ratio	49
2.3.11 Technology Adaptation	49
2.3.12 Peer Effects and Community Influence	51
2.4 Summary	52
Chapter 3 Methodology	54
3.1 Research Questions and Hypotheses	54
3.1.1 Hypotheses 1	55
3.1.2 Hypotheses 2	55
3.1.3 Hypotheses 3	56
3.2 Independent and Dependent Variables	57
3.3 Research Design	61
3.4 Research Methodology	62
3.5 Research Site and Participants	63

3.6 Data Collection	65
3.7 Instrumentation	66
3.7.1 Sources of Self-Efficacy in Mathematics Scale (SSEMS).....	67
3.7.2 Abbreviated Multidimensional Acculturation Scale (AMAS)	68
3.7.3 End-of-Year Math Course Grade	69
3.7.4 State Mathematics Standardized Assessment	70
3.8 Data Analysis.....	71
3.9 Validity	73
3.10 Reliability.....	73
3.11 Role of the Researcher	78
3.12 Limitations	80
Chapter 4 Results	82
4.1 Participants.....	83
4.2 Regression Results.....	85
4.2.1 Sources of Self-efficacy	87
4.2.2 Dimensions of Acculturation	87
4.2.3 Other Demographic Variables	88
4.2.4 Results 1	93
4.2.5 Results 2.....	94
4.2.6 Results 3.....	95
4.3 Summary	97
Chapter 5 Discussion	100
5.1 Interpretation of the Findings from the Theoretical Framework	100
5.2 Evaluation and Discussion of the Research Questions	103
5.2.1 Evaluation & Discussion 1.....	103
5.2.2 Evaluation & Discussion 2.....	107
5.2.3 Evaluation & Discussion 3.....	114
5.3 Summary	125
Chapter 6 Implications & Conclusions	128
6.1 Implications	129
6.1.4 Theoretical Implications	129

6.1.5 Methodological Implications	130
6.1.6 Research Implications	131
6.1.6.1 Mixed Methods Approach	131
6.1.6.2 Longitudinal Studies	132
6.1.6.3 Exploring Mechanisms	132
6.1.6.4 Exploring Contextual Factors	133
6.1.6.5 Exploring Other Factors.....	133
6.1.7 Practical Implications.....	134
6.1.7.1 Prioritizing Mastery Learning & Verbal Persuasion	134
6.1.7.2 Culturally Relevance & Responsive Teaching	136
6.1.7.3 Addressing Acculturation Stress & Issues	137
6.1.7.4 Mitigating Cultural Bias	137
6.1.7.5 Gender Considerations.....	138
6.1.7.6 Support for Different Grade Levels	139
6.1.7.7 Support for Late Arrivals	140
6.1.7.8 Encouraging Parental Involvement.....	141
6.1.7.9 Class Size Considerations	142
6.2 Limitations	143
6.2.1 Generalizability	143
6.2.2 Sample Size.....	144
6.2.3 Reliance on Self-Reported Data.....	144
6.2.4 Correlational Research Design.....	145
6.2.5 Academic Performance Indicators	146
6.2.6 Scope of Variables	146
6.3 Conclusions.....	147
References.....	151
Appendix A Principal Approval	192
Appendix B IRB Approval	193
Appendix C Parent Consent Form	194
Appendix D Student Assent Form	197
Appendix E Survey Instrument.....	198

1.1.1.1.1.1	Section I	198
1.1.1.1.1.2	Section II.....	204
1.1.1.1.1.3	Section III.....	211

List of Figures

Figure 1.1. 2015-2021 Pennsylvania Keystone exam performance across all subjects.....	4
Figure 1.2. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance.....	4
Figure 1.3. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance by urban-centric locale	8
Figure 1.4. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance by urban-centric locale	1
Figure 1.5. A comparison of a typical urban high school versus the state mathematics assessment average performance	1
Figure 1.6. 2015-2022 Keystone exam student-level mathematics performance	2
Figure 1.7. Regression coefficient plot on the model estimate for mathematics assessment score5	
Figure 2.1. Bandura’s Reciprocal Determinism (1978).....	12
Figure 2.2. Immigrate Students’ Mathematics Self-Efficacy Conceptual Model.....	22
Figure 3.1. Timeline for the dissertation research process	74
Figure 4.1. Regression coefficient plot of all explanatory variables in relation to the state assessment scores (left) and course grades (right).	92
Figure 5.1. Regression coefficient plot of the four sources of self-efficacy with state assessment scores (left) and course grades (right).	106
Figure 5.2. Regression coefficient plot of the different aspects of acculturation with state assessment scores (left) and course grades (right).	113
Figure 5.3. Regression coefficient plot of the moderating effects of gender and grade level on state assessment scores (left) and course grades (right).	116
Figure 5.4. Regression coefficient plot of the moderating effects of Age of Arrival to the U.S. on state assessment scores (left) and course grades (right).	118
Figure 5.5. Regression coefficient plot of the moderating effects of other moderating variables on state assessment scores (left) and course grades (right).	122
Figure 5.6. Regression coefficient plot of the moderating effects of immigrant generation on the state assessment scores	124

List of Tables

Table 1.1. Descriptive statistics by urban-centric locale	1
Table 1.2. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance descriptive statistics by year	6
Table 1.3. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance descriptive statistics by urban-centric locale	2
Table 1.4. 2015-2022 Keystone mathematics exam student-level summary statistics.....	8
Table 1.5. Regression estimates of the student-level data of an urban high school	3
Table 3.1. Statistical Analysis and Variables.....	59
Table 3.2. Research Study Timetable	76
Table 4.1.1. Demographic Summary Statistics Table of Research Participants.....	83
Table 4.2.2. Simplified Demographic Summary Statistics Table of Research Participants.....	84
Table 4.3. Regression estimates.....	85

List of Equations

Equation 1.1. Estimated mathematics assessment score model.....	4
Equation 4.1. Estimated model 1	90
Equation 4.2. Estimated model 2	90

Acknowledgements

Embarking on this dissertation journey has been a transformative experience, and I am sincerely grateful to those who have played pivotal roles in its realization.

First and foremost, I extend my deepest appreciation to my dissertation chair, Dr. J. Spencer Clark, for providing me with the invaluable opportunity to delve into this research. His guidance, patience, and unwavering support have been instrumental in shaping the trajectory of this scholarly pursuit.

A special acknowledgment goes to Dr. Tuan Nguyen, whose expertise in quantitative research illuminated the path forward. I am deeply grateful for his instruction, support, and expertise, which were crucial throughout the challenging phases of this research.

To the esteemed members of my dissertation committee, Dr. Cynthia Shuman and Dr. Michael Lawson, I express my heartfelt gratitude. Their generous investment of time, provision of insightful feedback, and scholarly guidance have been indispensable throughout this research journey. Their collective expertise has significantly contributed to the refinement and scholarly rigor of this work.

I also extend appreciation to Chanh Bao Lam, the TA whose assistance significantly contributed to the smooth progression of the research. His support has been invaluable and is deeply appreciated.

I am sincerely grateful to Kansas State University for the generous scholarships and financial support that made this academic pursuit possible. The university's commitment to fostering academic excellence has been a cornerstone of my educational journey.

To my family, the bedrock of my strength and resilience, I extend profound gratitude. Their unwavering support and understanding have been the driving force behind the successful completion of this dissertation.

A collective thank you is extended to my colleagues and coworkers whose collaborative spirit fostered an enriching teaching and learning environment, providing substantial help and support in achieving this milestone.

Lastly, to all my friends who offered words of encouragement, support, and camaraderie, thank you for being an integral part of this significant chapter in my academic journey.

This dissertation is a collective achievement, and I am profoundly thankful to each individual and organization who has contributed to its realization. Their presence has made this chapter in my academic journey truly significant.

Thank you.

Evangeline Li

February 2024

Dedication

I dedicate this research to the world education realm, recognizing the transformative power of education to shape minds, nurture spirits, broaden horizons, and create positive change. May this work contribute, in its own modest way, to the collective pursuit of knowledge and the advancement of education worldwide.

Preface

As the author of this dissertation, I am compelled to share a personal journey that has profoundly shaped the trajectory of my academic and professional pursuits.

My educational odyssey began in the bustling metropolis of Shanghai, where I navigated the corridors of elementary school before embarking on a transformative journey to the United States during my middle school years. Settling in a small urban northeastern region, I encountered a vibrant and diverse urban landscape that contrasted sharply with my previous experiences. Later, a move to a suburban enclave in New Jersey exposed me to yet another facet of American life, enriching my understanding of cultural diversity and educational systems.

Throughout my high school and college years, I developed a deep affinity for mathematics, a subject that offered me a sense of stability and purpose amidst the challenges of adapting to a new language and culture. While English posed hurdles in literature and history, mathematics provided a universal language through which I could excel and communicate with confidence.

Drawing from my own immigrant experience and educational journey, I embarked on a career in teaching, determined to empower young immigrant learners to pursue their academic passions in STEM-related fields. It was this dedication that led me to explore the factors influencing the academic performance of immigrant high school students in urban settings, with a specific focus on mathematics.

Through rigorous research and analysis, I delved into the complexities of self-efficacy and acculturation, drawing on established theories to illuminate the pathways to academic success. The findings of this study underscored the critical role of self-efficacy in shaping

learning outcomes while also highlighting the interplay of acculturation dimensions and other demographic moderators.

As I reflect on my own journey and the insights gleaned from this study, I am reminded of the profound impact that the process of learning and acculturation experiences can exert on the lives of immigrant students. An adage, "Schooling is a pair of glasses that you can never take off after you put them on," resonates deeply with me, emphasizing the lasting influence of education and experiences on individuals' perceptions and beliefs. It is my hope that this dissertation will not only deepen our understanding of the challenges faced by immigrant learners but also inform strategies to foster a more equitable and supportive learning environment for all students.

In closing, I extend my heartfelt gratitude to all who have supported me on this journey, from mentors and colleagues to family and friends. It is through your guidance and encouragement that I have been able to embark on this scholarly endeavor, and for that, I am truly grateful.

Chapter 1 Introduction

The United States of America is brimful with opportunities open to everyone, regardless of race, ethnicity, country of origin, and socioeconomic class, to attain better lives through education, hard work, and perseverance. In the 19th and early 20th centuries, no longer after the early European immigrants, a flow of opportunity seekers from Latin American and Caribbean areas migrated to the nation searching for stability and employment. Some were war refugees and political exiles from the Mexican Revolution (1910-1920) who fled to the U.S. to escape the war and violence; some were attracted by the new mining and agriculture industry job opportunities; others came after their families and friends for reunions. Over the past half-century, greater influxes of Hispanic migrants arrived in the U.S. for higher compensated jobs, greater economic opportunities, better healthcare, and quality education. From the mid-20th century onward, Latinos emerged as the largest migrant population in the nation. In 2018, nearly 44.8 million immigrants, or 13.7% of the nation's population, were living in the U.S.; The nation's Hispanic or Latino population went from less than 14.8 million in 1980 to more than 33.1 million in 2020, making up 18.5% of the nation's population (U.S. Census Bureau, 2021). On average, approximately one out of four public school students in the U.S. came from an immigrant family with at least one immigrant parent (Peguro & Jiang, 2014); some urban area public schools comprised more than 90% of Hispanic students. A continually growing migrant population from Mexico, Puerto Rico, and the Dominican Republic unceasingly added disproportionately to the number of low-income students in public schools (Griffith, 2017). Hispanic students constituted 22.7% of all the people enrolled in school, and the rate was continually increasing in many urban public schools (U.S. Census Bureau, 2021). Based on the

rapid growth rate, by the year 2050, more than 20 million school-age immigrant Latinos were projected to live in the United States (Chapa & De La Rosa, 2006).

Without a high school diploma or its equivalent, the American dream was a pipe dream for impoverished immigrants and newcomers because achieving monetary success and career stability was almost impossible in the absence of education in today's world. Unlike native-born Americans, immigrants had to continually confront substantial challenges and deficiencies in language and communication, dominant culture, resources, and networks. Education was the only pathway for immigrants to step onto the upper social ladder and achieve upward mobility. A high school diploma or equivalent was a critical indicator of student success in high school and a predictor of future success in life. People with a high school diploma or higher were found to have a higher compensated job, more stable job, better working conditions, and greater self-esteem (Clark & Martorell, 2014). Conversely, people without a high school diploma earned 63% lower pay per dollar than a high school graduate (U.S. Department of Labor, 2023); Health insurance was not always readily available, and career advancement is limited (Steinberg et al., 2006). High school dropouts were more likely to commit poor health and medical decisions and had delinquent involvement and illicit drug or substance abuse issues (Chavez et al., 1989; Reyna & Brainerd, 2007; Vázquez-Nava et al., 2019). Thus, high school education was also highly correlated to health outcomes and life satisfaction; it provided students with higher education opportunities and other lifelong opportunities beyond college and jobs. Students with a high school diploma were more likely to stay employed and have perseverance in finishing tasks that may nurture their self-esteem and self-concept.

However, the high school student dropout rate was high in many urban areas (see Table 1.1) for the past years. Table 1.1 disclosed descriptive statistics of all schools in Pennsylvania by

urban-centric locale. The data showed the mean number of students in each category, and the numbers in parentheses were the standard deviations.

Table 1.1. Descriptive statistics by urban-centric locale

	City	Suburb	Town	Rural	Total
Total Enrollment	622.22 (787.70)	660.33 (540.75)	496.63 (645.74)	431.96 (252.20)	587.18 (577.64)
Low Income Enrollment	436.77 (464.11)	236.81 (264.88)	235.62 (251.32)	182.69 (113.56)	266.89 (309.08)
English Language Learners	75.55 (118.81)	22.65 (39.83)	7.06 (11.89)	7.19 (11.03)	31.77 (69.79)
Dropouts	12.65 (37.76)	6.18 (21.67)	8.29 (48.70)	2.92 (4.20)	7.49 (29.13)
Graduate Count	157.92 (165.69)	244.99 (165.59)	139.72 (143.73)	107.03 (79.45)	176.55 (155.73)
Total College Bound	81.48 (86.85)	170.73 (135.73)	74.62 (68.00)	62.24 (54.37)	110.85 (112.41)
2- or 4-Year College or University	78.65 (84.83)	166.99 (134.51)	70.71 (62.65)	60.01 (53.56)	107.69 (110.80)
Total Postsecondary Bound	85.22 (89.78)	174.47 (137.18)	78.56 (69.79)	64.69 (55.38)	114.27 (113.99)
Non-Degree-Granting Postsecondary School	3.74 (7.47)	3.73 (5.95)	3.94 (5.51)	2.46 (3.21)	3.42 (5.71)
Specialized Associate Degree Granting Institution	2.83 (5.01)	3.74 (5.96)	3.92 (8.15)	2.23 (3.01)	3.16 (5.51)

Note. The data showed an average number of students in each urban-centric category. Standard deviation in parentheses.

As can be seen, the numbers of English language learners and students with low-income family backgrounds in City areas were much higher than the numbers in the other categories. The average number of dropouts was also twice as much as the average number in Suburb and more than four times greater than the average number in Rural areas. Then, the average numbers of high school graduates, students intending to go to college or postsecondary school, and students in a two-year or four-year college or university were lower in City areas than in the other categories. Immigrant students were commonly English language learners, and their families often resided in large cities due to more manual job opportunities, diverse and cheaper housing, and convenient transportation. The data indicated that students with immigration and low-income backgrounds who reside in City areas have a higher risk of being a dropout and a lower chance of attending colleges or universities.

Data from the U.S. Department of Education (2020) also indicated that educational attainment among immigrants varied widely by region of origin and Hispanic immigrants had a significantly lower educational attainment than the other immigrant groups. Nationally, more than 1/3 of the Hispanic population did not have a basic high school diploma (U.S. Census Bureau, 2021). The percentage of Hispanics holding a bachelor's degree or higher was 16% compared to the nation's 32%; the percentage having a two-year degree was 25% compared to the nation's 29%; the percentage holding a high school diploma or its equivalent or lower was 59% compared to the nation 39% (Pew Research Center, 2019). Nearly 71% of foreign-born Hispanics and 47% of U.S.-born Hispanics had a high school diploma or lower education (Budiman et al., 2020). According to U.S. Census data (2021), in Pennsylvania, Hispanics had the highest rate of 28.1% female and 33.3% male in lacking a high school diploma or equivalent compared to Whites, 8.2% female and 8.8% male. It specified that approximately 134.2 thousand

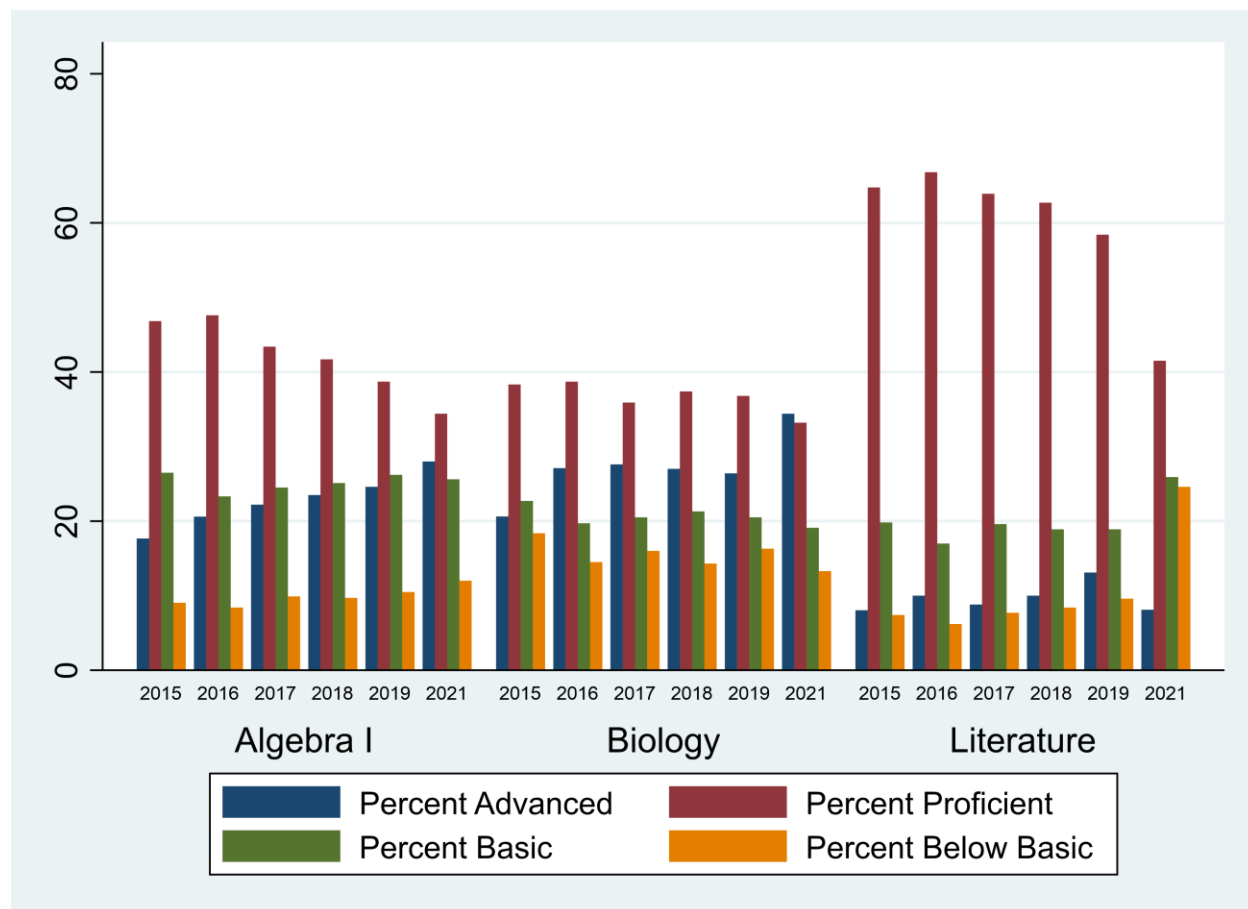
Hispanic people living in Pennsylvania did not complete their high school education. Also, in Pennsylvania, Hispanics had the lowest rate of 17.2% female and 12.6% male in college graduates compared to the White 30.4% female and 31.0% male and the Asian 50.5% female and 57.6% male (U.S. Census Bureau, 2021).

Low educational attainment impacted overall human functioning and resulted in multiple social problems affecting society. Students with insufficient education background resulted in poor language, memory, and functioning skills, mental and health issues, and deficient emotional and cognitive development; They were also twice as likely to be unemployed (Steinberg et al., 2006). Individuals who did not have a job were significantly more likely to commit robbery or be involved in burglary and other poverty crimes than individuals with full-time jobs (Kleck & Jackson, 2016). In 2019, the Hispanic population reached historic lows in their poverty rate of 15.7%, which was 1.5 times more than their share of the general population (U.S. Census Bureau, 2021). Minority immigrants' wages were also significantly below the native population, between 35% below for males and 28% for females (Bratsberg et al., 2006). School disengagement and the high unemployment rate also negatively impacted the U.S. economy, as an individual 18-year-old dropout earned \$260,000 less over a lifetime and contributes \$60,000 less in federal and state income taxes (Levin, 2005). The U.S. lost more than \$26 billion in federal and state income taxes each year and spent more than \$325 billion in lost wages, taxes, and productivity over their lifetimes (Monrad, 2007). Hence, a high school education was crucial in averting unemployment, mental and health issues, and involvement in criminal and antisocial behaviors among minority immigrant individuals. Such challenges emerged due to financial difficulties, gang activities, and peer influence, making high school education a fundamental factor in addressing social problems and preventing economic losses.

Underperformance in mathematics was a national issue that plagues educators, parents and guardians, school administrators, and policymakers. High school graduates lacking fundamental mathematics skills and concepts could hardly perform in many career fields. Basic mathematical knowledge and skills were essential in learning other disciplines in colleges, including sciences, engineering, business, economics, data analysis, technologies, etc. Another common graduation requirement in many public high schools was obtaining at least four math credits, which means students must take math in all four years of high school. Not only preparing students for analytical thinking and problem-solving skills, but learning mathematics also laid the foundations for critical STEM field occupations. In 2002, President George W. Bush assigned No Child Left Behind into law and established common core standards and measurable goals for all schools (Behind, 2002). Each individual state was required by the legislation to develop standardized tests and assess students in order to receive federal funding. The purpose of the state standardized assessments was to ensure every student who graduated from high school meets the standards and demonstrates their acquired knowledge. The state standardized testing also allowed for comparisons among schools with different demographics and in different regions. Figure 1.1 below indicated all Pennsylvania schools' performances on all subjects of the Keystone exams from 2015 to 2021. Data from the year 2020 was missing due to the pandemic. Compared to the other two subjects, Literature had the highest percentage of proficiency and much lower non-proficient (basic and below basic) rates. Although the subject of Biology also had a relatively low percentage of students who tested proficient, it had a higher advanced rate. Also, the percentages were pretty much at a similar level from 2015 to 2021. Then, the percentage of students proficient in mathematics exhibited a decreasing trend, signifying a decline in the number of students achieving proficiency each year since 2015. The percentage of

students who tested basic and below basic slightly increased. The figure clearly revealed the students' underperformances in STEM subjects (mathematics and biology).

Figure 1.1. 2015-2021 Pennsylvania Keystone exam performance across all subjects



Students' mathematics performance did not improve or remain constant. It declined for the past years (see Figure 1.2). There was a high demand for students' mathematics proficiency across the state. With the actual percentage labeled on the top of each bar, the graph indicated that the proficiency rate dropped significantly—13.82%, almost 14% since the year 2016.

Figure 1.2. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance

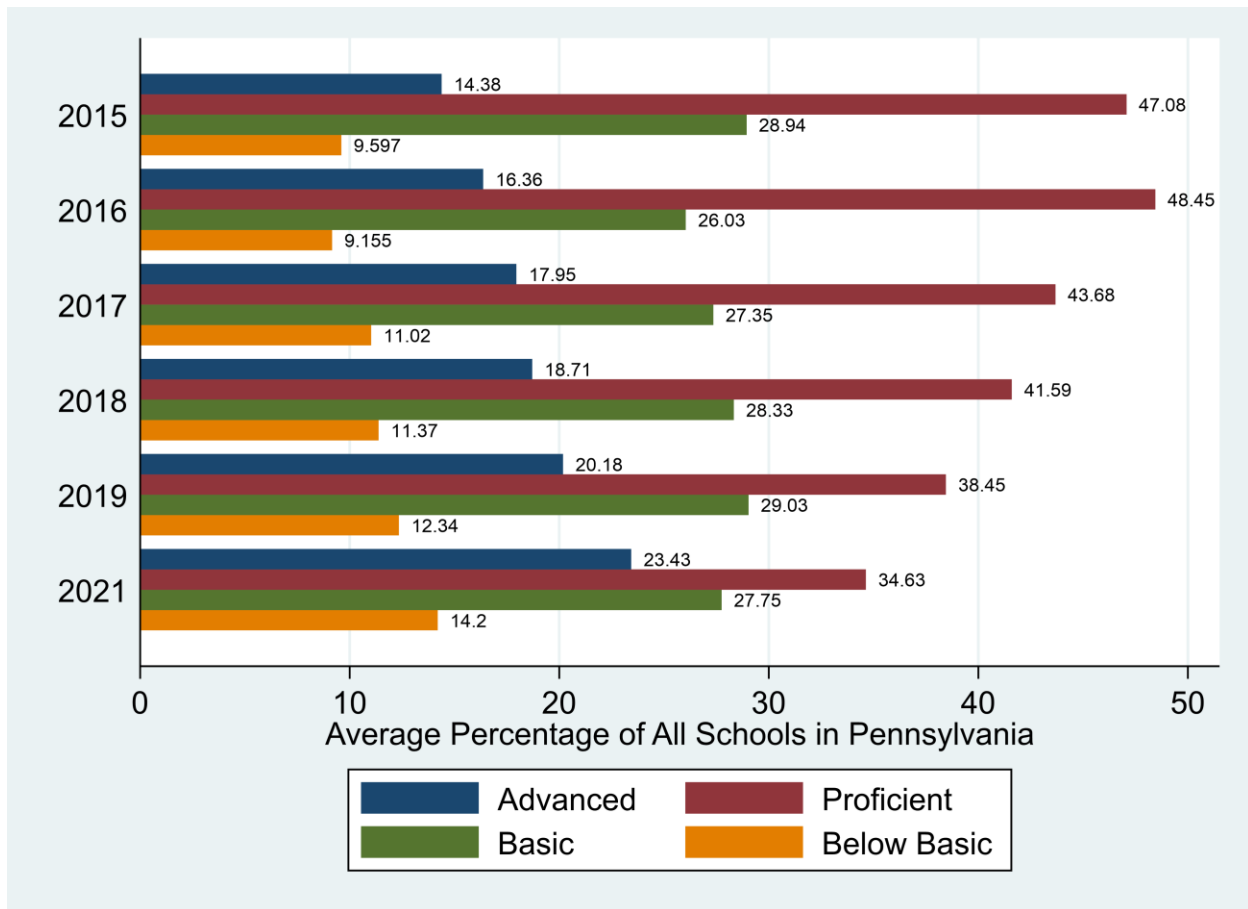


Table 1.2 also indicated that the average percentage of students who performed Advanced and Proficient (passing the benchmark) in 2019 was lower than in the last four years. The data in 2018 was even lower than in all previous years. Yet, the average percentage of students who performed Basic and Below Basic (failing the benchmark) in 2019 was higher than in previous years, and the data in 2021 was even higher than in all earlier years. The most recent data indicated a need for mathematics proficiency in general for all students statewide.

Table 1.2. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance descriptive statistics by year

	2015	2016	2017	2018	2019	2021	Total
Average Number Scored	158.787	161.862	173.991	154.801	155.307	134.372	156.304
	(145.627)	(149.122)	(147.840)	(147.516)	(144.268)	(130.955)	(144.716)
Percent Advanced & Proficient	61.730	64.999	61.810	60.738	59.136	59.029	61.250
	(21.900)	(21.730)	(22.687)	(23.150)	(22.905)	(23.178)	(22.672)
Percent Basic & Below Basic	38.652	35.292	38.484	39.759	41.493	42.131	39.297
	(22.163)	(21.931)	(22.837)	(23.599)	(23.384)	(24.075)	(23.104)

Note. The first row indicated the average number of participants by year. The following rows showed the average percentage.

Standard deviation in parentheses. Year 2020 was missing due to the pandemic.

As non-native English language speakers, immigrant students often faced disadvantages in professions requiring strong communication and social skills when selecting career paths. Immigrant students with a more substantial STEM background could pursue highly compensated STEM-related jobs such as engineers, scientists, mathematicians, etc. Otherwise, they only had the option to work as under-compensated manual laborers. Thus, mathematics performance was linked to graduation, high school dropout, academic trajectories, and career and higher education opportunities and was regarded as a critical indicator of later educational and occupational aspiration. In many school districts, improving student mathematics performance is one of the primary focuses for decades. Nevertheless, there were still significant gaps in mathematics performance among different regions.

The next two charts (see Figures 1.3 and 1.4) were generated by four different regions: City, Suburb, Town, and Rural. The exploded pieces in Figure 1.3 represented the average percentage of students who tested proficient and advanced in the mathematics keystone exam. Note that the Advanced percentage from City areas was more than three times less than the percentage from the Suburb areas and more than two times less than the percentage from the Rural and Town regions. However, the portion of Below Basic in City areas was approximately tripled compared to the other three areas. The average Basic rates were approximately 10% higher than the other areas. The stack bar chart (Figure 1.4) also showed greater Basic and Below Basic percentages and much smaller stacks of Proficient and Advanced ratios.

Figure 1.3. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance by urban-centric locale

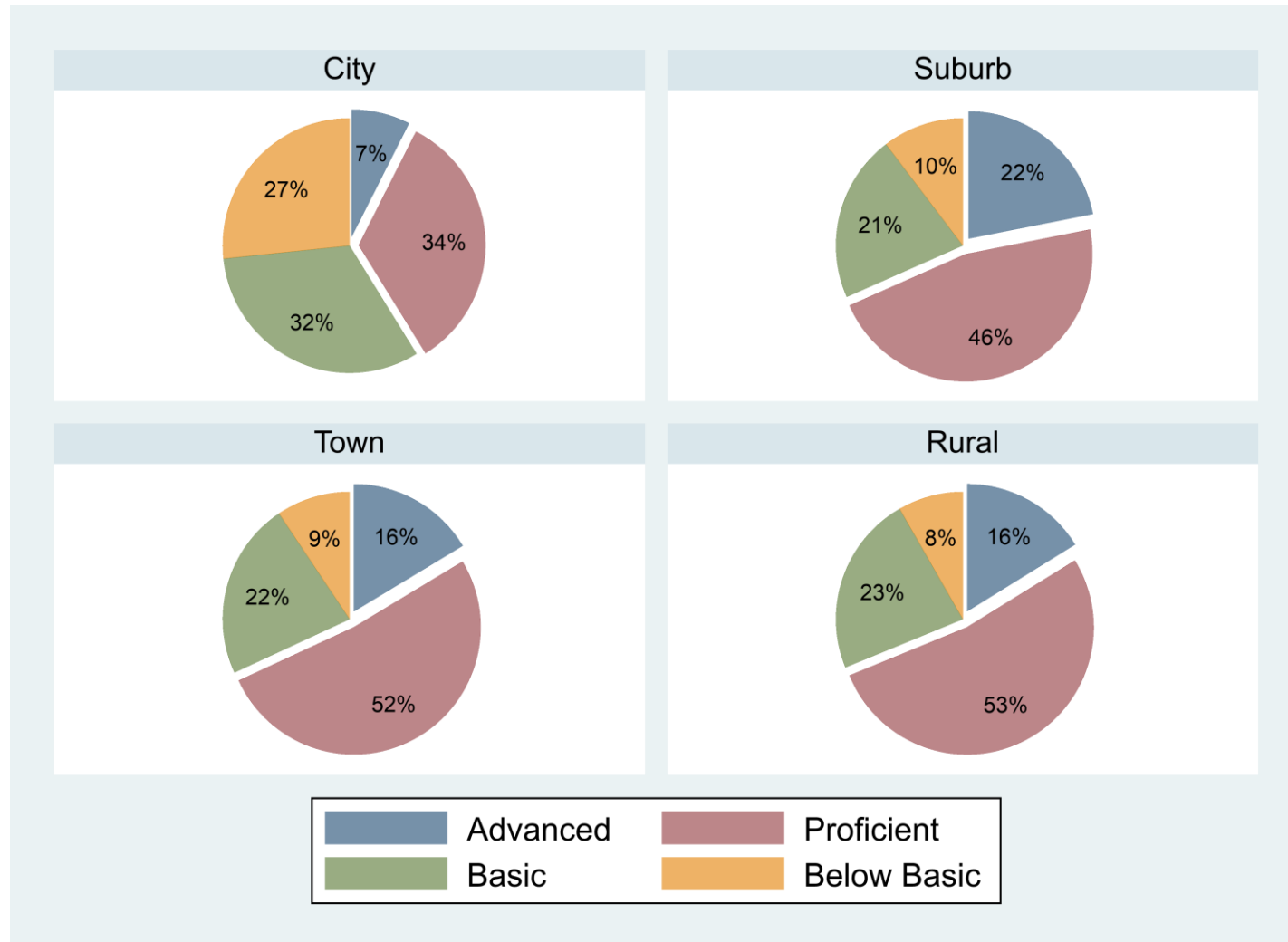


Figure 1.4. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance by urban-centric locale

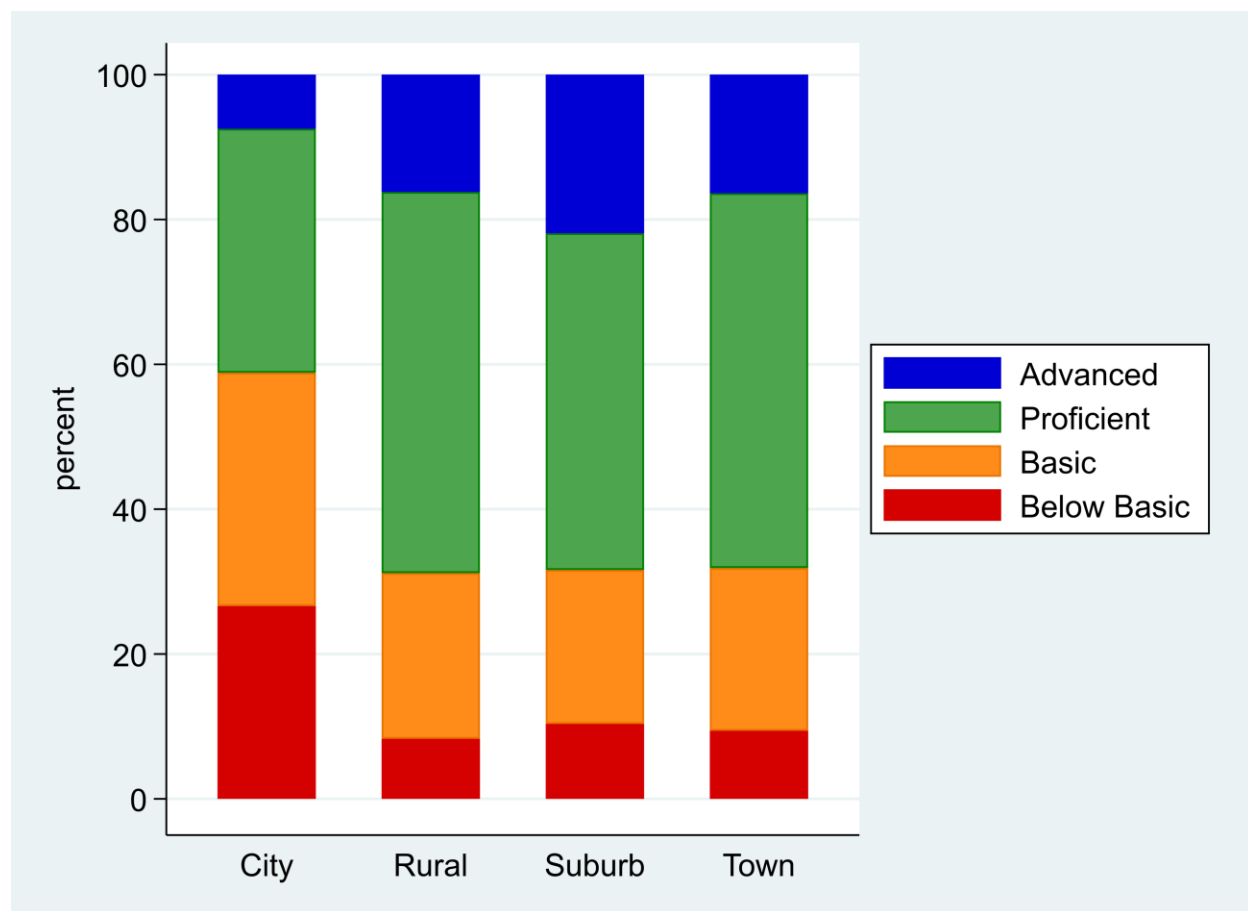


Table 1.3 displayed more detailed descriptive statistics of all schools' Keystone mathematics performances by urban-centric locale from 2015 to 2021. It was clear from the descriptive statistics that the average percentage of students who performed Proficient in City areas was much lower than in other areas. Also, the average percentage of students who performed Advanced in City areas was more than one-half of the percentages in Town and Rural areas and almost three times less than the percentage in Suburb areas. However, the average percentages of students who performed Basic and Below Basic in City areas were much higher

than in the other areas. Again, the statistics again indicated that the students who resided in City areas had generally lower mathematics proficiency than those living in other areas.

Table 1.3. 2015-2021 Pennsylvania Keystone exam school-level mathematics performance descriptive statistics by urban-centric locale

	(1) City		(2) Suburb		(3) Town		(4) Rural	
	mean	sd	mean	sd	mean	sd	mean	sd
Percent Advanced	7.47	12.07	21.90	16.62	16.38	12.55	16.20	12.37
Percent Proficient	33.69	21.86	46.49	17.02	51.74	15.44	52.62	15.50
Percent Basic	32.21	14.27	21.26	11.70	22.48	9.77	22.88	10.32
Percent Below Basic	26.64	22.82	10.36	12.06	9.40	9.43	8.30	8.04
Observations	2258		4576		1398		3103	

Note. The data showed average percent performance in each category and standard deviations.

Although there was some improvement in the mathematics performance of minority students over the past decades, significant gaps in mathematics achievement among different regions and between Latino and the other populations persisted. Since 1990, the average mathematics scores of 8th-grade Hispanic students in all assessments were nearly 25% lower than their White peers, with no measurable difference from the corresponding gaps in 2017 and 1990; In 2015, the mathematics score for 12th-grade Hispanic students was 22 points lower than their White peers, with no measurable difference from the corresponding gaps in 2005 and 2013 (U.S. Department of Education, 2020). In 2019, Hispanic students in Pennsylvania were scored 37 points lower than the White students in mathematics; Again, the performance gap was not significantly different from that in 2003 (U.S. Department of Education, 2019). For decades, low mathematics performance and school attainment of students with immigration backgrounds remain unsolved problems.

1.1 Self-Efficacy

Numerous external and internal factors led to the chronic low mathematical performance of immigrant minority students, such as language barriers (Buchmann & Parrado, 2006; Cummins, 1991; Cummins, 2000), parental education, and involvement (Assari et al., 2021; Durand, 2011; Rowan-Kenyon et al., 2008), the education system (An, 2004; Ma, 2010; Takanishi & Kauerz, 2008), and school infrastructure and safety (Bowers & Urick, 2011; Buckley et al., 2004; Lewis, 2000). Negative learning attitudes, lack of motivation, and fixed mindset toward mathematics were often identified as the root causes contributing to underachievement (Bandura, 2000; Zimmerman et al., 2017). Internal emotions, beliefs, and perceptions were recognized to be highly associated with underlying motivations, behavioral engagement, learning attitudes, and perseverance and tremendously impact student learning and performance (Bandura, 2006; Mozahem, 2020; Zimmerman et al., 1992).

Self-Efficacy, which originated from Albert Bandura (1977), referred to belief or judgment about one's own academic capabilities to learn and master the knowledge. It served as a prominent method to measure and analyze learners' internal emotions, beliefs, and perceptions toward learning mathematics. Bandura (2000) indicated that self-efficacy predicts how individuals exert effort in learning, encounter obstacles, and are resilient to failures. Self-efficacy also developed student learning attitudes, engagements, and behaviors that contribute to effective learning and higher academic achievement and could further influence student educational trajectories and beyond (Bandura et al., 2001; de Fátima Goulão, 2014; Lent et al., 1984). According to Bandura, self-efficacy was forged, developed, and shaped by four primary sources of influential exponents (see Figure 1): *mastery experiences*, *vicarious experiences*, *verbal persuasion*, and *physiological and emotional states* (Bandura & Wessels, 1994).

1.1.1 Mastery Experiences

Mastery Experiences involve students' previous mathematics learning experiences and performances. Succeeding in learning prior mathematics knowledge confirms the student's capabilities and generates confidence, leading to a more positive sense of self-efficacy in learning mathematics (Skaalvik et al., 2015). The sense of efficacy may be diminished when students copy others' solutions, receive substantial support from others, or perceive the knowledge as easy and weightless (Tschannen-Moran & McMaster, 2009). Conversely, students who experience failure and frustration in their prior mathematics classes are more likely to have a low sense of self-efficacy in learning higher-level mathematics.

1.1.2 Vicarious Experiences

Vicarious Experiences are developed through peer influences or watching peers complete a task. Watching peers solve a mathematics problem successfully and efficiently may increase students' sense of self-efficacy; they are more likely to believe that they also have the capabilities to complete the same task (Joët et al., 2011). The feeling of efficacy can decrease when peers put in a lot of effort and time and still struggle and hardly complete the task. Likewise, seeing a competent student who fails or gives up on solving the problem in class may lower the other students' efficacy. They are more likely to believe that they do not have the capabilities to complete the task either.

1.1.3 Verbal Persuasion

Verbal Persuasion refers to persuasive statements from a trusted person, who can be a teacher, advisor, parent, or guardian. Hearing the trusted person acknowledge the student's capabilities can strengthen the student's level of efficacy and make the student believe that he or she is capable of learning and completing the mathematics problem (Skaalvik et al., 2015). Yet, negative or discouraging statements may forge the student to doubt the chances of succeeding in learning the knowledge. Students who are more sensitive or credulous may read others' words between the lines and misinterpret others' comments about their capabilities or believe in someone's inattentive words regarding their chances of success, which can lead to a lower level of efficacy.

1.1.4 Physiological and Emotional States

Physiological and Emotional States apply to feelings of dislike, worry, tension, anxiety, depression, or other psychosomatic or physiological reactions that occur toward learning mathematics. They are often associated with negative or unsuccessful prior learning experiences. When students have intense negative feelings about mathematics, it also affects their physiological reactions, such as fastened heart rate, respiration, and physical pain (Mutlu, 2019; Ramirez et al., 2018), thus negatively impacting their self-efficacy in learning. Students may also develop a fixed mindset toward mathematics, thinking that they can never learn mathematics or that mathematics is not for them.

1.2 Acculturation

Acculturation refers to the process of contacting and exchanging through individuals' adaptation to the language, attitude, values, practices, and behaviors, among all other things, of a culture that was not originally their own (Santiago et al., 2014). Students with immigration backgrounds shuffle between cultures, the culture of the country of origin, the culture of the host country, the culture of their individual families, and the culture of the new neighborhood. The acculturation process is easier for students from countries that have cultures similar to the host country. However, the majority of immigrant families have completely different values, beliefs, languages, and cultural practices (Lilla *et al.*, 2021). Research (Fang, 2020; Zadeh et al., 2008) indicated that acculturation influences parents' beliefs about school achievement, which is then transmitted to the learners, impacting their academic performance. A positive acculturation attitude often contributes to higher academic scores. The present dissertation study incorporated a validated acculturation scale designed explicitly for Latino and Hispanic learners (Zea et al., 2011), and measured six dimensions of acculturation (*host cultural identity*, *home cultural identity*, *host country language*, *home country language*, *host cultural competence*, and *home cultural competence*). *Host cultural identity* and *home cultural identity* are used to describe individuals' identification and sense of belonging built from their experiences, talents, skills, beliefs, values, knowledge, social status and relationships, living and working environments, and beyond (Altugan, 2015). *Host country language* and *home country language* abilities refer to the linguistic proficiency in the host or home country, such as listening, speaking, reading, writing, and comprehension of local dialect, as well as some non-verbal communication (Selmer & Lauring, 2015). *Host cultural competence* and *home cultural competence* indicate the knowledge and ability of behaviors, attitudes, policies, thoughts, communications, actions, customs, beliefs,

values, and institutions among people from a racial, ethnic, religious, or social group (Purnell, 2016). The scale consisted of questions from different dimensions assessing individual contacts and changes in psychosocial and behavioral domains, such as understanding of the home and host cultures, sense of belonging, language proficiency, and social network (Zea et al., 2011).

1.3 Understanding the Problem

Mathematical knowledge is essential in learning other disciplines, including sciences, engineering, business, economics, data analysis, and technologies (Lipnevich et al., 2011; Mazana et al., 2019; Phonapichat et al., 2014). The mathematics curriculum in schools provides students with the fundamental knowledge and skills to learn a higher level of knowledge in the fields of science and technology, and it is crucial for economic success nationally and globally (Mazana et al., 2019; Ngussa & Mbuti, 2017). Mathematics is a more significant subject for immigrant students due to disadvantages in selecting career paths or professions that require strong communication and language skills. Yet, many students find it difficult to learn mathematics, and it is considered one of the most challenging subjects in high school. Students with immigration backgrounds often face more significant challenges in acquiring mathematical skills. As mentioned earlier, their performance in mathematics generally tends to be lower than that of their native peers, a trend attributed to various external and internal factors, as elucidated in the student-level data analyses presented later in this chapter.

Minority immigrant families often tend to cluster around urban areas because of the economic, cultural, and social opportunities that the cities could provide. Public schools in the urban areas are over-populated with minority immigrant students and English language learners. The following statistics were generated from student-level data of a representative public high-

poverty urban school located in southern Pennsylvania, which consists of approximately 5,000 students and is notorious for poverty, violence, crimes, drugs, poor nutrition, and family instability. Also, immigrant students from low-income and low-socioeconomic families increasingly presented problems such as dropout, limited English proficiency, unemployment, illiteracy, limited education, and juvenile delinquency. Although the school received federal funds, such as Title I and Title III, for high-poverty and English language learners, they scarcely produced the desired results that reduced the inequalities in achievements for immigrant students (Jimenez-Castellanos, 2012; RSD Budget Information, 2021).

The next table below (see Table 1.4) displayed the summary statistics of student-level data of a representative public high-poverty urban school located in southern Pennsylvania from 2015 to 2021. The mathematics state assessment was taken 7119 times with a mean score of 1449.2, a minimum score of 1278, and a maximum score of 1598. 68% of the tests scored ranged from 1408.06 to 1490.34, and 95% of the tests scored ranged from 1366.92 to 1531.48. Among the scores, the tests scored Advanced was very low, only 1% of the total; the tests scored Proficient was also not high, approximately 11% of the total. Then, the tests scored Basic and Below Basic were much higher, about 87% of the total (44.07% of Basic and 43.32% Below Basic). The statistics also indicated that 93.34% of the tests were taken by students from low-income family backgrounds, and 25.76% of the tests were taken by English language learners.

Table 1.4. 2015-2022 Keystone mathematics exam student-level summary statistics

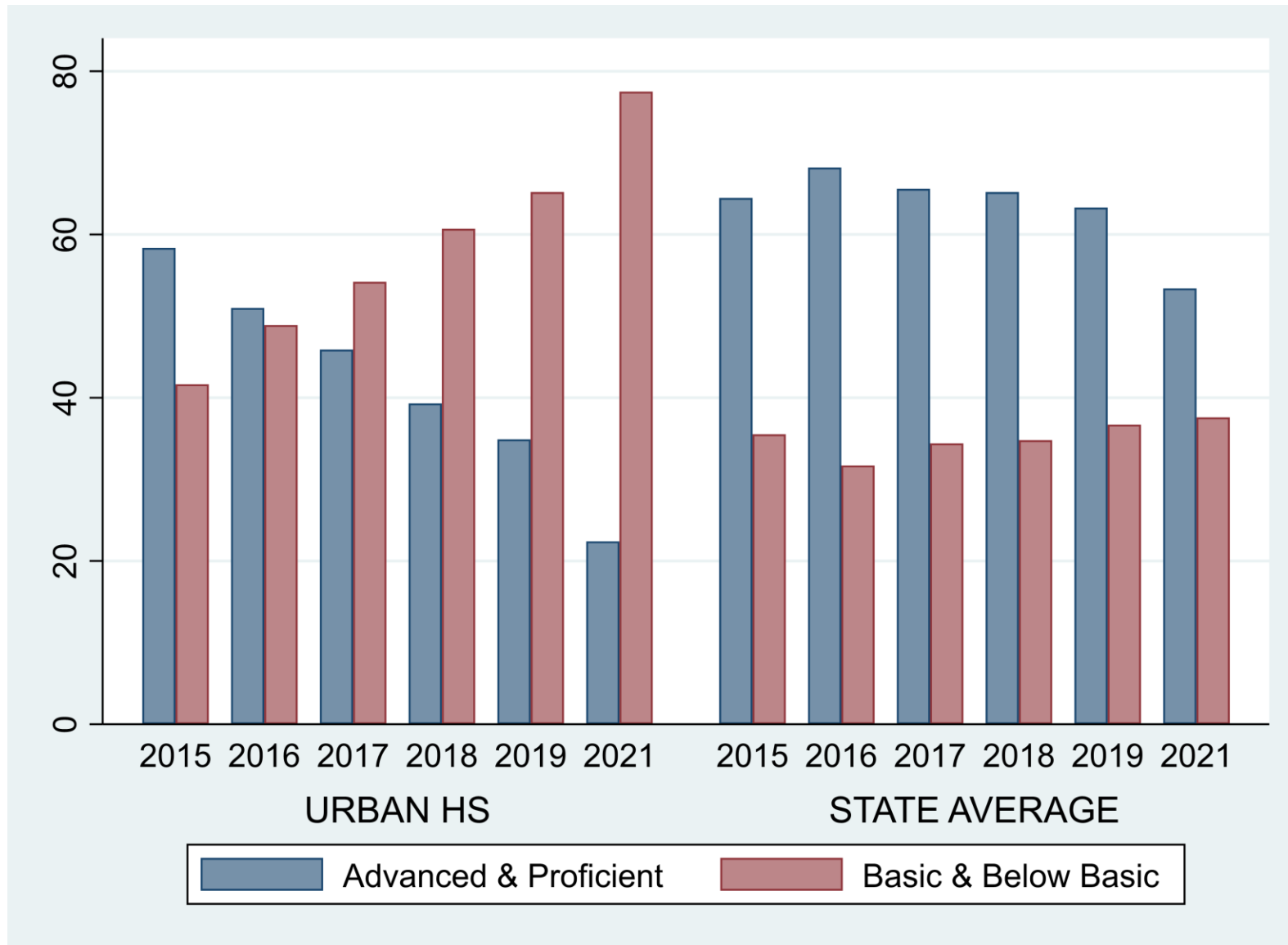
	count	mean	sd	min	max
Admin Scale Score	7119	1449.2	41.1415	1278	1598
Scored Advanced	7119	.0103947	0.1014	0	1
Scored Proficient	7119	.1156061	0.3198	0	1
Scored Basic	7119	.4407922	0.4965	0	1
Scored Below Basic	7119	.4332069	0.4956	0	1
Female	7119	.5163647	0.4998	0	1

Low Income	7119	.9334176	0.2493	0	1
English Language Learner	7119	.2576205	0.4374	0	1
8 th Grader	7119	.0351173	0.1841	0	1
9 th Grader	7119	.1816266	0.3856	0	1
10 th Grader	7119	.4138222	0.4926	0	1
11 th Grader	7119	.3690125	0.4826	0	1
12 th Grader	7119	.0004214	0.0205	0	1
American Indian	7119	.0002809	0.0168	0	1
Black or African American	7119	.0972047	0.2963	0	1
Hispanic	7119	.8304537	0.3753	0	1
White	7119	.0471976	0.2121	0	1
Multi-Racial	7119	.0196657	0.1389	0	1
Asian	7119	.0049164	0.0699	0	1
Native Hawaiian/Pacific Islander	7119	.0002809	0.0168	0	1

Note. Generated from 2015-2022 student-level raw data from an urban school district.

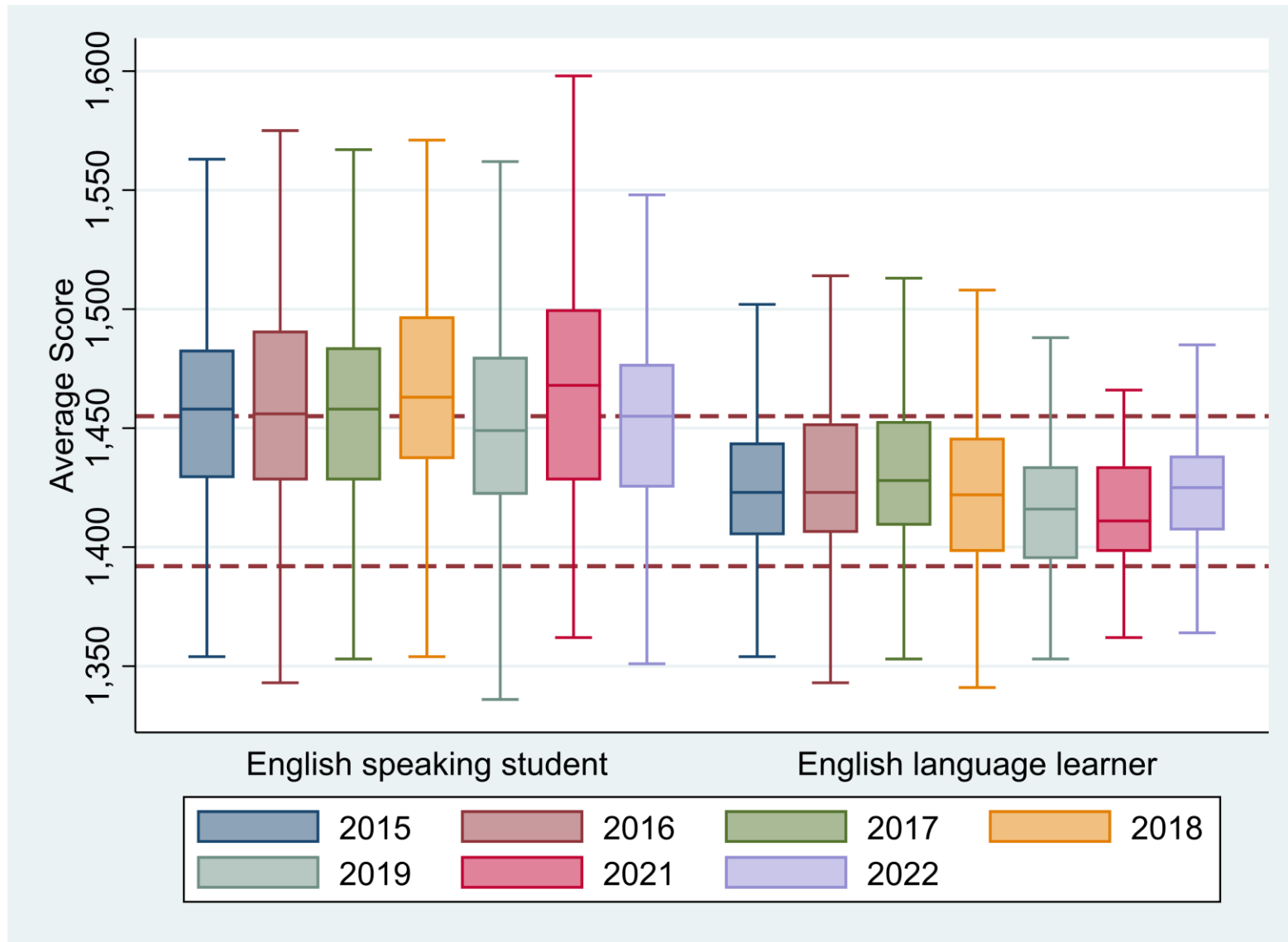
The next bar chart (see Figure 1.5) below compared the state mathematics assessment performance from the representative public urban high school versus the average state performance. Both groups had an increasing trend of Basic and Below Basic rates and a decline in Advanced and Proficient rates; however, the graph on the left side had a tremendously steeper increase and decrease compared to the chart on the right side. The Basic and Below Basic bar of the urban high school in 2021 was almost twice as tall as the Basic and Below Basic bar of the state average in the same year. Note that the sum of the average percentages of Advanced and Proficient was 12.60%, compared to the state average of 69.25%, while the sum of the average percentages of Basic and Below Basic was 87.40%, compared to the state average of 39.30%.

Figure 1.5. A comparison of a typical urban high school versus the state mathematics assessment average performance



The next boxplot (see Figure 1.6) used six years, from 2015 to 2022 (missing data from the year 2020 due to the pandemic), of student-level keystone mathematics exam data from the large representative urban school district. It drew a comparison of the performance of English language learners and non-English language learners. We could clearly see that the average interquartile range of the performance of English language learners was approximately from 1390 to 1450, and the average interquartile range for non-English language learners was approximately from 1425 to 1500. It was conspicuous that the English language learners had lower performance on average in the mathematics state assessments. There was a gap in student mathematics performance between native and non-native English speakers.

Figure 1.6. 2015-2022 Keystone exam student-level mathematics performance



Note. The graph excluded outside values. Generated from 2015-2022 student-level raw data from an urban school district.

Following was an estimated multiple regression model generated from STATA using the student-level data from the year 2015 to 2022 (see Table 1.5).

Table 1.5. Regression estimates of the student-level data of an urban high school

	(1) Math Assessment Score
Female	4.070** (0.906)
English Language Learner	-30.581** (0.996)
Low Income	0.855 (2.069)
American Indian/Alaskan Native (not Hispanic)	3.970 (10.797)
Black or African American	-7.688** (2.666)
Hispanic (any race)	0.182 (2.300)
Multi-Racial (not Hispanic)	1.342 (3.943)
Native Hawaiian or other Pacific Islander (not Hispanic)	20.372 (32.675)
9 th Grader	-2.586 (2.543)
10 th Grader	-19.214** (2.369)
11 th Grader	-8.743** (2.417)
12 th Grader	-49.159** (15.180)
Constant	1466.409** (3.817)
Observations	7119

Note. 2015-2022 Urban high school student-level representative statistics were employed.

Clustered standard errors were in parentheses. Reference groups were as follows: Gender (Male); Grade Level (8th Grader); Ethnicity (Caucasian); English Speaking Student (Non-English language learner; Eligibility for Free Lunch (Not qualified).

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

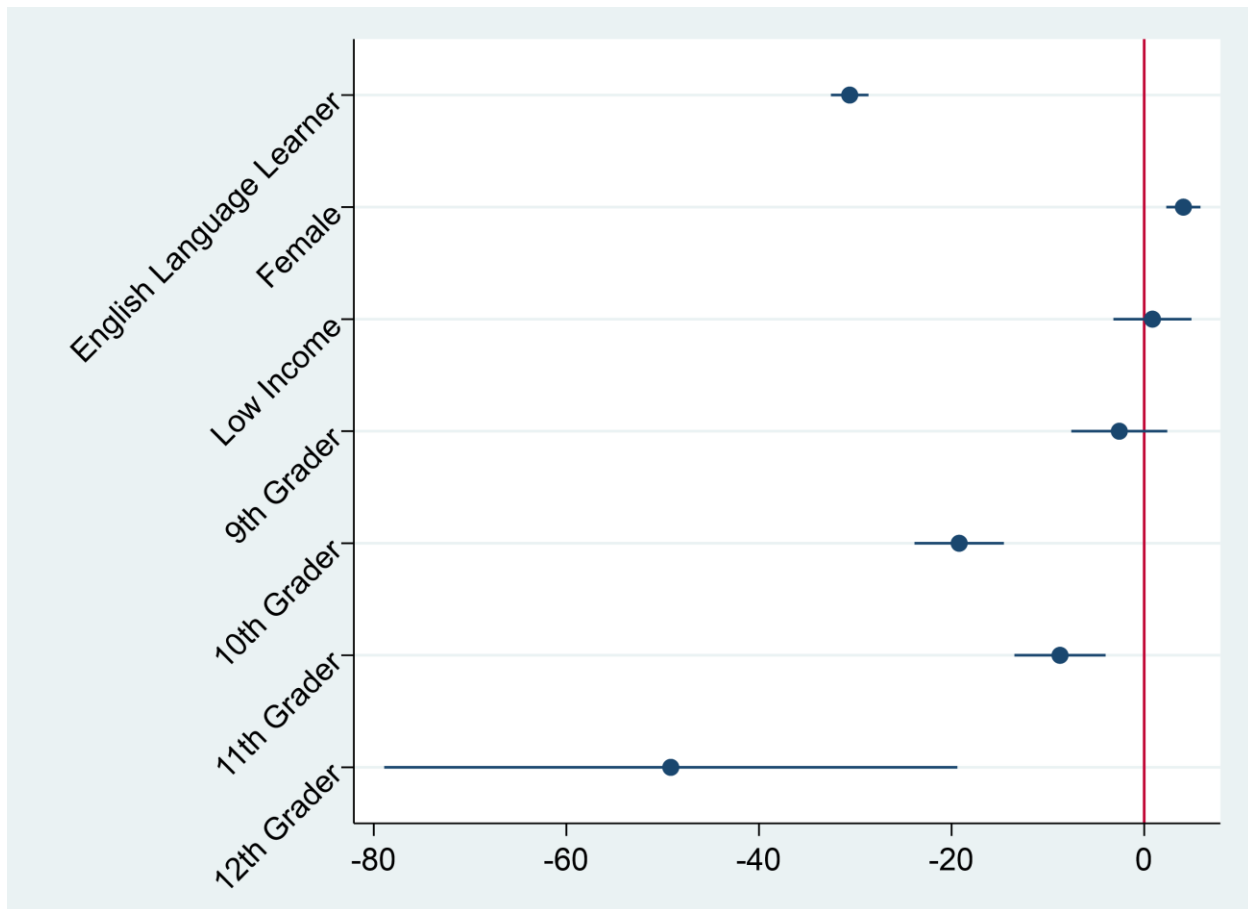
The control group for ethnicity was Caucasian; for grade level, it was 8th graders for two reasons. First, these two groups were not the smallest population group in the setting. Second, the purpose of the study was to focus on the other groups more. The model also set a fixed heteroscedasticity for accurate results. The results indicated that the constant/Beta0 hat was 1466.409, showing a Caucasian male 8th-grade student who was not an English language learner and does not come from a low-income family; the predicted state mathematics assessment score was 1466.409 (see Equation 1.1). The multiple regression results showed that only the variables female, ELL, black, tenth, eleventh, and twelfth were statistically significant since the p-value on these variables was less than 0.05. While low income did not exhibit statistical significance in the regression results, it doesn't imply that low income cannot be an explanatory variable for student underperformance. The lack of significance may be attributed to the homogeneity of the student-level data, where 93.34% of students came from a low-income background.

Equation 1.1. Estimated mathematics assessment score model

$$\widehat{mathassessmentscore} = 1466.409 + 4.070 * female - 30.581 * ELL + 0.855 * lowincome + 3.970 * americanindian - 7.688 * black + 0.182 * hispanic + 1.342 * multiracial + 20.372 * native - 2.586 * ninth - 19.214 * tenth - 8.743 * eleventh - 49.159 * twelfth$$

The following regression coefficient plot (see Figure 1.7) generally displayed all the regression coefficients without variables on different racial ethnicities. The plot showed more clearly on the statistically significant variables. Note that low income and 9th graders were not statistically significant because it included the value zero.

Figure 1.7. Regression coefficient plot on the model estimate for mathematics assessment score



Note. The graph excluded the variables of different racial ethnicities. Generated from 2015-2022 student-level raw data from an urban school district.

The regression test indicated that the English language learner was predicted to perform significantly lower than native English-speaking students. As English language learners were frequently from immigrant families, these families often gravitated toward urban areas for reasons such as affordable housing, convenient transportation, and increased job opportunities. Thus, there was a large academic performance gap between the City area and the other regions, as shown in the previous descriptive statistics and charts.

More than two thousand high school students in the high school were below basic in mathematics performance in 2019, approximately half of the high school student population. In 2021, only 63 students out of 878 high school freshmen and sophomores scored proficient and advanced in the math state standardized test; that was only 7% of the first- and second-year high school test takers passing the math state standardized test. Mathematics performance was closely associated with dropout rates, career opportunities, and higher education opportunities (Espino et al., 2017; Heck & Van Gastel, 2006; Steinberg et al., 2006). Education should be a channel for immigrant and low-socioeconomic students to improve their family incomes and socioeconomic statuses. Still, the immigrant students in the district barely made progress in moving up.

Many newcomers came to the U.S. with mismatched values, beliefs, perceptions, and entirely different learning environments from their home countries. Different immigrant generations also had considerably different values, cultures, beliefs, and perceptions inherited from their immigrant parents. Also, many minority immigrant youths with various cultural backgrounds and inadequate educational resources had profound emotional and psychological needs, resulting in different degrees of adaptation and acculturation to the host culture. It was essential to explore the different sources of self-efficacy and other potential factors and note the complexities of the acculturation process among the youths, which were entirely different from adults, and to what extent these complexities intertwine with their self-efficacy in learning mathematics. My study aimed to examine students' self-reported self-efficacy, acculturation, and other related potential influencers affecting their mathematics performances in high school. Therefore, in this dissertation, the researcher evaluated:

1.3.1 Research Question 1

To what extent do the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) correlate with immigrant student mathematics performances in an urban high school?

1.3.2 Research Question 2

To what extent do the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*) correlate with immigrant student mathematics performance in an urban high school?

1.3.3 Research Question 3

Are there any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status?

1.4 Significance

As increasing immigrant students in high schools with entrenched mathematics performance gaps and demanding minority immigrant educational improvement became challenging crises in the U.S. and many other countries (Takeuchi, 2018), existing research (Andrade, 2018; del Mar Haro-Soler; 2021; Lilla et al., 2021) implied uncertainty and controversy on the degree of the impact of academic self-efficacy and acculturation among immigrant students. Examining the extent of the impact of the four sources of self-efficacy and multidimensional acculturation on immigrant students' high school mathematics performance

was vital for educators, parents or guardians, school administrators, and policymakers. Within this study, certain factors emerged as notably influential in shaping the mathematics performance of immigrant students. These findings offered valuable insights for educators and schools in comparable urban settings, both within the U.S. and on a global scale.

The concepts of self-efficacy and acculturation were researched and developed in the educational field for over two decades; however, self-efficacy was rarely studied together with acculturation, and the impact of the four sources of self-efficacy and the extent of acculturation remained controversial. Although numerous studies suggested a positive correlation between self-efficacy and academic performance and achievements (AlJaser, 2017; Ansong et al., 2019; Olivier et al., 2019; Ozkal; 2019; Samavi, 2017; Shahzad & Naureen, 2017); within the researcher's current knowledge scope, there was not much research exploring how each individual source of the four sources of self-efficacy and acculturation affects student mathematics learning and achievement. Further, even fewer studies focused on whether and how each component impacted immigrant students' mathematics performance and the differences associated with gender, grade level, age at arrival to the U.S., immigrant generation, parental education, socioeconomic status, and acculturation levels in an urban high school setting. This research strived to fill in the research lacuna by examining how self-efficacy and acculturation impacted immigrant students' mathematics performance compared to their native peers. It discussed the differences in the findings associated with gender, grade, age at arrival to the U.S., socioeconomic levels, parental education, and immigrant generation in an urban high school setting. Moreover, the findings of this study guided researchers to focus on researching and expanding the more prominent influencer for immigrant student academic achievement. Research and exploration of the impact of the four self-efficacy resources and six dimensions of

acculturation were essential to reveal more statistical information to researchers and possibly push the research forward in the related fields.

The findings of this study were instrumental in advocating and enhancing the prominent role of self-efficacy, acculturation components, and other influencers that played a significant role in the mathematical learning and performance of immigrant students or minority learners with immigrant backgrounds. The implications derived from this study extend beyond mere statistical data, presenting numerous considerations to address challenges associated with the prominent factors and influencers effectively unveiled in the research. Likewise, they have the potential to be used to create and implement improvement plans and manage or control the root causes of minority and immigrant students' mathematics underperformance. Additionally, the statistical results can be used to project and potentially change immigrant student mathematics learning trajectories in urban high schools. It is anticipated that mathematics or relevant-subject teacher education programs will also consider, design, and integrate different ways and strategies to promote and reinforce the leading self-efficacy and acculturation extents and other prominent influencers in the training, teaching, and learning.

Chapter 2 Literature Review

Self-efficacy, an amalgamation of the notions of self-esteem, self-regulation, self-concepts, confidence, resilience, and motivation that contribute to individual behaviors and learning outcomes, gained substantial attention in contemporary research. Acculturation also played an influential and compelling role in immigrant students' academic performance and achievement. This dissertation examined how the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) and acculturation correlate with immigrant student high school mathematics performances in a high-poverty urban school district. This chapter served to illustrate pertinent theories and concepts and explore, summarize, and synthesize existing research. In the first part of this chapter, I elucidated the theoretical framework for my dissertation and the related theories and concepts. The second part of this chapter provided an overview of the history and the background content related to the topic. And the last part of this chapter reviewed and discussed dominant factors identified in relevant empirical research, the conflicts, and controversies.

2.1 Theoretical Framework

The frame of this research utilized Bandura's self-efficacy theory as a foundation and his four theoretical sources of self-efficacy to detect any significant correlation between self-efficacy and student performance in high school mathematics classes. Berry's acculturation theory and the different dimensions of acculturation were also employed in the study. The dissertation study also examined any differences in the findings associated with gender, grade, age at arrival to the U.S., and immigrant generation.

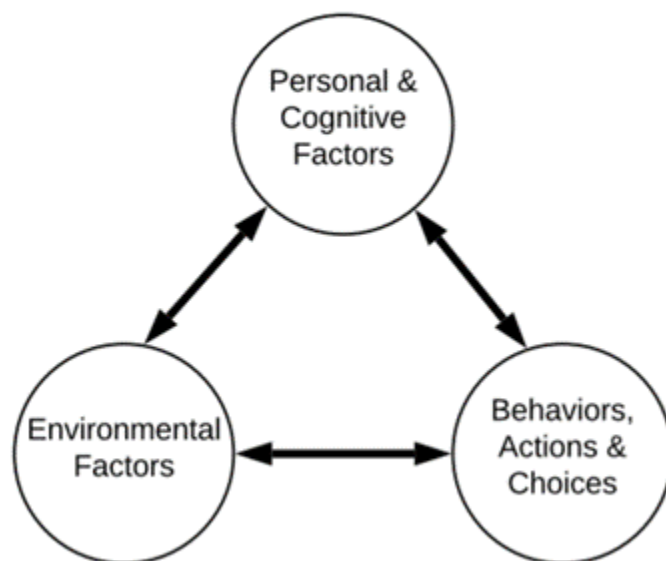
2.1.1 Social Cognitive Theory

Self-efficacy theory was derived from a broader theoretical framework of social cognitive theory built upon and integrated from social learning theory. Social learning theory started as an attempt by Robert Sears and proposed and developed by Albert Bandura, suggesting that individual behavior and learning processes are acquired through observing, modeling, and imitating other people (Bandura, 1977). It first emphasized direct instruction and repetitive reinforcement and later developed into social cognitive theory in 1986, incorporating the social environment and behavioral interaction components. Social cognitive theory accentuated social and environmental influences and highlighted that individuals' behaviors are acquired and shaped by past experiences and other internal and external social and environmental factors such as education, communication, social interactions, and outside media influences (Bandura, 1989). Individuals learn by observing others' behaviors, yet others' behaviors can change or influence individuals' cognitions, whether they acknowledge or reject the behaviors. Similarly, environmental components can also contribute to individuals' mindset depending on whether the behaviors were rewarded or punished.

Reciprocal determinism was a central concept of the social cognitive theory, which explained that individual behavior is controlled and developed through cognitive processes contributed by the external environment and social stimulus factors (Bandura, 1978). This concept posited a reciprocally dynamic and triadic relationship among the environmental, behavioral, and personal components (see Figure 2.1). More specifically, the relationship between the components did not occur one way or the other; instead, behavior influenced the environment, and the environment influenced future behaviors; Both affected the individual cognitively and affectively, which also affected future behavior and the environment (Bandura,

1978). For example, a learner missed school days and failed a math test. As the content was built on, the learner did not understand more content, failed more math tests, and started acting out in class. The teacher and other peers disliked the learner, resulting in the learner skipping more math classes and failing more math tests. The teacher and other peers set up the learning environment; The learner acting out and escaping classes were the behavioral components, and the learner's feelings about math class were individual components. Each component coincided with the learner and affected the other components by repercussions.

Figure 2.1. Bandura's Reciprocal Determinism (1978)



Note. The figure exhibited a triadic reciprocal relationship among environmental, personal, and behavioral factors.

2.1.2 Self-Efficacy Theory

Based upon the notion of reciprocal determinism, Bandura (1977) developed the concept of self-efficacy, which refers to the level of a learner's confidence and belief in their ability to

produce successful outcomes (Bandura, 2006). He specified that self-efficacy plays an essential role in human agency determined by an individual's self-appraisal that affects cognitive, affective, and behavioral changes (Bandura, 1989). Self-efficacy was not a simple behavioral model but an amalgamation of the ideas of self-esteem, self-regulation, self-concepts, confidence, resilience, and motivation. The theory emphasized the roles of self-concept and self-regulation, consolidating with internal and external contributors. Recognizing that learners do not passively absorb new knowledge, numerous factors also influence the learning process repercussively and often dynamically shift learners' perceptions, thus contributing to the actual performance or learning outcomes. Moreover, Bandura argued that a learner's self-efficacy can be changed or improved in different environments or by various behavioral and psychological treatment procedures. Self-efficacy theory became a dominant concept in copious fields and guided research in multiple domains.

2.1.2.1 Four Sources of Self-Efficacy

Although researchers did not reach a consensus on which is the most influential source among the four theorized sources of self-efficacy: *mastery experiences*, *vicarious experiences*, *verbal persuasion*, and *physiological and emotional states*, still a substantial body of research indicated that *mastery experiences* is the most controlling factor contribute to learning outcomes (Capa-Aydin et al., 2018; Loo & Choy, 2013). Successful learning experiences provide learners with the most authentic evidence of success. Multiple successful learning experiences gradually build a robust belief in learners' self-efficacy. On the other hand, multiple unsuccessful learning experiences lead learners to lose confidence in completing the learning task and not believe in their capabilities to learn the topic. While *mastery experiences*

directly evident learners about their competencies, it does not always automatically determine learners' self-efficacy. Learners interpret their learning experiences differently depending more on personalities and other personal factors (Bandura, 2000). In Usher and Pajares' study (2006) of 263 middle school students, they found that Mastery experience did not predict the low-achieving students' perceived self-efficacy. Capa-Aydin and colleagues (2018) found both mastery and *vicarious experiences* highly correlate with student learning outcomes. Some researchers found that *vicarious experiences* are the most recognizable dominant in shaping self-efficacy (Huang et al., 2020; Wilde & Hsu, 2019), while others did not (Abdullah & Mustafa, 2019; Gebauer et al., 2019). Then again, Klassen (2004), del Mar Haro-Soler (2021), Usher & Pajares (2006) found that *verbal persuasion* is a significant source, whereas Gebauer and colleagues (2019) did not. Notwithstanding, *physiological and emotional states*, such as anxiety and stress, were identified as notable sources in lowering individual self-efficacy in learning (Cheng, 2020), but others disagreed on that (Abdullah & Mustafa, 2019; Gebauer et al., 2019). Inconsistent findings of the roles of the four sources of self-efficacy indicated that the four sources of self-efficacy weigh differently in various domains and heavily depending on the educational settings.

2.1.3 Acculturation Theory

Acculturation theory, first proposed by John Schumann (1978), mainly focused on the process of second-language acquisition. Schumann (1978) suggested that a learner's second-language acquisition is directly linked to the learner's degree of acculturation built upon two sets of factors –social and psychological elements. Based on this premise, Schumann (1978) proposed the acculturation/pidginization model and identified two types of acculturation. Type 1

learner was referred to as the learners who are only socially integrated, having social contacts and connections, but still retain the lifestyle and values of their home culture; Type 2 learners were not only socially integrated but also adopted the host country's lifestyle and values (Zaker, 2016). Further implementing Schumann's concept, John W Berry (1997) delved into a two-dimensional fourfold acculturation model to outline four different types of acculturation: *integration*, *assimilation*, *separation*, and *marginalization*. *Integration* characterizes immigrants with strong cultural orientation in both home and host countries; *Assimilation* refers to people who have a strong orientation toward the host culture while a weak orientation toward the culture of origin; *Separation* describes an individual's cultural orientation toward home country is strong but weak toward the host country; *Marginalization* indicates immigrants with weak orientation in both home and host cultures (Berry, 1997). Subsequently, Tsai and colleagues (2000) gauged Chinese Americans' acculturation from three dimensions: behavioral, cultural identification, and language.

Based on John Schumann's acculturation theory and some past acculturation models, Zea and colleagues (2011) developed and constructed a valid multidimensional acculturation scale to assess six dimensions of acculturation: *host cultural identity*, *home cultural identity*, *host country language*, *home country language*, *host cultural competence*, and *home cultural competence*. Altugan (2015) identified *Host/home cultural identity* as individuals' identification and sense of belonging built from their experiences, talents, skills, beliefs, values, knowledge, social status and relationships, living and working environment, and beyond. *Host cultural identity* pertains to an immigrant's sense of belonging, identification, relationship, and status in the host country, while *home cultural identity* reflects the person's sense of belonging to their country of origin. *Host country language* ability refers to the linguistic proficiency in the host country, such as

listening, speaking, reading, writing, and comprehension of local dialect, as well as some non-verbal communication (Selmer & Luring, 2015). *Home country language* is the native language that the person speaks and communicates at home and in the country of origin. Purnell (2016) identified *Host/home cultural competence* as the knowledge and ability of behaviors, attitudes, policies, thoughts, communications, actions, customs, beliefs, values, and institutions among people from a racial, ethnic, religious, or social group. *Host cultural competence* involves an immigrant's awareness, attitude, knowledge, and skills engaging in the host country; home cultural competence refers to a person's knowledge and ability of behaviors, values, beliefs, policies, and other aspects of the country of origin (Oikarainen et al., 2019).

2.1.3.1 Multidimensional Acculturation

The impact of different dimensions of acculturation on students' beliefs and academic performances sparked controversy (Areba et al., 2021; Fang, 2020; Lilla et al., 2021; Singh & Jack, 2022). Chapman-Hilliard and colleagues (2016) argued the significance of culturally empowering learning in connecting to the racial and *cultural identity* of African American students and impacting their learning motivation and academic achievement. Talpade and Talpade (2020) also indicated that racial identity and academic confidence are highly correlated to academic access, which supports culturally relevant pedagogy in helping students to construct their identity and improve academic success. In contrast, Whitesell and colleagues (2009) found cultural identity is mostly unrelated and had only very small indirect effects on a learner's high school performance. More recently, Singh and Jack (2022) conducted 55 semi-structured qualitative interviews to investigate international students and scholars on whether the *home country language* and *home country culture* are influential to their academic success. They

discovered that language and culture are influential in multiple aspects, such as training, supervision, group work, friendship, and life adjustment (Singh & Jack, 2022). Yet, Hernandez (2007) used data from the Texas Higher Education Opportunity Project and found that *home country language* does not sufficiently explain academic achievement patterns across different racial and ethnic groups. Additionally, Brace (2011) found that *cultural competence* and related concepts such as culturally relevant pedagogy have no statistical impact on student academic achievement. While more recently, other research (Adera & Manning, 2013; Lee, 2022; Patterson et al., 2018) promoted social and *cultural competence* in the classroom and school for student learning.

Moreover, Lilla and colleagues (2021) indicated that *assimilated* immigrant students have the same level of academic self-concept while the integrated, separated, and marginalized immigrant students have a lower level of academic self-concept, and assimilated immigrant students also had greater performance in school. Yet, Fang (2020) conducted a stratified cross-sectional study and found that *integrated* immigrant students have the most significant positive association with academic achievement. While Fang (2020) and Lilla and colleagues (2021) found positive correlations between acculturation and academic performance, Areba and colleagues (2021) discovered negative correlations in their study. The transition process was easier for individuals with a strong cultural orientation toward the host country and neighborhood, and they often had behaviors and academic performance similar to their native peers. Immigrant students who had a weak cultural orientation toward the host country had a more challenging time during the transition process. They showed less learning motivation and lower academic concepts and performance than their native peers (Lilla et al., 2021; Melkonian et al., 2019). Martinez-Taboada and colleagues (2017) also highlighted that cultural dissonance

between home and school environments can account for the perceived academic performance of immigrant students. Similarly, Mejia-Smith and Gushue's study (2017) found that career decision self-efficacy significantly correlates with career paths and acts as a mediator between acculturation level and career choices or goals. Hence, past studies (Lilla et al., 2021; MartinezTaboada et al., 2017; Melkonian et al., 2019) indicated that different acculturation extents may distinctly influence immigrant students' perceived academic self-efficacy and mathematics learning performance.

2.1.4 Age and Grade Level

Self-efficacy, as mentioned earlier, is a combination of notions of self-esteem and self-regulation, the role of age or different grade levels may also act differently at the different teen stages. Research showed that age plays a vital role in self-efficacy judgments because age significantly moderates self-evaluation (Conn, 1998). Mozahem et al. (2021) surveyed 374 secondary school students and showed age as a strong moderator of self-efficacy in learning mathematics. When five-year-old learners encounter an unsuccessful learning experience or discouragement from others, they commonly react and think differently from adult learners. As people get older, their self-efficacy toward certain things can differ depending on different experiences and factors. Chyung (2007), Bausch et al. (2014), and Chu (2003) all found significant age differences in perceived self-efficacy, and younger students improved their self-efficacy in learning significantly more than older students. However, Hargis' study (2001) did not find significant age differences in self-efficacy. The inconsistent findings among different age groups suggested that age and grade level may potentially be an influential element of perceived self-efficacy.

2.1.5 Gender

There were also discrepancies in findings on the gender differences in self-efficacy and academic performance. Chu (2003) and Kumar (2006) indicated that gender is not a significant predictor of self-efficacy, while Gully and Chen (2010) and Sherman and colleagues (2000) demonstrated gender difference between self-efficacy and performance. Ardura and Galán (2019) sampled 507 secondary school students and found that female students outperform male students in Physics and Chemistry and have a higher self-efficacy. Tzu-Ling (2019) also demonstrated a significant difference in self-efficacy between male and female students in learning science, technology, engineering, and mathematics. The study comprised 407 first-year college students and contrastingly found male students have a higher self-efficacy (Tzu-Ling, 2019). Huang (2013) also exhibited male students show higher self-efficacy than females, and yet female students were found to have better academic achievements in self-regulated learning than male students in Yukselturk and Bulut's study (2009). Additionally, Mozahem et al. (2021) used surveys developed by Usher and Pajares (2009) for a study of students from six private schools and found that females are more likely to develop lower levels of self-efficacy. Rosson et al. (2011) also concluded that male students have significantly higher perceived self-efficacy than female students. Numerous studies showed that gender needs to be considered as a potential factor in generating academic self-efficacy and may have a high association with the dependent variable.

2.1.6 Age at Arrival

Similarly, age at arrival to the United States was also proved to result in various academic performances. The academic contents were more difficult in secondary schools, while the new entrants also passed the critical age for language proficiency and natural adaptation to cultures and other heterogeneous conditions. The secondary school environment frequently posed numerous challenges and barriers that could potentially have motivational effects on the new entrants (Adeyemo, 2005). Potochnick (2018) exhibited a significant academic performance gap between the primary- and secondary-grade-age arrivals in the study and even a greater performance gap than their native peers. Immigrant students in K-12 generally underperform their native peers due to language, culture, and other barriers that were further discussed later in this chapter. However, Roessingh (2008) found that older-arriving students (aged 15-16) generally have greater academic performance than the younger arrivals (aged 12-14), and the students who arrived at age 6-11 struggled the most academically. Lane, Kim, and Schrynemakers (2020) uncovered a negative correlation between the number of years living in the United States and academic performance in their study. They exhibited that the greater the number of years living in the U.S., the lower academic performance scores (Lane et al., 2020). Additionally, Hilliard et al. (2018) and McNair et al. (2016) indicated English language learners achieved remarkable success in post-secondary education. Thus, different ages at arrival could result in different acculturation levels and also generate various outcomes in building and shaping learners' self-efficacy, affecting achievement.

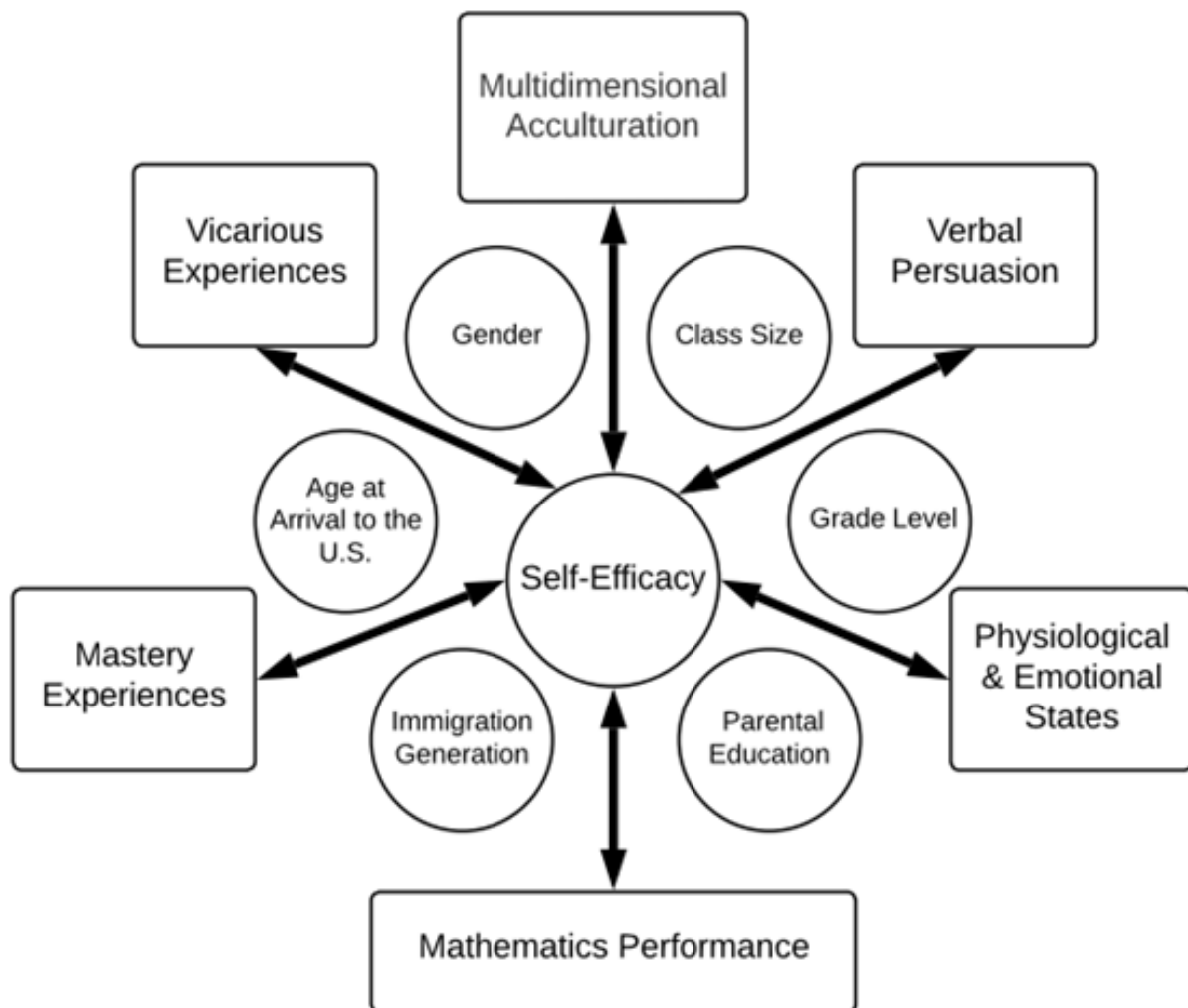
2.1.7 Immigrant Generation

Despite scarce research on the immigrant generation's perceived self-efficacy, copious research showed significant differences between different generation groups and their academic achievements. Klein et al. (2020) sampled 440 aged between 12- and 19-year-old immigrant adolescents and confirmed that first-generation immigrant youths have higher levels of emotional and psychological problems, such as depression and anxiety, affecting their academic performance. Moon and Ruiz-Casares (2019) indicated that even though first-generation immigrants have a higher average of emotional and psychological problems, they also have significantly more remarkable academic achievements than second-generation immigrants. Second-generation immigrants often feel pressure from parents, cultural disparities, and parental standards, while first-generation immigrants' pressures are usually from their own awareness. Both were closely associated with internal and external factors affecting academic performance, which was discussed later in the chapter. Additionally, some research indicated that first-generation immigrant students have more motivations and incentives to work hard and gain upward social mobility than second-generation immigrant students and their native peers (Klein et al., 2020; Moon & Ruiz-Casares, 2019; Silver et al, 2021). More urban and suburban high schools were experiencing increasing numbers of immigrant students from different generations. Still, there was insufficient research exploring the effect of the immigrant generation as a moderator. The correlation between immigrant generation and acculturation, as well as the potential moderating effect on student self-efficacy and learning among different immigrant groups, warranted attention from researchers.

The figure below (see Figure 2.2) concluded and displayed a conceptual model of relationships among the four sources of perceived self-efficacy, six aspects of acculturation, and

all other factors and influencers affecting immigrant students' mathematics performance. Self-efficacy perspectives acted as mediators during the process, and different aspects of acculturation, immigrant generation, age at arrival to the U.S., grade level, and gender might moderate the effect. The model also incorporated family socio-economic level, parental education and involvement, class size, and other miscellaneous variables for more accurate estimates, which were explained and reviewed later in this chapter.

Figure 2.2. Immigrate Students' Mathematics Self-Efficacy Conceptual Model



Note. Sources of self-efficacy and acculturation were considered as potential mediators, while the other variables were explored for their potential moderating effects.

With all good intentions to provide knowledge and skills, schools and education served their purposes to produce intelligent and productive citizens; however, numerous internal and external factors cultivated people's cognitive, affective, and behavioral patterns. Immigrants and minorities often faced more challenges and obstacles in schools and communities. The first- and second-generation immigrants also had to battle between their values, cultures, norms of behavior, and mainstream cultures and judgments. To fully explain the complexity of difficulties faced by minority immigrant students, we had to look backward and discuss the background contents for understanding the contentious debates over immigration acceptance.

2.2 An Overview of Immigrant Legislations and Educational Reforms

In the early 1600s, groups of people from the Eastern seaboard, including Spain, Britain, the Dutch, and Sweden, migrated to America for greater economic opportunities and religious freedom. They were the first influx of immigrants after the native Americans. Later, between 1815 and 1845, one million Irish came to America, settled, and made new homes for themselves. Then, followed the Southern, Eastern, and Central European immigrants in the late 1800s, the Chinese, Japanese, and Mexicans also immigrated to America seeking job opportunities (Martin, 2009).

While these demographic changes opened onto rising job demands and a soaring economy, the politicians and leaders launched the idea of *Americanization*, which was to educate immigrants on the English language, Anglo-American culture, and ideas about American

democracy (Hill, 1919). Schools and social activists diverged into three different opinions about Americanizing immigrants –*assimilation*, *cultural pluralism*, and *amalgamation*.

Assimilationists stood up for the minority and immigrants giving up their own identities and taking on the characteristics of the Anglo-American culture. Cultural pluralists respected all cultures and advocated a great mixture of different cultures that each culture retains some characteristics, which was also the ideal of “salad bowl.” Yet, amalgamationist was the “melting pot” analogy that advocated the different cultures and religions interweaved, mixed, and formed a new culture (Mirel, 2010).

In 1906, Theodore Roosevelt amended the Naturalization Act and required immigrants to learn English to become citizens. It reinforced English as the dominant language for the country, and at the same time, many states restricted schools using non-English language instructions (LeMay et al., 1999). In 1923, *Meyer v. Nebraska*, the first U.S. Supreme Court case that debated foreign language education. The court ruled that the state law restricting foreign-language education violated the due process clause of the Fourteenth Amendment (Blackman & Wasserman, 2016). The decision protected non-English languages as a subsidiary of instruction in schools and confirmed the dominant status of the English language (Kibler, 2008). Subsequently, *Farrington v. Tokushige* (1927) and *Stainback v. Mo Hock Ke Lock Po* (1949) fortified schools and parents’ right to teach students foreign languages (Valdes, 1981). As cultures, values, beliefs, and identities are embedded into languages, the settlements also contributed to the foreign language and culture maintenance (Ovando, 2003).

During that time, three political forces, *democratic equality*, *social efficiency*, and *social mobility*, were formed and generated the trajectory of education development. *Democratic equality* supported citizenship training, equal access, and equal treatment, while *social*

efficiency prioritized economic needs and *social mobility* pursued individual interests in education (Labaree, 2008). It was undeniable that the force of *social efficiency* was formed to accommodate the increasing economy's needs because of the arrival of millions of immigrants and a growing population. However, *Humanists* opposed schools preparing students for the workforce and advocated the curriculum created central liberal arts and general intellectual skills. And yet, *social meliorists* believed education was a tool to reform society and create a change for the better. At the same time, *developmentalists* emphasized the development of children's emotional and behavioral qualities and attempted to organize the curriculum according to the psychological development sequence of the learners (Kliebard, 2004). The different tensions and forces were interwoven and created contrasting and complementing trajectories in the developments of American education and immigrant education that lasted up to the present time.

Before 1952, not all ethnic and racial groups were eligible for naturalization and had the same citizenship status as the white immigrants. The non-white people were classified as inferiors and could not attend the same schools as the white descendants (Franklin, 1956; Martin, 2009; Sitkoff, 2001). In the Civil Rights Act of 1964, Title VI of the Act prohibited discrimination based on race, color, and national origin in all federally assisted schools and programs (Act, 1964). Followed by the Supreme Court's decision on the well-known *Brown v. Board of Education* (1954) remarkably paved the way for the integration and inclusion of public schools (Warren, 1954). The Bilingual Act of 1968 recognized the needs for and values of foreign language and bilingual education and funded public schools to establish educational programs for students with limited English-speaking proficiency (Muo, 1994). In the following years, civil-rights scholars and activists developed the concept of *Critical Race Theory* that

sought to critically examine social, cultural, and legal issues related to race and racism because they believed that racism is common and woven into the American policies and laws (Delgado & Stefancic, 2017). In 1981, the court decision for *Plyler v Doe* stroke down a state statute of denying funding for education to undocumented immigrant students (Powell, 1981). In 1994, the reauthorized Bilingual Education Act promoted bilingualism by funding schools that developed more bilingual programs; It was a sign of returning to bilingual education for many schools and educators (Wiese, & Garcia, 1998).

In 2001, the *No Child Left Behind Act (NCLB)* required all states to raise academic achievement levels for all students, including all minority, English language learners, and students with disabilities (Behind, 2002). All schools were accountable for student academic achievement levels as broken out by numbers on standardized tests, and there were severe penalties for schools that did not make their adequate yearly progress (Jennings & Rentner, 2006; Linn et al., 2002; Simpson et al., 2004). In 2010, the *Math and English Common Core Standards* were released, and the *Science Common Core Standard* was released in 2013 to prepare students for the working force (National Governors Association, 2010; Porter et al., 2011).

2.2.1 Social Acceptance

The United States had a long history of immigration, and the federal laws throughout history led to debates and uproars in society. In the nineteenth century, the federal laws considered the poor and unskilled refugees and undocumented immigrants from Northern Europe as “free white people” who were able to obtain U.S. citizenship, whereas the other immigrants were prohibited from naturalization (Price, 1966). People believed that the immigrants were

taking over their jobs because immigrants were willing to accept lower wages and work longer hours, and the sick and poor immigrants were detrimental burdens to the U.S (Arnold, 2011; Kliebard, 2004). Anti-immigration movements and protests were aroused by the mainstreaming of hate toward immigrants (Arnold, 2011; Clark, 2012). Influenced by *Eugenicists*, people accepted and advocated the concept of sterilizing non-white human races by selectively mating white people only with white people (Selden, 2000). People of color were viewed as inferior and unwelcoming people across the country. The non-white immigrants' descendants were also separated, excluded, and unaccepted by mainstream society.

In the early twentieth century, non-white settlers substantially increased due to massive migration from Europe and Asia, followed by the Great Atlantic Migration (Martin, 2009). Many foreign colonies flocked together to protect and preserve their culture and legacy. Shifted by the social dynamics, the federal laws changed, updated, and extended naturalizations to Native American descents (1940), Chinese (1943), Filipinos and Indians (1946), and all ethnic and racial groups in 1952. The nation's economy tremendously increased due to the increasing job market and workforce. In the late twentieth century, the *life adjustment movement* (Hartman, 2008) to ensure all American youth safely and smoothly transitioned from adolescence to adulthood shaped education toward racial equality and inclusivity, which *Democratic equality* was pervaded in education on preserving the commonwealth. More human capitals and workforce were needed after World War II for the nation's postwar development and prosperity; Subsequently, some groups started to accept the fact that the immigrants contributed to the infrastructure and development of the nation and showed their potential strengths that benefit the country (Burkholder, 2011).

Also, a group of politicians and economists pushed society to move toward *social efficiency* for *public interest*, which was for the welfare or well-being of the general public and society – the dominant white people’s welfare and well-being. To settle the white people’s concerns regarding an increasingly large and heterogeneous group of students, they advocated differentiated education to prepare some students for colleges while training others to work and fulfill the job market (Fallace & Fantozzi, 2013). It was effective and efficiently contributed to the improvement of society and accommodated economic needs. However, it intensified educational inequalities and economic segregation. Wealthier families could afford nicer and more expensive houses with higher property and local taxes, whereas low-income families could only afford to live in disadvantaged districts. Most dominant white people intended to live in expensive, predominantly White communities for highly advantaged education resources. Newcomers and minority families could not afford to live in expensive houses and districts and gathered together living in relatively disadvantaged neighborhoods, causing minority students’ school districts to become increasingly populated by more minority and low-income students (Pattillo, 2005). Students were segregated by family income and social class between school districts, and educational resources are unequally distributed (Owens, 2018; Sharkey, 2014). Students from highly advantaged communities and disadvantaged neighborhoods did not have the same school funding, teacher quality, peer influence, parent support, and social capital. Likewise, *social mobility* was prominent in the higher education realm, which was discussed later in the paper.

From repelling and repulsion to accepting and seeking ways to accommodate Americanize immigrants, the Americans had to acknowledge the undeniable trend of the cosmopolitan society (Mirel, 2010). The American society diverged into different sides toward

immigrants. On one side, people enjoyed the benefits of cheaper labor and a dynamic economy; on the other side, people sensed the social burdens of poor immigrants and threats of an intense job and economic market because of the higher competition driven by diligent immigrants.

2.2.2 School & Curriculum Improvements

Before 1954, foreign immigrants were segregated, and the black students were separated from the white children. White parents were reluctant to send their children to the same school as colored and immigrants. The government created separate schools for the colored students and institutions to Americanize the immigrant. They were viewed and treated as inferiors and home enemies (Clark, 2012; Selden, 2000). Immigrant education was aroused by the ideas of transforming the inferiors and bringing everyone together morally through schooling but without granting them citizenship.

Throughout the nineteenth century, the desegregation movements forwarded the process of Americanizing immigrants. Public schools reformed to include all children regardless of race and recognized the needs of language deficiency and values of bilingual education (Labaree, 2012). Although the four leading forces *humanism*, *meliorism*, *social efficiency*, and *developmentalism* influenced the American curriculum thought and practice (Kliebard, 2004). In some areas, different approaches were also implemented to acculturate immigrants (Gutfreund, 2017). Also, some people preferred to preserve their home cultures; others favored language restriction and *monoculturalism* (Kibler, 2008).

After World War II, the *life adjustment movement* fermented education reforms, and the concepts of *simulation*, *pluralization*, and *amalgamation* penetrated and influenced the public-school systems (Mirel, 2010). For example, in some schools, newcomers were provided with all

bilingual instructed classes. In comparison, some schools let immigrant students taken all English classes with ESL support. Yet, some schools offered content-based sheltered English classes or structured immersion classes. Also, in some districts, immigrant students could only attend classes with mainstream students and had very few ESL pull-out sessions. Public schools promoted inclusion but still had diverse opinions on including immigrant students.

Popular terms such as culturally responsive teaching or relevant pedagogy required teachers to respect, recognize, and incorporate diverse cultures into teaching. Outwardly, schools were moving toward and embraced more *cultural pluralism* rather than *amalgamation* or *assimilation*. However, the majority teaching force consisted of white Americans with limited knowledge and scarce experience of diverse cultures, and most schools and classrooms were still embracing *amalgamation*. The *No Child Left Behind Act (NCLB)* and *Common Core Standards* set benchmarks and required schools to raise academic achievement levels for all students, including all minority, English language learners, and students with disabilities. The standards were political- and business-driven as a joint business and education effort. They were specifically crafted to ensure that the schools and teachers were designing curriculum, facilitating learning, and getting the students ready to move into the working force and apply skills that the business leaders alleged were missing among the graduates, such as application-orientated, innovative, creative thinking, problem-solving, etc. The concepts and ideas of *social efficiency* embedded in the academic content prevailed over the K-12 immigrant education, which contributed to intensified school racial and economic segregation (Fallace & Fantozzi, 2013).

Moreover, *Critical Race Theory* was rarely taught through the lens of history or civics to help young people to be more inclusive and empathic. Some states even banned the idea to

incorporate *Critical Race Theory* in classes and criticized that it could create a racial divide and was detrimental to the white students (Ladson-Billings, 2013). Schools found it hard to train and develop culturally responsive, relevant teaching and awareness that eliminating systematic racism and cultural bias at different levels (Howard, 2016). It came across as cultural pluralism was an ideology that existed for a long time. Still, educators were seldom able to implement it widely in schools and teaching practices.

2.2.3 Individual Struggles

In the 1900s, the increasing number of students gave rise to *democratic equality*, *social efficiency*, and *social mobility*; they forged, interweaved, interfered, and dominated education (Labaree, 2008). In the character of *public interest*, the dominators and elite families were aware that they had already stepped to the upper social ladder. Creating differentiated education and local control for the white neighborhood because they did not want to step down on the ladder (Rury, 2015); contrarily, the immigrant and minority families were at the lower social ladder, striving to move to the upper ladder to achieve wealth and prosperity. For many poor first-generation immigrants and labor families, education was the opportunity and pathway to get out of poverty. It was notable that one person stepped up on the social ladder, then there had to be a person stepped down (Labaree, 2012). Not everyone could stay on the top of the ladder.

Progressively, *social mobility* dominated the modern higher education realm, whereas *social efficiency* dominated in K-12 immigrant education, which was previously discussed. Higher education turned into a commodity for people. People from wealthy families could afford more education (Duncan et al., 2017). Yet, the immigrants and laborers had to work to support their families at earlier ages, and education became less important when compared to

surviving and sustaining (Ziol-Guest et al., 2016). Education turned into a barrier for immigrants and laborers to move up in the graded hierarchy and social ladder. In contrast, the possibility of obtaining higher education and remaining on the top of the social ladder was higher for people from families who did not have to worry about the affordability of higher education. They did not have to suffer the burden of high interest from student loans but the scarce educational resources and support from the family. *Social efficiency* and *social mobility* became agents to the schools and society that bifurcated and unfeasible to achieve equality and inclusion for every individual student. Immigrant and minority families could hardly climb up the social ladder and improve their social status; indeed, the social ladder became a glass floor for many immigrants. They barely had the mobility to move.

2.2.4 Cultural Gaps

The German colonists tried to preserve their home culture and religion by having their descendants studying in German instruction in the 17th and 18th centuries (Ellis, 1954; Wooley, 1944). During the war, English-speaking Americans considered speaking another language was a symbol of anti-America (Kibler, 2008). Decades after, although federal and states recognized the needs and values of bilingual education and culturally responsive instructions, immigrant students are still underserved. Contributing from the idea of *social efficiency* acted as an agent to *assimilate* diverse and heterogeneous populations, schools and teachers taught and trained students the curriculum and skills to fit in the American society dominated by Anglo-American culture. The literature, history, language arts, and humanities subjects were all subjective and centered around the Anglo-American culture. Formal and informal cultural barriers were embedded in schools in every aspect, such as curricula, academic content, extracurricular

activities, sports, school social environment, students, teachers, etc. These cultural barriers were often grounded deeply and highly complex based on the values and beliefs of a dominant group and alienated individuals away from the dominant group. They could be formidable obstacles limiting achievement and growth in socioeconomic status (Caffarella, 2010).

As previously mentioned, immigrant students often had profound emotional, psychological, and academic needs, and they are more vulnerable. Many newcomers had entirely different customs, norms, religions, and cultures besides the language barrier. Most school districts still comprised mostly white American teachers and did not have teachers or interpreters who knew the same language and cultural backgrounds. Also, many ESL classes were taught by teachers who only spoke English, and teachers often felt helpless with the non-English-speaking students in the class. While White students scored much higher on reading and math achievement tests than other minority students (U.S. Department of Education 2016); Still, most states had state standardized English tests that the students are required to pass to graduate. Apart from all the above, high school students must also take the Scholastic Aptitude Test (SAT) to apply to most colleges. The SAT questions included Anglo-American cultural expressions and knowledge. Some problems from the SAT contained ethnic and social-class bias in words that only students from mostly wealthier families are exposed to and know the meanings. The SAT scores were much lower at the schools where higher minority students enrolled and strongly related to lower enrollment of immigrant and minority students in 4-year colleges (Buchmann et al., 2010; Schmitt et al., 2009). It became a barrier for minority students to get higher education and step up on the social ladder; in contrast, education turned to protection for the Anglo-American descendants to remain on the upper ladder. The concepts of inclusion, culturally responsive, and relevant pedagogies were often seen in social media and educational discussions.

Society and educators often alleged they are trying to close the gaps between different cultures but could hardly decenter the Anglo-American curricular power and effect.

2.2.5 School Social Involvement

In the school setting, akin to a microcosm of society, immigrant students frequently encountered challenges in fostering intercultural relationships with their peers, primarily attributable to language and cultural barriers. While American-born students were still in the throes of immaturity and crudeness at that age, immigrant students found themselves more sensitive and vulnerable to the new culture and environment surrounding them. Despite the fact that non-native English speakers require social interactions to learn social English and culturally relevant interpersonal skills, disengagement from school activities might serve as a protective measure against academic failure, cultural shocks, and psychological imbalance (Motti-Stefanidi, 2015). Although all students were encouraged to participate in after-school extracurricular activities, many new immigrants and minority students did not find enjoyment in them. They often grappled with peer pressure, alienation, systemic racism, and academic stress. Engagement in extracurricular activities were crucial for students to broaden their interests and perspectives, as well as to build social and interpersonal skills that prove beneficial in college, future careers, and life. However, if the school lacks diversity or fails to embrace it, participation in such activities might inflict more harm than benefit on immigrant students, both academically and psychologically. Racism and exclusion, perennial issues, extend beyond individual actions or prejudices.

2.2.6 Academic Performance

For many high school students, graduation and GPA symbolized academic success. Language deficiency and cultural differences not only built barriers for immigrant students to participation and engagement in classes and school but also held them back from achieving higher grades. Immigrant students frequently needed more time, support, and resources during the transition. However, as previously discussed, research showed racial segregation and educational inequalities between high- and low-income social classes did not mitigate. Minority student schools became increasingly populated by more minority and low-income students, and minority students attended schools with poverty rates that were approximately double that of white students (Orfield et al., 2016). Fewer resources, inadequate teacher quality, adverse peer influence, lack of parental support and social capital, more issues about economic segregation, school racial segregation, and academic achievement gaps between white and minority students remain unsettled (Duncan et al., 2017).

Despite some immigrant students attending predominantly White schools and receiving the same educational resources in schools, the schools rarely modified curricula and classes for non-native English speakers. History was the most challenging subject for immigrant students. Not only was the language the obstacle, but more of the unfamiliar religions, ancestors, cultures, past events, chronicles, and more. They must encounter so many things that they never heard of in their families, communities, and prior education and could not relate to or connect them to any of their previous scope of knowledge (Goodman et al., 2020). Moreover, they had to take four years of a foreign language like everyone else. Using a second language to learn a third language was never easy. However, society often criticized immigrants' academic performance compared

to nonimmigrant students. Still, it failed to acknowledge that immigrant students face barriers and hardships beyond their lack of sufficient English proficiency.

2.2.7 Higher Education Opportunity

Besides academic and social barriers, financial obstacles also rendered higher education difficult and challenging for immigrant students. The increasing tuition costs and limited financial aid resources discouraged immigrant students from applying to colleges. Also, undocumented immigrant students could not legally receive any federal student financial aid or grant for college. Moreover, language proficiency can lower immigrant students' self-concept, steering them away from challenging tasks, such as obtaining higher education (Bailey et al., 2011). Being alienated socially in school, students often felt nervous, less confident, and self-doubting. As a result, they took fewer rigorous classes and more regular classes to shelter them. Kerr (2014), Koch, Slate, and Moore (2012) describe the core classes as being large, loud, and disordered, and the honors and advanced placement (AP) classes as being more rigorous and competitive. These challenging classes covered more content knowledge and information, and the assignments and assessments are more corresponding to college classes (Guzy, 2016). Many immigrant students had scarce information about honors and AP classes that would benefit them academically and provide better preparation for college (Kanno, 2014).

2.3 Factors Affecting Immigrant Student Self-efficacy and Academic Performance

The education for immigrants were reformed and improved, but there was still a long way to go. Over the past half-century, researchers identified and studied various factors contributing to immigrant student academic performance. It was important to note that all of the

components also worked reciprocally, affecting individuals' perceived self-efficacy and thus contributing to their academic performance (Hwang, 2016). These factors might create an unfavorable environment for immigrant students, decreasing their self-efficacy and ultimately impacting their mathematics performance. Most of the factors could be sorted into one or multiple sources of the four sources of self-efficacy or a component of acculturation, and some might be classified being a part of moderators. Due to the research limitations, few external and internal factors were not investigated further in this dissertation study. However, for the sake of acquiring an in-depth understanding of the topic, the remainder of this chapter provided a brief review of all of these explanatory factors and influencers and the related controversial sub-concepts in the relevant empirical research.

2.3.1 Language Barriers

Students with immigration backgrounds often faced multiple challenges and disadvantages that affect their academic performance, and these various factors might also affect them in learning mathematics. As English language learners (ELLs), immigrant students were unable to communicate fluently or speak English effectively and tended to have lower self-efficacy in learning since they were often confused and disoriented with English instructions. Language insufficiency was a major disadvantage that affected immigrant students' performance in high school since language proficiency is a primary factor in understanding content, exchanging information, and acquiring knowledge (Buchmann & Parrado, 2006). Learning a new language did not come easily and naturally for immigrant students beyond elementary levels (Collier, 1995). High school newcomers often needed more transition time and assistance in adapting to a new school and learning environment (Hopkins et al., 2013). Research indicated

that conversational language, or *Basic Interpersonal Communication Skills* (BICS), could be learned within about two years, but academic language or *Cognitive Academic Language Proficiency* (CALP) could take much longer to acquire (Cummins, 1991; Cummins, 2000). Moreover, the oral and written language skills necessary to acquire academic context were essential to succeed and were more cognitively demanding in high school (Carhill et al., 2008), and immigrant students who arrived in the U.S. beyond elementary levels must learn all the challenging subjects while picking up the new language. Using a second language to learn academic contexts created various barriers for high school students to comprehend context, communicate with teachers and peers, analyze and grasp complex concepts, and limit their participation in exchanging ideas in learning. Many immigrant students exhibited strong linguistic insecurity and felt anxious about their English and school performance compared with their native peers (Kanno, 2018). The linguistic insecurity toward learning might generate low academic confidence and result in ELLs staying in the recommended low-track courses, thus further negatively impacting their academic self-efficacy and performance (Kanno, 2018). English language proficiency was part of immigrant student acculturation (Marin & Gamba, 1996) and was included as a moderator to their mathematics performances.

2.3.2 Prior Education

Immigrant students' prior educational experiences were also critical in their academic achievement (Lee, 2012). Bandura (1977) also referred to prior educational experiences within the confines of *mastery experiences* and emphasized that they were prominent sources that influenced student self-efficacy in learning. Yet, prior educational experiences also involved teachers' encouragement and peer influences. Thus, it could also be a factor that overlaps three

academic self-efficacy sources: *mastery experiences*, *vicarious experiences*, and *verbal persuasion*. Depending on the country of origin, many migrants and refugee students did not have formal schooling; some experienced interrupted formal education (SIFE), and others never had any type of formal education prior to immigration (Hos, 2020). In many urban area schools, approximately 10% of ELLs were students with interrupted formal education (Bartlett & Garcia, 2011; Hos, 2020; Potochnick, 2018). These students typically functioned two or more years behind their peers in reading and mathematics, and many of them were not literate in their native languages (DeCapua et al., 2009). Students with interrupted formal schooling or inadequate educational backgrounds were at high risk of dropping out of high school (Hos, 2020; Potochnick, 2018). They were also less likely to respect school rules and standards, score lower on standardized tests, and have lower GPAs and other long-term adverse effects on achievement compared to the secondary student population as a whole (Lee, 2012; Hos, 2020; Potochnick, 2018). In the context of *mastery learning experiences*, one of four sources of self-efficacy, various levels and quality of prior education and schooling could tremendously impact immigrant student academic self-efficacy and thus influence their performance after immigration to the U.S.

2.3.3 Early Experience with Math Learning

Another part of *mastery learning experiences* was an early positive experience with math learning, which could also help learners establish confidence and positive self-concept toward mathematics and create intrinsic motivation in learning mathematics at an early age that benefits subsequential education. Confidence, self-concept, and intrinsic motivation were essential factors that produced learning interest that undeniably play a crucial role in students acquiring

knowledge and cognitive development (Fisher et al., 2012). Research indicated that earlier positive math learning experience leads to greater interest in mathematics (Heaverlo et al., 2013). Students with positive learning experiences could attain higher levels of math understanding, cultivate interest and intrinsic motivation, and lay the foundations for subsequent mathematics achievements, which lead to a positive attitude toward mathematics (Jo & Son, 2021).

However, negative learning experiences resulted in math anxiety or fear of mathematics (Ashcraft, 2002; Maloney & Beilock, 2012; Maloney et al., 2015). These negative classroom experiences with math included being embarrassed in front of classmates, encountering biased behavior from the teacher, receiving negative comments, perceiving a negative attitude, or facing an angry response when seeking clarification (Jackson & Leffingwell, 1999; O'Leary et al., 2017). As a result, students developed a negative attitude, lost interest, or experienced a lack of confidence in subsequent math learning, which was also associated with decreased working memory, cognition, and problem-solving abilities, thereby impacting their overall mathematics performance (Ashcraft & Krause, 2007; Barroso et al., 2021; Lee, 2009).

2.3.4 Cultural Differences

Although immigrants negotiated and shaped their cultural identities over time by various elements such as language, ethnic background, residence culture, and experience (Weber et al., 2018), some embedded values and norms still separate them from mainstream groups. They were often inclined to look up to the dominant ethnic groups, impacting their self-esteem and self-efficacy. Also, different ethnic groups often faced stereotypes based on race, origin, religion, and ethnicity (Clark, 2012). Because of the systematic underachievement and disparities of school performance between Latino students and European American students in schools of the U.S.,

Hispanics were stereotyped with low academic performance and educational attainment (Chu & Brown, 2017; Weber et al., 2018). A stronger ethnic identification could cause stronger negative stereotypes that affect their academic performance. It also contributed to the Hispanic population's low self-efficacy in learning STEM subjects such as mathematics and sciences (Lin et al., 2018). In recent studies, Latino immigrant students performed worse on math assessments when facing stereotype threats than under control conditions (Chu & Brown, 2017). Additionally, Hispanic high school students who attended a majority-Hispanic high school had more robust ethnic identification and performed worse than those with weaker ethnic identification (Urdan & Teramoto, 2021). Contradictorily, Asian or Asian American students also tended to have lower academic efficacy beliefs than individuals raised in Western cultures but commonly outperformed their peers (Salili et al., 2001).

Besides the stereotype threats, immigrant students also carried different cultural norms and perspectives toward education, and they were also determinants in shaping educational trajectories, decisions, and school achievements (Valadez, 2008). For example, Holland and Eisenhart (1990) indicated the influence of societal norms and gender expectations toward female students in shaping their decisions to select academic tracks that were not challenging but increased their chances for romantic attachments. Lately, although Valencia debunked the myth that "Mexican Americans don't value education" (2019), people who grew up in working-class families were still more likely to select technical or vocational curricula and choose blue-collar works because of the values and perceptions passed from their parents (Ziol-Guest et al., 2016). Thus, stereotype threats and cultural differences were essential to the transition during adaptation to the new country. They were assessed in the frame of immigrant students' acculturation dimensions to examine their significance on student mathematics performance.

2.3.5 Socio-Economic Family Background and Resources

Family socioeconomic statuses might play a vital role in the systematic underachievement of Hispanic immigrant students. Han and colleagues (2015) examined the correlations between family socioeconomic status and the self-efficacy perspective and found that socioeconomic status highly affects student self-efficacy in learning. Family socioeconomic status was determined by the parents' education, job, income, political power, and prestige in society, which was a critical determinant in student academic achievements (Akhtar & Niazi, 2011). Baird (2012) found that low socioeconomic groups consistently underperformed other groups, and student test scores were closely associated with students' family socioeconomic statuses (Hanushek & Luque, 2003; Wößmann et al., 2005). The mathematics achievement gaps were wider between low-socioeconomic and high-socioeconomic students (Elliott & Bachman, 2018; Polidano et al., 2013). Minority immigrant students from high-poverty families were much more likely to drop out than those from advantaged families (Elliott & Bachman, 2018).

Although education might seem to be the opportunity or pathway to get out of poverty and move up on the social ladder; however, they often had to work or take care of their families at earlier ages, and education became less important compared to surviving and sustaining (Ziol-Guest et al., 2016). With more time working outside of school, low-socioeconomic students engaged less in academics and study than students from high-socioeconomic families (Walpole, 2003). In contrast, their native peers, the higher socioeconomic groups advantaged groups, did not have to suffer the burden of part-time work and insufficient education funds (Duncan et al., 2017) and often had better educational resources and opportunities compared to the low socioeconomic groups (Baird, 2012). U.S. Census (2021) indicated a high proportion of first-generation immigrant and minority families live in poverty –households with aggregated annual incomes

below the federal poverty level. Second-generation immigrants commonly had a higher financial and socioeconomic status than the first-generation. Although in the high-poverty urban school district, the difference in socioeconomic level between the first- and second-immigrant generations would not likely be significant enough to influence their efficacy. Still, the dissertation study included the variable of students with low-income family backgrounds, as previously mentioned in the conceptual model.

2.3.6 Parental Education and Involvement

Parental education and involvement might also moderate schooling attainment and student academic achievement. A Parent served as a child's first teacher, and learning could happen in everyday moments since a child was born. Students often inherited their parents' values and perspectives toward education and made decisions based on their parents' characteristics (Chevalier, 2004). A student's perception and appreciation of education and schooling often mirrored the values and perspectives held by their parents or families. How a student valued and viewed education and schooling often reflected the parents' or families' values and perspectives. For example, if a parent thought that Algebra was not an important life skill, the child would often have the same value toward Algebra and believed it was not worth learning and understanding. Some low- and middle-socioeconomic families preferred technical and vocational schools rather than high school or 4-year colleges because they believed that they could learn more practical things, get trained in some specific career fields, and earn money sooner without debt or student loans. Many minority immigrant students dropped out of high school to work in restaurants and factories owned by people of the same ethnicity and speak the same language other than English. Rowan-Kenyon et al. (2008) called attention to the

importance of encouragement from parents in students' education attainment, academic trajectories, and career choices. Also, students' academic performance and achievement in school were associated with their learning outside of school, from the parents, and within their home and community environment (Durand, 2011). Chiu et al. (2016) found that the education level of the students' fathers had the most impact on student academic achievement compared to family socioeconomic statuses and income. Recent research shows that higher parental educational attainment is associated with higher mathematics test scores in urban and suburban schools (Assari et al., 2021). The encouragement, cheering, and support from parents could be more significant and persuasive than words from teachers or peers. While not likely a considerable variation existed in parental education and involvement in the present research setting, parent education, and involvement were still incorporated as the penitential explanatory variables in the model, as mentioned earlier, for more accurate estimates.

2.3.7 Societal and Education System

While the difference in socioeconomic status influence persisted, the national education system could also affect student academic achievement by moderating or aggravating socioeconomic inequality. As previously discussed, the early math learning experience was essential and might impact students' subsequent learning and achievement. However, in most school districts in the U.S., students did not have a certified or specialized teacher in teaching mathematics until middle school. Teachers and teaching were found to be one of the significant factors linked to students' mathematics achievement in Trends in International Mathematics and Science Study (TIMSS) and other studies (An et al., 2004). In kindergarten and elementary schools, teachers were responsible for teaching all topics, including reading, math, science, and

social studies. Kindergarten and elementary school teachers were required to know content knowledge in areas like algebra, data analysis, and probability. Yet, most of them did not have adequate preparation and training in mathematics (Li, 2008). Certified elementary school teachers could teach mathematics without taking rigorous college-level math courses (Epstein & Miller, 2011). Ma (2010) indicated that U.S. elementary school teachers lack a strong math knowledge base. Also, An (2004) specified that U.S. teachers do not have deep and broad mathematics content knowledge. The education system emphasized various activities designed to promote student interest and creativity but lacked connection and coherence between content knowledge and concepts (An, 2004; Ma, 2010). Moreover, Ma (2013) critiqued the U.S. elementary textbooks as being too abstract on some mathematics concepts and focused more on application, and students often learn these abstract concepts without solid foundational skills. PK-5 mathematics education was the cornerstone of higher-level mathematics; It could provide a strong foundation of math cognition and skills for students' lifelong learning, math learning, and eventual competitiveness in higher education and adult society (Takanishi & Kauerz, 2008). Without grasping the foundational math skills, acquiring higher-level mathematics was impossible and resulted in poor performance.

Furthermore, immigrant students from a country with an entirely different education system could have more barriers and difficulties in learning. Mercado and Trumbull (2018) indicated that the U.S. culture was the most highly individualistic compared to other countries globally; 70% of the world's countries had a collectivistic culture and view. Immigrant students from countries with a highly collectivistic view were likely to demonstrate respect, listen and obey the teacher, and often work collectively and cooperatively with their peers. However, when being in a highly individualistic new host country, they were often afraid to speak up, express

opinions, and ask questions. The differences might cause conflicts and misunderstandings, negatively affecting student self-efficacy in acquiring knowledge in school and eventually impacting their academic performance. The societal and education systems were partly incorporated as part of the immigrant student acculturation dimensions. Yet, they were difficult to measure and examine the significance in a monochromatic education system. Therefore, they were not distinctly examined as individual factors or moderators due to the study's limitations.

2.3.8 Student Agency

Student agency was generated based on self-efficacy and also contributes to student learning and academic achievement. Learning with agency was not simply gaining an understanding of the knowledge taught by teachers because teachers have limited time in class; Instead, learning based on student agency was proactive and from curiosity and desire for the knowledge inherent within the student (Claxton, 2013). Student agency could empower students to encounter these obstacles, acquire and absorb knowledge toward their self-development, and successfully adapt to changing times and divergent environments (Bandura, 2001). Research started to focus on sparking student agency in learning and the impact of student agency on learning performance, learning experience, and academic achievement. For example, Robertson (2017) and Robinson and Taylor (2017) encouraged teachers to promote student agency in learning by restructuring their roles in the classroom, allowing students to have more control and voice-over learning; Hence, the students became more proactive and self-motivated. Sosa et al. (2021) also indicated that many studies asserted that flipped classrooms foster autonomous learning, improve student understanding, reduce failure, and increase academic performance.

Students with agency were self-initiated in learning and integrated with self-efficacy, aspiration, organization, regulation, reflection, proactivity, personal integrity, intrinsic motivation, and positive attitudes (Klemenčič, 2015; Vaughn, 2020). They often acted on their intentions and took actions to develop their own stance in the learning context. Student agency developed student learning attitudes and behaviors, contributed to effective learning outcomes and higher academic achievement, and often positively influenced their educational trajectories and beyond (Klemenčič, 2015). Since student agency was derived from self-efficacy, it was an output built upon the belief rather than an explanatory variable that impacts efficacy. Hence, it was not examined in this dissertation research. Furthermore, immigrant students from a country with an entirely different education system could have more barriers and difficulties in learning. Mercado and Trumbull (2018) indicated that the U.S. culture was the most highly individualistic compared to other countries globally; 70% of the world's countries had a collectivistic culture and view. Immigrant students from countries with a highly collectivistic view were likely to demonstrate respect, listen and obey the teacher, and often work collectively and cooperatively with their peers. However, when being in a highly individualistic new host country, they were often afraid to speak up, express opinions, and ask questions. The differences might cause conflicts and misunderstandings, negatively affecting student self-efficacy in acquiring knowledge in school and eventually impacting their academic performance. The societal and education systems were partly incorporated as part of the immigrant student acculturation dimensions. Yet, they were difficult to measure and examine the significance in a monochromatic education system. Therefore, they were not distinctly examined as individual factors or moderators due to the study's limitations.

2.3.9 School Infrastructure and Safety

The urban schools served a high percentage of high-poverty families and minority immigrant groups since it was customary that the first- and second-generation immigrant populations resided in metropolitan or city areas. Most urban school buildings were built decades ago, and half of the buildings are more than 50 years old. These buildings were poorly equipped with shabby and disrepair equipment, broken plumbing, deteriorating physical condition, and poor ventilation (Deye, 2015; Lewis, 2000). Although there were investments and funding from the government and organizations, the poor physical conditions of school buildings were merely improved. Some buildings were unsafe, and others often had massive rodent problems and were in danger of transmitting diseases. Many school districts could not report expenditures for equipment and infrastructure because the funding was embedded with specific support programs (Sielke, 2001). Evidence showed school infrastructure, facilities, and maintenance influence teaching and learning, increase student absenteeism and significantly impact student academic performance and mathematics achievement (Bowers & Urick, 2011; Buckley et al., 2004; Lewis, 2000). School facilities and working conditions were also associated with teacher recruitment and retention, the quality of teaching and learning, and educational outcomes (Buckley et al., 2004). The shortage of qualified mathematics teachers in numerous urban school districts was increasing, leading to many math classes being conducted without certified math teachers (Dupriez, 2016). Students' *physiological and emotional states* could be influenced by the deteriorating school infrastructure and condition, reducing self-confidence in learning and impacting academic outcomes. Nevertheless, the dissertation study took place in a high-poverty high school, and a comparison or comparative data analysis could not be made due to the monochromatic high-poverty background.

2.3.10 Class Size and Student Teacher Ratio

Class size and student-teacher ratio could also impact student academic learning and achievement. In schools with smaller class sizes, teachers tended to have more time and energy to spend with individual students in the class, answer particular questions from individuals, and provide more differentiated and customized learning (Francis & Barnett, 2019). Individual students also received more attention and feedback, such as encouragement and *verbal persuasion* from the teacher. The range of diverse learning styles and abilities reduces with a smaller student population and a lower chance of distractions from other students. However, public schools' class size and student-teacher ratio in urban areas were typically larger than those in suburban or rural areas because of the funding and lack of teachers. With large class sizes and student-teacher ratios, it was challenging for teachers to deliver quality lessons, and they often had to spend more time creating a positive learning environment and dealing with disruptive behaviors. Students might get confused about the academic content and then show frustration, anxiety, and depression when learning support and guidance are lacking. English language learners and immigrant students in urban schools often required more help but hardly received sufficient attention from the teachers and support staff. Since class size and student-teacher ratio were very much alike and similar for individual participants, they were not examined separately; only class size was incorporated into the regression model.

2.3.11 Technology Adaptation

The use and implementation of educational technology proliferated and soared in the past decade; interactive educational technology and virtual learning tools were widely implemented

in most school districts. All teachers started using digital grade books, lesson plans, and calendars. Many schools stopped sending paper report cards and had parents access the portal and view student grades digitally. Students were provided with a Chromebook or iPad that they could take home for school purposes. School districts also encouraged teachers to use various technologies in the classroom and communicate with the students and parents. Theoretically, technology promoted student learning experience and interests, improved student confidence, and emphasized applications in order to achieve higher learning outcomes (Fonseca et al., 2014; Tawafak et al., 2018). Cheng et al. (2015) indicated that technology also promotes students' long-term knowledge retention through increased participation and engagement in learning.

Yet, educational technology was not extensively used in many other countries worldwide nor generally accepted as supportive in learning. Some countries still required students to work with pencils and paper and prohibit any electronic devices in classrooms. Also, many studies found negative effects of technology on school performance, and the effect of technology on academic performance remained controversial. Almost all school-age students had access to the internet and used social networking sites or apps, but many relied heavily on social networking apps, social media, and online games. The students who were on the internet for more than 34 hours per week had lower grades and lower learning outcomes (Chen & Peng, 2008). Sana et al. (2013) measured student comprehension test scores and found that technology use in classrooms decreases test scores. Anand (2007), Fox et al. (2009), Kubey et al. (2001), and Kuh and Hu (2001) all reported that heavy use of online recreation, instant messaging, and video games are negatively correlated with the student's GPA and academic performance.

Consider the fact that students learn differently, and technology might affect student academic learning in both positive and negative ways. Some students might learn well with more

visual and application problems; others work better with pencil and paper. Some students properly used the educational resources to support them in learning; others used them as cheating tools. Some students might benefit from interactive educational technologies; others might get easily distracted by various resources online. Technology adaptation might be part of the acculturation, acting as a moderator in learning and performance. It was integrated into one facet of the acculturation assessment to scrutinize the level of challenge immigrant students face in adapting their learning styles and how it might impact their academic performance.

2.3.12 Peer Effects and Community Influence

Poor minority immigrants typically stayed in large cities or urban areas and sent their children to schools in socioeconomically disadvantaged neighborhoods with high violence and crime rates. Local homicides were correlated with low academic test scores (Sharkey, 2010), and neighborhood violence often led to low academic performance (Schwartz et al., 2016). Aizer (2007), Bingenheimer et al. (2005), and Sharkey (2010) all revealed that student exposure to neighborhood violence is linked to disruptive and distracting behaviors in the classroom and high emotional and psychological issues such as depression and aggression, which resulted in poor academic performance. For example, students who suffered stress and trauma from neighborhood violence may not form aggressive behaviors and manners immediately but exhibit emotional and psychological problems such as anxiety and depression, which might cause distraction and disengagement in the classroom (Shonkoff & Phillips, 2000).

In a study of 1641 middle and high school students, Zysberg and Schwabsky (2021) suggested that school climate is correlated to academic achievement and self-efficacy. Students who were interested in mathematics, puzzles, and logical problems improved the test scores of

their partners (Eisenkopf, 2010). They might also motivate each other in learning. Tu and Chu (2020) showed that peer relationships significantly impact student learning motivation and effectiveness. Yet, peer effects might also negatively influence learning. Commonly, students who encountered violence also exhibited behavioral issues in school, spanning from mere inattentiveness or distraction to more severe violent and disruptive behaviors. Some students tended to behave aggressively as a form of protection to protect themselves (Harding, 2010). When they were shown the same uncooperative behavior and attitude in school or the classroom, even if they just acted tough and were not inclined to be violent, they might still create behavioral and psychological influence as the other students might feel less safe in the environment and get distracted (Burdick-Will, 2018). The other students might also copy the violent behaviors and believe that was a way to show bravery or strength to keep themselves away from violence or botheration. Peer effect was included within the framework of *vicarious experiences* source of academic self-efficacy, which also matter in the process of learning, academic achievement, and school attainment (Eisenkopf, 2010; Mora & Oreopoulos, 2011). However, community influence was not included in the regression model due to the inherent challenges in accurately measuring and isolating the factor within the current research context.

2.4 Summary

As presented in this chapter, abundant research reposed on Bandura's self-efficacy theory and applied it in various fields. However, numerous studies concurred with Bandura on *mastery experiences* as the most impactful influencer on mathematics learning outcomes among the other three sources of self-efficacy. Still, inconsistencies and discrepancies were reported in the findings, and the results varied in different domains. Past literature also specified that age,

gender, age at arrival to the U.S., multidimensional acculturation, socioeconomic status, parental education, and immigrant generation may affect students' academic performance, indicating the significance and necessity for further examination. The literature review showed very limited research exploring perceived self-efficacy correlated with students' high school mathematics performance in high-poverty public schools. Also, scarce research investigated how each individual source of the four sources of self-efficacy affects the self-efficacy perspective of secondary school students with immigration backgrounds. Even fewer studies focused on the differences in the findings associated with gender, grade level, age at arrival to the U.S., acculturation, socioeconomic status, parental education, and immigrant generation in an urban high school setting. The dissertation study added to the existing body of research related to academic self-efficacy by connecting with the immigration context and addressing more potential variables, including acculturation level and immigrant generation.

Chapter 3 Methodology

The purpose of this dissertation study was to determine whether and to what degree correlations exist between the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) in math, the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*), gender, grade level, age arrival in the U.S., parental education, immigration generation, socioeconomic status, and immigrant students' mathematics performance in the urban high school. Past research was inconsistent with the degree of correlations between the four sources of self-efficacy, acculturation, and student mathematics achievement, and there was scarce research that directly studied immigrant student populations in an urban high school setting. Barely any research combined the Sources of Self-Efficacy in Mathematics Scale (SSEMS) and the Abbreviated Multidimensional Acculturation Scale (AMAS) and incorporated other potential explanatory variables to examine multiple aspects of immigrant student mathematics learning.

This chapter presented the research questions and hypotheses that the dissertation study focuses on examining. Independent and dependent variables were discussed, and the research site, participants, methodology, design, data collection, instrumentation, and data analysis procedures were described and explained. In addition, this chapter also presented and explained the validity, reliability, and limitations of the study.

3.1 Research Questions and Hypotheses

Prior to this study, scarce research studied the impacts and influences of an individual source of the four sources of self-efficacy and acculturation on mathematics performances of

immigrant students and students with immigration backgrounds. Although some research showed that some degree of relationship exists between perceived self-efficacy and academic achievements (Akturk & Ozturk, 2019; Hidayah, 2022; Olivier et al., 2019) and acculturation and academic performance (Areba et al., 2021; Lilla et al., 2021; Moní et al., 2018), researchers did not reach a consensus on the findings. The four sources of self-efficacy were rarely studied together with acculturation and other potential influencers in research on high school students' mathematics performance. To fill in the research gap, three research questions were employed to guide the study.

3.1.1 Hypotheses 1

RQ1: To what extent do the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) correlate with immigrant student mathematics performances in an urban high school?

H1o: The four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) are not statistically correlated with immigrant student mathematics performances in an urban high school.

H1a: At least one of the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) is statistically correlated with immigrant student mathematics performances in an urban high school.

3.1.2 Hypotheses 2

RQ2: To what extent do the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and*

home cultural competence) correlate with immigrant student mathematics performance in an urban high school?

H2o: The dimensions of the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*) are not statistically correlated with immigrant student mathematics performances in an urban high school.

H2a: At least one of the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*) is statistically correlated with immigrant student mathematics performances in an urban high school.

3.1.3 Hypotheses 3

RQ3: Are there any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status?

H3o: There is no significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status.

H3a: There is a significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status.

3.2 Independent and Dependent Variables

This dissertation study utilized survey responses regarding the participants' perceived self-efficacy in mathematics and acculturation in the U.S. and other self-reported demographics, along with their end-of-year mathematics course grades and the state standardized assessment scores, to examine the extent of the correlations. This section outlined the study's independent and dependent variables.

The independent variables, also known as explanatory variables, were the participants' perceived four sources of self-efficacy in mathematics: *mastery experience*, *vicarious experience*, *verbal persuasion*, and *physiological and emotional states*, and the six dimensions of acculturation: *host cultural identity*, *home cultural identity*, *host country language*, *home country language*, *host cultural competence* and *home cultural competence*. These explanatory variables were chosen because self-efficacy, as a major component of human cognitive agency, determines individuals' internal emotions and feelings, which may potentially impact their behaviors and outcomes (Bandura, 1989). Also, acculturation, grounded in social and psychological elements that displayed significant distinctions between immigrant learners and native learners, might have potential influences on immigrant students' learning and performance in school (Berry, 1997). In addition to these explanatory variables, participants' self-reported demographic variables (i.e., gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status) were considered as other potential explanatory variables, or moderators, because past research also indicated that these could be potential impactors affecting student learning (Elliott & Bachman, 2018; Mozahem et al., 2021; Silver et al, 2021).

The dependent variables, also known as response variables, were the participants' end-of-year mathematics course grades and their state standardized assessment scores. The students were required to complete one math course each year throughout high school. At the end of the school year, the teacher calculated an end-of-year course grade based on the student's average percentage obtained in four quarters to show a compilation of student performance and achievement in the course. The end-of-year course grade showed a student's in-class participation, the completion of in-class work and homework, the level of knowledge demonstration in quizzes or tests, also potentially the attitude and effort demonstrated in the subject. The high school students were also mandated to demonstrate proficiency in the state standardized mathematics assessment, which measures their Algebra knowledge. Research showed that variation in grading criteria among different teachers, standardized testing did not offer a meaningful measure of the learning progress, and the course grades were often discrepant from the assessment scores (Lehman et al., 2018; Lipnevich et al., 2020; Tatar & Düşteğör, 2020). Either one hardly showed a complete and accurate picture of a student's academic performance. Therefore, this research study set up two models using multiple regression. Model 1 regressed the same variables with the state standardized assessment scores, and model 2 regressed the independent variables with the end-of-year mathematics course grades.

Table 3.1. Statistical Analysis and Variables

Research Questions	Independent Variables	Dependent Variables	Statistics
To what extent do the four sources of self-efficacy (<i>mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states</i>) correlate with immigrant student mathematics performances in an urban high school?	Self-efficacy Sources (<i>mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states</i>)	State Standardized Mathematics Assessment Scores, End-of-Year Mathematics Course Grades	Multiple Regression

To what extent do the six dimensions of acculturation (<i>host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence</i>) correlate with immigrant student mathematics performance in an urban high school?	Acculturation Dimensions (<i>host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence</i>)	State Standardized Mathematics Assessment Scores, End-of-Year Mathematics Course Grades	Multiple Regression
Are there any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status?	Grade Level, Gender, Age at Arrival to the U.S., Immigrant Generation, Parental Education, Class Size, Socioeconomic Status	State Standardized Mathematics Assessment Scores, End-of-Year Mathematics Course Grades	Multiple Regression

3.3 Research Design

A quantitative correlational design best fitted the nature and purpose of this dissertation study, examined whether and to what degree the relationships between the aforementioned potential impactors or variables and immigrant students' mathematics performance without establishing or implying a causal relationship between two or more variables (Curtis et al., 2016). This research study hypothesized the correlations among the variables. However, it did not attempt to draw causal inferences at the level of investigation since there is no manipulation of the independent variables and could not establish causalities relationships among the independent and dependent variables (Bloomfield & Fisher, 2019). Also, it did not attempt to compare characteristics between groups, precluding between-group comparative methods such as t-test, ANOVA, or MANOVA. Instead, the data was collected from one group of students exclusively enrolled in high school mathematics classes.

Moreover, this dissertation research utilized two theory-based survey instruments for data collection, and both instruments are correlational designs investigating the magnitude of the relationships. The outcomes of this study expressed in correlation coefficients to predict (1) Whether or to what extent the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) is statistically correlated with immigrant student mathematics performances; (2) Whether or to what extent the dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*) is statistically correlated with immigrant student mathematics performances; and (3) Whether or to what extent there is a significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status.

Correlation coefficients describe the degree or strength of the association between variables, ranging between -1 and +1, with -1 indicating the most robust negative relationship, +1 indicating the most robust positive relationship, and zero as no relationship (Seeram, 2019). Therefore, the research analyses conjectured how well the potential influencers or independent variables can predict immigrant students' mathematics performance. The further the correlation coefficients are away from zero, the stronger the predictions are. Again, note that no causality was established because there was no manipulation of the independent variables in the theories and designs.

3.4 Research Methodology

A quantitative methodology was deemed most suitable for the research study in the dissertation, aiming to examine the potential influence of immigrant student perceived self-efficacy and acculturation on their mathematics performance. Quantitative research was used to examine the relationship among variables and how one variable affects another, whereas qualitative research focuses on a detailed understanding of a phenomenon and human perceptions (Creswell, 2020). This dissertation study focused on discovering relationships rather than a detailed understanding of a phenomenon and human perceptions. Also, the research questions directed the possible correlations between the variables. The corresponding hypotheses addressed the assumptions based on the past research and theories that: (1) At least one of the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) is statistically correlated with immigrant student mathematics performances; (2) At least one of the dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural*

competence and *home cultural competence*) is statistically correlated with immigrant student mathematics performances; and (3) There was a significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status.

Also, the key difference between quantitative and qualitative research is that quantitative research is all about statistical "measures," and qualitative emphasizes lived "perception" (Rutberg & Bouikidis, 2018). For this study, the measurable data was collected using validated instruments for measuring self-efficacy and acculturation level, demographic data, end-of-year course grades, and the state standardized assessment scores, which were all quantitative or measurable data. The level of measurement of the data was primarily ordinal, and the data was distinctive and had a degree of magnitude. All data were convertible to statistical data, requiring a quantitative methodology. Furthermore, quantitative research also relies heavily on theories that form a hypothesis and test the hypothesis (Kelley & Bolin, 2013). The hypotheses of this dissertation study were developed based on Albert Bandura's self-efficacy theory (Bandura, 1989), John W. Berry's acculturation theory (Berry, 1997), and the potential relationships and findings established from past research. Both instruments were correlational designs and investigated the magnitude of the relationships.

3.5 Research Site and Participants

The study occurred in a public high school situated in an urban area of the northeastern United States, utilizing Google Forms for recruitment and survey purposes. Google Forms, a web-based survey tool specializing in online surveys and common data collection, was selected due to its suitability within the institution, which mandates the use of the school email address

for security and reliability (Vasanth Raju & Harinarayana, 2016). The public high school was selected for its representation as a typical urban high school with a substantial population of immigrant students and English language learners. Compared to schools in other regions, urban schools often had a high concentration of poverty, substantial racial and ethnic minorities, a vast concentration of immigrant populations, and linguistic diversity (Farinde-Wu, 2018). The school district website reported in 2021 that the district students represent 28 countries and speak 27 languages with over 95% minority and 25% English language learners, which provides a high minority student population, multicultural environment, and a high immigration background for research (RSD, 2022). The research site was the only high school in the urban district with approximately 5,000 students, and over 80% of the student population is from economically disadvantaged family backgrounds (RSD, 2022). The U.S. Census Bureau (2021) reported that urban high schools serve the highest percentage of low-income students, the highest number of Latinx immigrant students, and the highest English language learner population.

The participants for this study were 9th through 12th high school students who were currently enrolled in public urban high schools in the northeastern U.S. and were also enrolled in a mathematics class or took the math state standardized assessment test. These requirements helped generate a sample of participants that fairly represented the characteristics of the desired sample participants for the dissertation study since students from this urban high school were primarily immigrants from another country or with immigrant family backgrounds. The participants who met the criteria were students who were exposed to the four sources of self-efficacy and were experiencing or potentially impacted by acculturation in high school. To further ensure the participants were the desired population, the research had a statement regarding the criteria required to participate in the study shown in the consent form and at the

beginning of the survey. Additionally, the school email address was required to access the study to exclude random people from accessing the survey.

3.6 Data Collection

This dissertation research study used convenience sampling with criteria such that participants must be enrolled in the high school, taking a math course, or participating in the state standardized assessment. Prior to the research study and collection of data in the urban high school, the building principal's approval was acquired and submitted to the Kansas State University Institutional Review Board (IRB), including the proposal explaining the purpose, nature, duration, and procedures. The Committee on Research Involving Human Subjects reviewed the proposal and granted full approval in 2022 for three (3) years for the research study. After passing the proposal defense, the Parental Consent and Student Assent invitation letters were then distributed to all students during homeroom in the high school to encourage participation. The letters explained why the participant received the research invitation and the study's purpose and emphasized that participation is entirely voluntary and can be withdrawn at any time without penalty. They also stated that there is no known risk to participants beyond that of daily life. Since the initial attempt to obtain responses did not yield a sufficient number of participants, the letters were sent out again. To encourage participation, incentives such as extra credit points, snacks, and the chance to win a \$25 McDonald's gift card were provided. All collected data and information remained confidential and were stored and password protected by investigators, and at no time was any student's actual identity revealed. After the participant voluntarily returned the Parental Consent and Student Assent letter, an email containing a link to

the electronic survey in Google Form was sent out. The survey requested the participant's permission again before its launch.

3.7 Instrumentation

The electronic survey consisted of seventy-six (76) questions in three (3) sections that took approximately twenty (20) minutes to complete. The first section was the twenty-four (24) questions from the Sources of Self-Efficacy in Mathematics Scale (SSEMS) developed by Usher and Pajares (2009). The questions were answered according to a six-point Likert-style scale, which assessed students' perceived efficacy in learning mathematics. The second section was the forty-two (42) questions from the Abbreviated Multidimensional Acculturation Scale (AMAS) developed by Zea and colleagues (2003), which was measured on a four-point Likert-style scale. The questions assessed students' multidimensional acculturation from various aspects through social interaction. The last section was self-reported demographic questions about gender, grade level, age arrival in the U.S., parental education, immigration generation, socioeconomic status, and estimated class size in the math class. At the end of the survey, a check-up question asked whether participants thoroughly read the questions and selected the best option representing their experience, opinion, or feeling. After answering all the questions in the survey, the final screen displayed the debriefing statement and thanked the participants for their time and effort in participating in the research study.

The study used the end-of-year math course grades and state standardized assessment scores as performance indicators, and individual participants' math course grades and assessment scores were acquired from the student database. The student identification numbers were collected in the survey to pair up with their end-of-year math course grade and the state

standardized assessment score. Participants were then assigned a random sample numerical code, and their identification number column was deleted, so confidentiality was inherent. All collected data and information were converted into Excel files, kept confidential, stored, and password protected on KSU OneDrive. The data was thoroughly digitally erased three years after completing this dissertation study.

3.7.1 Sources of Self-Efficacy in Mathematics Scale (SSEMS)

In line with the research pursuit to explore immigrant students' perceived self-efficacy in mathematics and its connection to their mathematics performance, the Sources of Self-Efficacy in Mathematics Scale (SSEMS) by Usher and Pajares (2009) was utilized in this dissertation study. SSEMS was constructed to align with Bandura's self-efficacy theory and tested for validity and reliability using three stages and four multiple regression analyses and examining the correlation of each individual source of self-efficacy with the self-efficacy measure (Usher & Pajares, 2009). The instrument was also submitted to the experts for evaluation, including Albert Bandura, and was later validated by other researchers (Arslan, 2012; Zientek et al., 2019). SSEMS was chosen for the study because the scale reduces the original 73 items down to 24 items and still fully addresses and reflects the impacts of the four theorized sources of student self-efficacy in learning mathematics. Items #1-6 assessed the learner's *mastery experience*, #7-12 evaluated the *vicarious experience*, #13-18 estimated the influence of social *verbal persuasions*, and the last six items, #19-24, assessed the learner's *physiological and emotional state*. Each item evaluated participants' responses on a six-point Likert scale, where "Strong Disagree" was coded 0, "Disagree"—1, "Somewhat Disagree"—2, and "Somewhat Agree"—3. "Agree"—4, and "Strongly Agree"—5. The validation test showed that all items were

statistically significant, and convergent validity indicated strong associations among the sources (Usher & Pajares, 2009).

3.7.2 Abbreviated Multidimensional Acculturation Scale (AMAS)

Past acculturation scales were theorized and measured with many items through one or more of the five aspects: behavior, cultural identity, knowledge, language, and values. For example, a scale developed by Tsai and colleagues (2000) measuring Chinese Americans' acculturation from three dimensions (behavioral, cultural identification, and language) consisted of 77 items. Built upon John Schumann's acculturation theory (1986) and John W Berry's bidimensional acculturation model (1997), Zea and colleagues (2003) created and developed an abbreviated multidimensional acculturation Scale (AMAS) assessing six dimensions of acculturation, particularly for Latinx. The scale was a self-report instrument assessing multiple dimensions for changes in individual immigrant learner's psychosocial and behavioral factors (Zea et al., 2011). This acculturation scale was employed in the study because it is statistically valid and designed for Latinx, which aligned with the student demographics of the research site. It was also abbreviated with fewer items but still addresses multidimensional aspects. AMAS comprises a total of 42 items on a 4-point Likert scale. The first part was regarding an immigrant's U.S. acculturation, and the second part was the home culture acculturation; both parts were further divided into three components: cultural identity, language competence, and cultural competence. Items #1-12 evaluated the individual's perceived U.S. identity and home country identity, where "Strongly Disagree" will be coded 0, "Disagree"—1, "Agree"—2, and "Strongly Agree"—3. Items #13-42 assessed the language and cultural competence in the host and home countries, using "Not at All"—0, "A Little"—1, "Pretty Well"—2, and "Extremely

Well”—3. The empirical validation study showed convergent and discriminant validity in the samples and were widely implemented in various studies (de Mamani et al., 2017; Zea et al., 2011).

3.7.3 End-of-Year Math Course Grade

Students enrolled in the high school were required to take one mathematics course each year throughout the four years of high school for a total of 4 math credits as part of the graduation requirements. A general letter grade system was employed for all courses in the school, reflecting a compilation of student performance and effort, as well as how well the student mastered the academic material and the overall mastery of the subject. Weighting could vary depending on teachers, but the general weighting of the grade was suggested to have 40% authentic assessments, 30% tests and quizzes, 20% class work, participation, or practice, and 10% homework. The quality point average was based on letter grades indicated below:

A+	-	4.33 Quality Points	C	-	2.00 Quality Points
A	-	4.00 Quality Points	C-	-	1.67 Quality Points
A-	-	3.67 Quality Points	D+	-	1.33 Quality Points
B+	-	3.33 Quality Points	D	-	1.00 Quality Points
B	-	3.00 Quality Points	D-	-	0.67 Quality Points
B-	-	2.67 Quality Points	F1	-	0.00 Quality Points
C+	-	2.33 Quality Points	F2	-	0.00 Quality Points

A student who received an A+/A/A- for “Excellent” ranges from an average of 90% to 100%, indicating superior achievement and exceptional effort, and works willingly, effectively, and independently; B+/B/B- for “Good” ranges from an average of 80% to 89%, representing proficiency and above-average quality achievements; C+/C/C- for “Average” ranges from an average of 70% to 79%, exhibiting acceptable performance and achievements; D+/D/D- for “Below Average” ranges from an average of 60% to 69%, indicating minimum passing

achievement and a great need for improvement in the areas; and F1/F2 for “Failure,” an average of 59% or below, representing not achieved passing.

3.7.4 State Mathematics Standardized Assessment

As an important high school academic performance indicator in the northeastern U.S., the state standardized assessment—Keystone Exams, was developed by the State Department of Education (PDE) to assess and measure high school student end-of-course achievement in Algebra, Biology, and Literature. The school offered the Keystone Exams two to three times a year, depending on the principal and administration team. Students took the exams in the school administrated by the school staff. All staff members must complete the online State Test Administration Training (PSTAT) once every year to qualify for proctoring the exams. The scope of this study focused on reviewing only the Algebra or mathematics portion of the Keystone assessment. The Keystone mathematics exams consisted of two modules: multiple-choice questions, constructed responses or open-ended questions. Each module had 23 multiple-choice questions and four constructed-response questions. According to PDE (PDE, 2022), approximately 60% to 75% of the total score was from the multiple-choice questions, and 25% to 40% of the total score was provided from constructed-response questions. The written responses for the constructed-response or open-ended questions were evaluated and scored by professionally trained scorers implementing a pre-determined scoring system. For mathematics constructed-response questions, students were instructed to write out their steps for solving a problem, explain their reasoning, and create graphs, plots, or diagrams. Scores were given based on content only, and spelling and punctuation were not included in the scoring guidelines. Students took the exams at or near the end of the Algebra or related remediation course. They

could take the exams as early as 9th grade, but most students took them in 10th or 11th grade. Student performance on the Keystone Exams fell into one of the following four performance levels: Below Basic, Basic, Proficient, and Advanced, as indicated below:

Below Basic	Basic	Proficient	Advanced
1200 - 1438	1439 - 1499	1500 - 1545	1546 - 1800

Only the scores that fell into the Proficient or Advanced levels were considered passing or satisfactory. Each exam had two modules with a composite score ranging from 1200 to 1800. The estimated time needed for each module is 90 minutes, 10-15 minutes for administrative tasks, and 75 minutes for the actual exam. Students were required to pass both modules to pass each exam. The passing benchmark of 1500 was adjusted and set after all of the exams were evaluated and scored. If students failed either module, they would need to retake both modules of the exam until they received a satisfactory grade of at least 1500. Students who did not pass the exam must continually be enrolled in an Algebra-related remediation course until they meet the passing benchmark.

3.8 Data Analysis

This dissertation research utilized multiple regression to examine the predictive relationships of whether and to what extent each individual independent variable impacted the immigrant student's mathematics learning outcome. Multiple regression is a statistical technique best for analyzing the relationship between independent and dependent variables (Kelley & Bolin, 2013). The null hypotheses of the multiple regression predicted (1) the potential relationship between the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) and student mathematics

performances; (2) the potential relationship between de and student mathematics performances; (3) the potential influences of the other variables (i.e., gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status) to student mathematics performances.

All the survey data was collected using Google Forms. The individual students' state standardized assessment scores and the student data from the school database were exported as Excel files for data analysis. The data was imported into STATA/BE 17.0 software program as STATA datasets, and the sample size was planned to be greater than one hundred (100). The researcher then went through a data curation and investigation process. The data was merged, appended, cleaned, and scanned for inconsistencies. The researcher observed and visually inspected each independent data in the dataset to ensure the response from the participants are 9-12th grade students enrolled in the high school and had either a course grade or math assessment score available. Responses from students without any of these criteria were deleted, and missing values and duplicated data were excluded from the analysis. Then, plots and graphs were conducted to examine the potential relationships between each predictor variable and the response variable. Several diagnostic tests and treatments were planned and employed before and after regression, including the Heteroskedasticity White or Breusch-Pagan test for heteroskedasticity, variance inflation factors (VIFs) for multicollinearity, and the heteroskedasticity-robust standard errors for ensuring the validity of the regression results.

Upon completion of the data curation and investigation, the researcher then coded the data with the previously mentioned scales and ran the multiple regression in two models. Model 1 regressed all explanatory variables with the state-standardized assessment scores, and model 2 regressed all explanatory variables with end-of-year course grades. An alpha level of 0.05 was

used to determine the statistical significance of the multiple regressions. The statistical results, determining whether to accept or reject each null hypothesis identified in the dissertation study, were presented in Chapter 4, accompanied by explanations and reasoning.

3.9 Validity

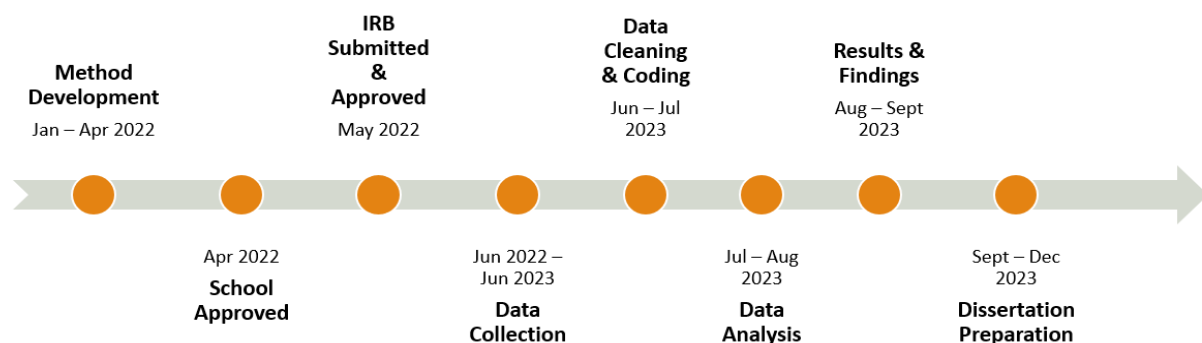
Validity ensures that a concept or theory is accurately measured in the study, and any quantitative research requires considerations for validity (Heale & Twycross, 2015). Since it was extremely difficult to develop new instruments and account for all types of validity and reliability, this dissertation study utilized the two existing tested and validated instruments: the Sources of Self-Efficacy in Mathematics Scale (SSEMS) by Usher and Pajares (2009) and the abbreviated multidimensional acculturation Scale (AMAS) by Zea and colleagues (2003). Both instruments were tested for validity in multiple studies (Usher & Pajares, 2009; Zea et al., 2003), and were widely implemented in various research studies (del Mar Haro-Soler, 2021; Huang et al., 2020; Lilla et al., 2021). As previously mentioned, SSEMS was developed through three phases of multiple testing, revision, and evaluation in separate studies and sent to the experts for appraisal, which reassured its validity (Usher & Pajares, 2009). AMAS was also developed through two different studies and demonstrated adequate content, construct, and criterion validity in both studies (Zea et al., 2003).

3.10 Reliability

Quantitative research must also consider the study's reliability or consistency (Creswell, 2020). There are three attributes of reliability, homogeneity, stability, and equivalence; Stability reliability was measured using an instrument with repeated testing, and the participant had

approximately the same response each time in multiple repeated tests; equivalence reliability was the measure of two or more forms of the same test cover similar content (Heale & Twycross, 2015). However, repeated testing was not applicable in this dissertation study since the study was designed so that individual participants were only instructed to take the survey once. Also, equivalence reliability was not applicable because the research did not employ multiple forms of the instrument. The validation tests in both studies (Usher & Pajares, 2009; Zea et al., 2003) indicated homogeneity reliability, or internal consistency, with Cronbach's alpha analyses. A Cronbach's alpha value greater than 0.7 was an acceptable reliability score of internal consistency (Heale & Twycross, 2015). For the Sources of Self-Efficacy in Mathematics Scale (SSEMS), Usher and Pajares (2009) obtained a Cronbach's alpha value that was greater than 0.7 in all sources of self-efficacy; 0.88 for *mastery experience*, 0.84 for *vicarious experience*, 0.88 for *social verbal persuasions*, and 0.87 for *physiological and emotional states*. For the abbreviated multidimensional acculturation Scale (AMAS), Zea and colleagues (2003) indicated strong internal consistencies with Cronbach alpha coefficients ranging from 0.90 to 0.97. These results suggested the internal consistency of the reliability of the instruments.

Figure 3.1. Timeline for the dissertation research process



The above figure (Figure 3.1) displayed a timeline of the dissertation research process. In April 2022, the research was approved by the building principal in the school. In May 2022, IRB was submitted and approved. The initial data collection process was started in June 2022 and continued until June 2023. Participants were invited and voluntarily returned parental consent and student assent forms. By the end of June, the data collection will be completed. The researcher started the data cleaning and coding process in July 2023 and then conducted the data analysis. In August 2023, the researcher generated the results and findings and proceeded to the dissertation preparation stages.

Table 3.2. Research Study Timetable

Time Frame	Activity	Description
January – April 2022	Method Development	Identified the most appropriate research methods and techniques; selected data collection instruments; developed a detailed roadmap for executing the research study.
April – May 2022	Proposal Composition, School Protocol Adherence, and IRB Clearance Acquisition	Drafted a preliminary study proposal for the study; obtained approval from both the school and IRB.
June 2022 – June 2023	Data Collection	Distributed parental consent and student assent forms; provided and administered the surveys to the participants
June – July 2023	Data Curation	Reviewed the collected data to ensure it is accurate, complete, valid, and reliable; conducted data cleaning, validation, transformation, coding, and preservation.

July – August 2023	Data Analysis	Applied statistical and analytical techniques; employed statistical tests and models to identify correlations and associations between variables; generated visual representations of the data.
August – September 2023	Formulating Results and Findings	Formulated results from the analysis; pinpointed the key findings with respect to the research inquiries; addressed any limitations of the study.
September – December 2023	Dissertation Preparation	Revised, refined, and finalized Chapters 1-6 in consultation with the committee; worked with the committee to prepare for the dissertation defense.
January – April 2024	Final Defense and Dissertation Submission	Conducted the final dissertation defense; addressed suggestions and feedback from the committee; made necessary revisions based on committee input; prepared the finalized dissertation for submission.

3.11 Role of the Researcher

The researcher of this dissertation study attended elementary school in a large city, Shanghai, and immigrated to the U.S. in middle school. She attended an urban middle school in a northeastern region near Chinatown, relocated to a suburban area in New Jersey, and finished her four-year high school there. She then acquired her bachelor's and master's in Secondary Mathematics Education at universities in the northeastern U.S. She experienced drastic shifts in languages, cultures, values, and different regions and felt enormous differences in multiple aspects of contrasting educational and school systems and learning experiences. Upon graduation, the researcher also taught for several years in a college in Shanghai, a public high school in suburban New Jersey, and both middle and high schools in urban Pennsylvania. She applied what she experienced and learned to teach and hopes to help and lead more young immigrant minority learners in pursuing STEM-related career paths.

As a minority and young immigrant who arrived in the U.S. in middle school, the researcher was always interested and overachieved in the subject of mathematics throughout middle school, high school, and college years. Mathematics was not a favorite subject to the researcher when she was studying in her home country, but she knew at an early stage of life that she had comparative disadvantages in subjects such as literature, history, and humanities due to the intensive high English language skills required in these fields. As she continued reinforcing her mathematics skills throughout high school and college, she favored mathematics and later decided to become a high school mathematics teacher. The researcher believed that young immigrant learners from non-English speaking countries with entirely different school systems and language and cultural differences already have disadvantages in learning, such as English language barriers and cultural differences. Focusing on non-language-intense subjects such as

mathematics, science, and technology could minimize the linguistic distance, knowledge gap, and academic performance disparity between immigrant learners and their native peers.

The researcher was in a position aiming to gain insights into various potential explanatory variables in correlation with immigrant students' mathematics underperformances. Carrying her own immigration experiences, educational and teaching experiences, and knowing the general underperformance in mathematics of the young immigrant population and minority learners with immigration backgrounds in the urban high school, the researcher was cognizant of her potential biases. However, the teaching and learning experiences in different countries and various regions also shaped the researcher to become more neutral and impartial in the study. Moreover, with the quantitative research design of this dissertation study, the researcher's position and potential biases would not have much impact on the results and findings.

The researcher was working in the urban high school, the research site, as a 10th through 12th mathematics teacher. The researcher had over ten years of teaching experience and over five years of teaching experience in the current research site. Also, the researcher was coaching some sports clubs and participating in extracurriculars after school. The researcher recruited qualified participants, obtained parental and student consent, sent out the electronic survey, collected and cleaned data, downloaded academic performance data from the school database, and analyzed them. The role and position that the researcher was in may make some students feel obligated to participate in the study as they may know the researcher as a former or current teacher. However, every effort was made to assure objectivity, participants' freedom of participation, the anonymity of the responses, and the security of the data.

3.12 Limitations

Though the methodological design of the research strived to pursue and fully fulfill the research objective, it could still contain some methodological limitations. First, survey fatigue might occur when the participants get bored or tired while conducting the survey. Although the selected instruments were not time-consuming and were entirely based voluntarily, the respondents might still be fatigued by the multiple questions and choices in the survey. Survey fatigue might cause the respondents to rush through the survey questions or randomly select some choices to finish the survey, which might negatively impact the data quality. Nevertheless, the survey fatigue could be minimized by making the instructions clear and concise, eliminating open-ended questions, and communicating to the respondents that they could quit the survey at any time without a penalty. Second, the research design might carry omitted variable bias since it excluded some potential explanatory variables such as educational system and technology adaptation. Also, although the study regressed two models and used both the end-of-year course grades and the state standardized assessment scores as the student performance indicators, these two indicators might still not be able to provide a complete picture of how well the student acquires knowledge in a subject (Willingham et al., 2002). Moreover, the quantitative correlational study produced comprehensive analyses of the potential impacts of various explanatory variables on academic performances; however, it might fail to provide details and nuances of immigrant students' mathematics learning experiences, attitudes, and perceptions (Creswell, 2020). Even though qualitative research methodology might gain more insights into experiences or phenomena, derive different concepts or ideas, and generate themes, the chosen quantitative research design enabled more extensive sample data and a more substantial number of participants for the study. Additionally, the researcher's position or potential bias might have

an impact on the findings, and also, again, the methodology was aligned with the research questions and topic perfectly. Therefore, the aforementioned potential limitations of the methodological design did not reduce the significance and value of this dissertation research study. The limitations, along with some additional constraints, were once again comprehensively outlined and explained in Chapter 6.

Chapter 4 Results

This dissertation study examined whether and to what degree of correlations exist between the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) in math, the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence and home cultural competence*), gender, grade level, age arrival in the U.S., parental education, immigration generation, socioeconomic status, and immigrant students' mathematics performance in the urban high school. The three research questions guiding the study were presented in the previous chapter. Multiple Regression model was used to address the research questions, which explored the extent to which of the four sources of self-efficacy correlate with immigrant student mathematics performances, the extent to which the six dimensions of acculturation correlate with immigrant student mathematics performance, and any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status. Taken together, the results provided a summary of the study's findings and the statistical results in detailed explanations, which also offered insight into whether and to what extent the degree of correlations exist between each independent variable and students' mathematics performances. The findings furnished educators and researchers with additional statistical information, guiding them to focus on the dominant impactors. Additionally, educators and policymakers can utilize these findings to create improvement plans and manage or control the root influencers of immigrant student mathematics underperformance, creating the most effective educational and learning environments to facilitate optimal performance and knowledge acquisition.

4.1 Participants

The sample for this dissertation study comprised of 9th through 12th grade high school students ($N = 324$) currently enrolled in the public urban high school in the northeastern U.S. and enrolled in a mathematics class or took the math state standardized assessment test in 2022. The participants' demographic summary statistics were outlined in Table 4.1. Participants constituted 59.0% females and 41.0% males, with 31.5% 9th graders, 38.9% 10th graders, 28.7% 11th graders, and less than 1% 12th graders. The largest group of participants were second-generation immigrants (44.1%), followed by first-generation immigrants (27.2%). The majority of participants were born in the U.S. (71.3%), while 13.0% of the population arrived between 6 and 11. The vast majority of participants (93.8%) were eligible for free lunch in school. Also, the majority of participants (82.2%) belong to classes with a size ranging from 11 to 20 (44.1%) or 21 to 30 (45.1%); Fewer participants belonged to classes with a size of less than 10 (3.4%) or greater than 31 (7.4%). Lastly, the highest educational attainment of most participants' parents was high school (51.9%), followed by college (19.8%) and graduate school (15.4%).

Table 4.1.1. Demographic Summary Statistics Table of Research Participants

	<i>M</i>
Female	0.590
9 th Grader	0.315
10 th Grader	0.389
11 th Grader	0.287
12 th Grader	0.009
Age Arrival: < 0	0.713
Age Arrival: 0 ~ 5	0.093
Age Arrival: 6 ~ 11	0.130
Age Arrival: 12 ~ 14	0.049
Age Arrival: 15 ~ 16	0.006
Age Arrival: > 16	0.009
Eligible for Free Lunch	0.938
Parent Edu: No Education	0.034
Parent Edu: Elementary School	0.009

Parent Edu: Middle School	0.086
Parent Edu: High School	0.519
Parent Edu: College	0.198
Parent Edu: Graduate School	0.154
Class Size: < 10	0.034
Class Size: 11 to 20	0.441
Class Size: 21 to 30	0.451
Class Size: > 31	0.074
First Generation Immigrant	0.272
Second Generation Immigrant	0.441
Third Generation Immigrant	0.170
Fourth Generation Immigrant	0.117
Total	324

Note. Generated from the survey statistics.

The table presented below (Table 4.1.2) consolidates several demographic characteristics into a Simplified Demographic Summary Table within the study. The data encompassed crucial demographic information, offering a comprehensive overview of the research participants.

Table 4.2.2. Simplified Demographic Summary Statistics Table of Research Participants

	<i>M</i>
Female	0.590
9 th ~ 10 th Grader	0.704
11 th ~ 12 th Grader	0.296
Age Arrival: < 0	0.713
Age Arrival: 0 ~ 11	0.223
Age Arrival: 12 ~ 16	0.055
Age Arrival: > 16	0.009
Eligible for Free Lunch	0.938
Parent Edu: No Education	0.034
Parent Edu: Primary & Secondary Education	0.614
Parent Edu: College and Higher	0.352
Class Size: 1 to 20	0.475
Class Size: 21 to > 31	0.525
1 st & 2 nd Generation Immigrant	0.713
3 rd & 4 th Generation Immigrant	0.287
Total	324

Note. Generated from the survey statistics.

4.2 Regression Results

The multiple regression estimated for the relationships between the *mastery experience*, *vicarious experience*, *verbal persuasion*, *physiological and emotional state*, *host and home cultural identity*, *host and home country language*, *host and home cultural competence*, demographic variables, and state assessment scores and end-of-year course grades presented below (see Table 4.2).

Table 4.3. Regression estimates

	Model 1 State Assessment Score	Model 2 Course Grade
Sources of Self-Efficacy		
Mastery Learning Experience	0.962 ⁺ (0.569)	0.144** (0.017)
Vicarious Learning Experience	-0.621 (0.479)	-0.013 (0.015)
Verbal Persuasion	1.259** (0.424)	0.005 (0.012)
Physiological & Emotional State	-0.091 (0.331)	-0.016 ⁺ (0.009)
Dimensions of Acculturation		
Host Cultural Identity	-1.561* (0.704)	-0.038* (0.019)
Home Cultural Identity	2.474** (0.767)	0.017 (0.023)
Host Country Language	1.033 ⁺ (0.584)	-0.007 (0.017)
Home Country Language	0.872* (0.407)	0.008 (0.012)
Host Cultural Competence	0.695 (0.752)	0.033 (0.020)
Home Cultural Competence	-2.858** (0.738)	-0.036* (0.018)
Other Variables		
Female	-5.919 (4.673)	0.388** (0.142)
10th Grader	-10.931 ⁺ (5.690)	-0.618** (0.149)
11th Grader	-3.348 (6.333)	0.125 (0.168)
12th Grader	-38.288** (12.634)	-0.657 (0.949)

Age Arrival: 0 ~ 5	-24.313 ⁺ (14.072)	0.233 (0.403)
Age Arrival: 6 ~ 11	-24.181 ⁺ (12.923)	0.340 (0.383)
Age Arrival: 12 ~ 14	-39.409* (15.887)	0.329 (0.494)
Age Arrival: 15 ~ 16	-57.762* (27.295)	0.278 (0.866)
Age Arrival: > 16	-61.152** (19.034)	0.950 ⁺ (0.496)
Eligible for Free Lunch	-5.158 (7.811)	-0.059 (0.328)
Parent Edu: No Education	8.136 (9.780)	-0.041 (0.283)
Parent Edu: Elementary School	-14.435* (6.980)	-0.399 (0.632)
Parent Edu: Middle School	16.187 ⁺ (8.323)	0.115 (0.289)
Parent Edu: High School	13.398* (5.264)	0.170 (0.187)
Parent Edu: College	22.306** (6.905)	0.239 (0.211)
Class Size: 11 to 20	19.643 ⁺ (11.089)	0.439 (0.310)
Class Size: 21 to 30	12.840 (11.261)	0.546 ⁺ (0.315)
Class Size: > 31	8.645 (12.765)	0.604 (0.378)
First Generation Immigrant	19.380 (13.559)	-0.121 (0.425)
Second Generation Immigrant	5.661 (7.028)	0.068 (0.221)
Third Generation Immigrant	-1.217 (7.825)	-0.069 (0.243)
Constant	1369.284** (23.126)	-0.046 (0.770)
Observations	324	324

Note. 2022-23 End-of-year course grades, state standardized assessment scores, and survey statistics were employed. Heteroskedastic-robust standard errors were in parentheses. The coefficients in the regression models were presented relative to the reference groups for categorical variables, where applicable. Reference groups were as follows: Gender (Male); Grade (9th Grader); Immigrant Generation (4th Generation); Eligibility for Free Lunch (Not

qualified); Parent Education (Graduate School).

⁺ $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

4.2.1 Sources of Self-efficacy

The results indicated that *mastery learning experience* had a statistically significant positive correlation with course grades ($\beta = 0.144$, $p < 0.01$). Although it also demonstrated a positive correlation on state assessment scores ($\beta = 0.942$, $p < 0.10$), it did not reach the level of statistical significance set at $\alpha = 0.05$. The regression estimates suggested that *vicarious learning experience* had a negative correlation with both state assessment scores ($\beta = -0.621$, $p > 0.05$) and course grades ($\beta = -0.013$, $p > 0.05$); however, the correlation did not reach statistical significance. *Verbal persuasion* had a significant positive correlation with state assessment scores ($\beta = 1.259$, $p < 0.01$), but it did not have a statistically significant correlation with the course grades ($\beta = 0.005$, $p > 0.05$). *Physiological and Emotional State* had a negative correlation with state assessment scores ($\beta = -0.091$, $p > 0.05$) and course grades ($\beta = -0.016$, $p < 0.10$). While it had a marginal correlation with course grade, due to the p-values being higher than the predetermined alpha level of 0.05, the correlations were not statistically significant.

4.2.2 Dimensions of Acculturation

The results revealed that *host cultural identity* exhibited a significant negative correlation with both state assessment scores ($\beta = -1.561$, $p < 0.05$) and course grades ($\beta = -0.038$, $p < 0.05$). On the other hand, *home cultural identity* had a strong significant positive correlation with state assessment scores ($\beta = 2.474$, $p < 0.01$) and no significant correlation with course grades ($\beta = 0.017$, $p > 0.05$). *Host country language* was slightly negatively correlated with course grade ($\beta = -0.007$, $p > 0.05$) and positively correlated with state assessment scores ($\beta = 1.033$, $p < 0.10$),

but it was not statistically significant. Home country language had a significant positive correlation with state assessment scores ($\beta = 0.872, p < 0.05$) but no statistically significant correlation with the course grades ($\beta = 0.008, p > 0.05$). *Host Cultural Competence* had no significant correlation with the state assessment scores ($\beta = 0.695, p > 0.05$) and course grades ($\beta = 0.033, p > 0.05$). Furthermore, the estimates indicated that *home cultural competence* was both statistically significant and negatively correlated with state assessment scores ($\beta = -2.858, p < 0.01$) as well as course grades ($\beta = -0.036, p < 0.05$). The negative correlation was more pronounced with state assessment scores than with course grades.

4.2.3 Other Demographic Variables

Being female was shown positive moderation on the correlations of the predictor variables and course grades ($\beta = 0.388, p < 0.01$) but did not have statistically significant moderation on state assessment scores ($\beta = -5.347, p > 0.05$). The results also showed that being a 10th grader had a statistically significant negative moderation with course grade ($\beta = -0.618, p < 0.01$) and had marginally negative moderation with state assessment scores ($\beta = -10.931, p < 0.10$). However, the latter was not statistically significant at the 0.05 level. Likewise, being a 12th grader had a statistically significant negative moderation with state assessment scores ($\beta = -38.288, p < 0.01$). Moreover, the study's results revealed that the age at which an individual immigrated to the United States had significant moderation effects on state assessment scores. Specifically, the participants who arrived in the U.S. between 12 and 14, between 15 and 16, and after 16-year-old exhibited notable negative moderations with the assessment scores with $\beta = -39.409, p < 0.05$; $\beta = -57.762, p < 0.05$; and $\beta = -61.152, p < 0.01$, respectively. On the other hand, for participants who arrived between 0 and 5 and between 6 and 11, only marginally

significant moderation with state assessment scores had been shown ($\beta = -24.313$, $p < 0.10$) and ($\beta = -24.181$, $p < 0.10$), respectively. The results also indicated that only the participants who arrived after 16 years old had marginal moderation on course grades, and the rest of the age ranges did not significantly moderate the correlation with course grades. Additionally, the results suggested that there was no significant moderation between a participant's eligibility for free lunch and their state assessment scores ($\beta = -5.158$, $p > 0.05$) or course grades ($\beta = -0.059$, $p > 0.05$). In other words, whether or not the participants were eligible for free lunch, which was often used as an indicator of low-income status, did not appear to have any influence on their academic performance. Furthermore, different levels of parental education could also have a significant moderation effect on participants' state assessment scores. The results showed that parents who attended high schools and colleges had a positive effect ($\beta = 13.398$, $p < 0.05$; and $\beta = 22.306$, $p < 0.01$, respectively). Yet, parents who had an elementary school education background had significantly negative moderations on participants' assessment scores ($\beta = -14.435$, $p < 0.05$), and parents with a middle school education background had marginally positive moderation ($\beta = 16.187$, $p < 0.10$). The impact of class size on academic performance appeared to have some marginal moderation effects. Specifically, class sizes between 11 to 20 students showed a marginally positive moderation on state assessment scores ($\beta = 19.643$, $p < 0.10$), while class sizes between 21 to 30 students had a marginally positive moderation on course grades ($\beta = -0.546$, $p < 0.10$). However, since the alpha level is set at 0.05, these moderations were not statistically significant in relation to their correlation with state assessment scores or course grades. Lastly, the results revealed that the immigrant generation, whether first-, second-, or third-immigrant participants, did not have a statistically significant moderation effect on their state assessment scores or course grades.

Equation 4.1. Estimated model 1*State Assessment Score*

$$\begin{aligned}
&= 1369.284 + 0.962 * \text{Mastery} - 0.621 * \text{Vicarious} + 1.259 * \text{Verbal} - 0.091 \\
&* \text{Physiological \& Emotional} - 1.561 * \text{Host Identity} + 2.474 * \text{Home Identity} \\
&+ 1.033 * \text{Host Language} + 0.872 * \text{Home Language} + 0.695 * \text{Host Competence} \\
&- 2.858 * \text{Home Competence} - 5.919 * \text{Female} - 10.931 * \text{10th Grader} - 3.348 \\
&* \text{11th Grader} - 38.288 * \text{12th Grader} - 24.313 * \text{Age Arrival 0~5} - 24.181 \\
&* \text{Age Arrival 6~11} - 39.409 * \text{Age Arrival 12~14} - 57.762 * \text{Age Arrival 15~16} \\
&- 61.152 * \text{Age Arrival} \\
&> 16 - 5.158 * \text{Eligible for Free Lunch} + 8.136 * \text{Parent Edu: No} - 14.435 \\
&* \text{Parent Edu: Elementary} + 16.187 * \text{Parent Edu: Middle} + 13.398 \\
&* \text{Parent Edu: High} + 22.306 * \text{Parent Edu: College} + 19.643 * \text{Class Size 11~20} \\
&+ 12.840 * \text{Class Size 21~30} + 8.645 * \text{Class Size} \\
&> 31 + 19.380 * \text{First Gen} + 5.661 * \text{Second Gen} - 1.217 * \text{Third Gen}
\end{aligned}$$

Equation 4.2. Estimated model 2

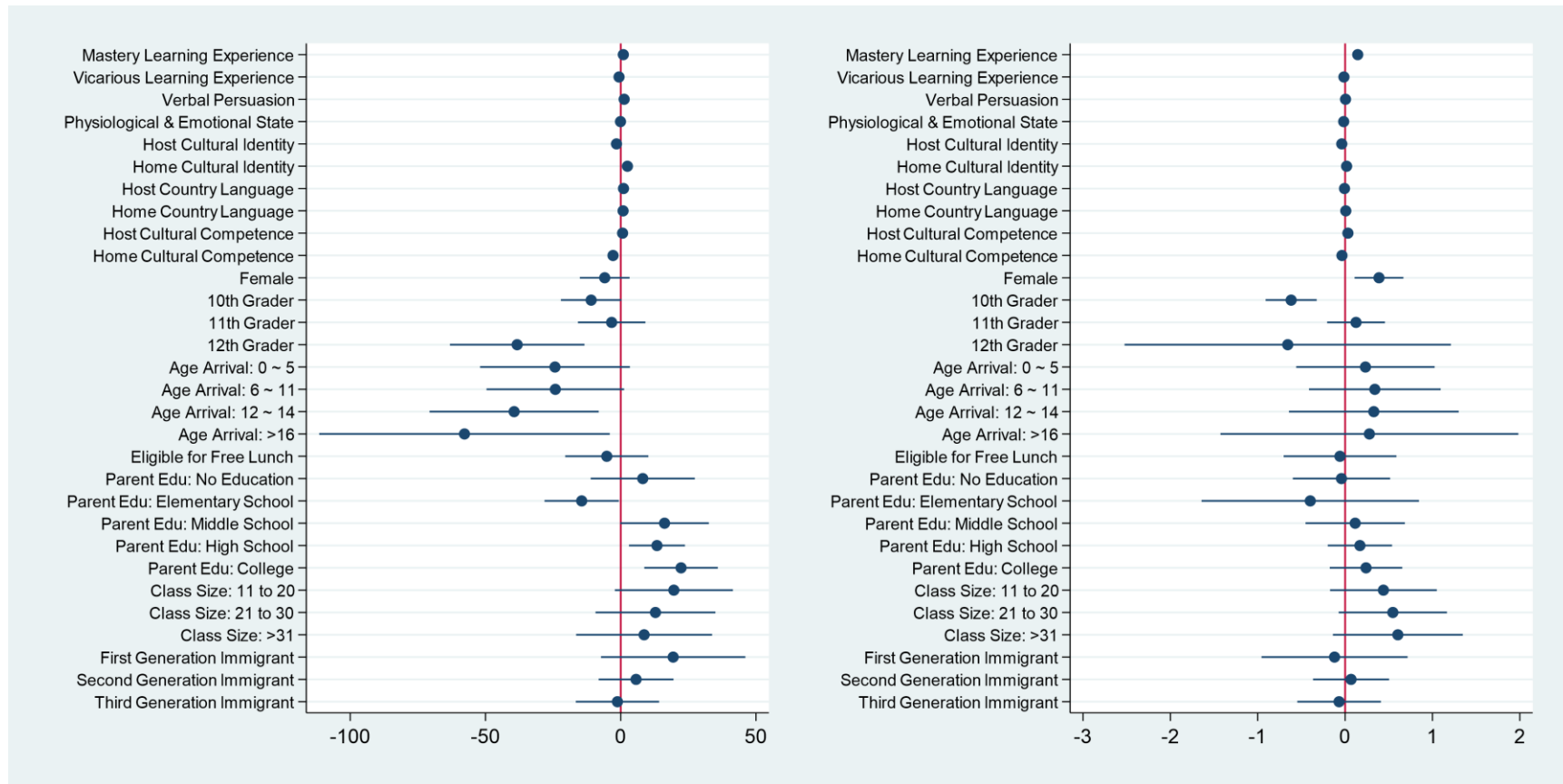
$$\begin{aligned}
\text{Course Grade} &= -0.046 + 0.144 * \text{Mastery} - 0.013 * \text{Vicarious} + 0.005 * \text{Verbal} - 0.016 \\
&* \text{Physiological \& Emotional} - 0.038 * \text{Host Identity} + 0.017 * \text{Home Identity} \\
&- 0.007 * \text{Host Language} + 0.008 * \text{Home Language} + 0.033 * \text{Host Competence} \\
&- 0.036 * \text{Home Competence} + 0.388 * \text{Female} - 0.618 * \text{10th Grader} + 0.125 \\
&* \text{11th Grader} - 0.657 * \text{12th Grader} + 0.233 * \text{Age Arrival 0~5} + 0.340 \\
&* \text{Age Arrival 6~11} + 0.329 * \text{Age Arrival 12~14} + 0.278 * \text{Age Arrival 15~16} \\
&+ 0.950 * \text{Age Arrival} \\
&> 16 - 0.059 * \text{Eligible for Free Lunch} - 0.041 * \text{Parent Edu: No} - 0.399 \\
&* \text{Parent Edu: Elementary} + 0.115 * \text{Parent Edu: Middle} + 0.170 \\
&* \text{Parent Edu: High} + 0.239 * \text{Parent Edu: College} + 0.439 * \text{Class Size 11~20} \\
&+ 0.546 * \text{Class Size 21~30} + 0.604 * \text{Class Size} \\
&> 31 - 0.121 * \text{First Gen} + 0.068 * \text{Second Gen} - 0.069 * \text{Third Gen}
\end{aligned}$$

The regression estimates were applied to forecast the state assessment score (Model 1) and the end-of-year course grade (Model 2) of a male 9th grade student who is a fourth-generation immigrant born in the United States, not qualified for free lunch, and whose parents attended graduate schools (see Equation 4.1, Equation 4.2). These predictions were based on various predictor variables, including the four sources of self-efficacy and the six dimensions of acculturation, along with moderator variables, such as demographic variables (e.g., age at arrival to the U.S., parental education levels, and immigrant generation status). The coefficient in front

of each independent variable represented the estimated change in the dependent variables (state assessment score or end-of-year course grade) for a one-unit increase in the corresponding independent variable, holding all other variable constants. For example, a one-unit increase in *mastery learning experience* was correlated with a predicted increase of 0.962 in the state assessment score and 0.144 in the course grade, while a one-unit increase in *home cultural competence* was associated with a predicted decrease of 2.858 in the state assessment score and 0.036 in the course grade.

It was imperative to acknowledge that the results of the two regression models used in this study, which utilized assessment scores and course grades as the two performance indicators, revealed interesting and noteworthy differences (see Figure 4.3). While both models demonstrated significant relationships between various predictor variables and response variables, some predictor variables appeared to be more influential in one model over the other. In Model 1, which used assessment scores as the performance indicators, the predictor and moderating variables that showed the strongest association with assessment scores were *verbal persuasions*, the majority of acculturation components, age at arrival to the United States, and parental education. Other variables, such as gender and class size, were shown weaker association or moderation in this model. On the other hand, in Model 2, which used course grades as the performance indicator, fewer predictor and moderating variables emerged as significant.

Figure 4.1. Regression coefficient plot of all explanatory variables in relation to the state assessment scores (left) and course grades (right).



4.2.4 Results 1

RQ1: To what extent do the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) correlate with immigrant student mathematics performances in an urban high school?

H1o: The four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) are not statistically correlated with immigrant student mathematics performances in an urban high school.

H1a: At least one of the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) is statistically correlated with immigrant student mathematics performances in an urban high school.

Based on the regression analysis, the results suggested that *mastery learning experience* had a statistically significant positive correlation of strong magnitude with the end-of-year course grades but not on state standardized assessment scores as per the predetermined 5% alpha level set prior to the test. However, there was a marginal effect in the results on the state assessment scores at a 10% level, indicating a positive correlation of weak magnitude. *Vicarious learning experience* had no correlation with either state assessment scores or course grades. *Verbal persuasion* had a highly significant correlation with state assessment scores but was not shown to have a significant correlation with course grades. Lastly, *physiological and emotional states* showed negative correlations of weak magnitude with course grades and assessment scores, but the correlations were not statistically significant. The null hypothesis (H1o) was rejected as at least one of the four sources of self-efficacy was found to be statistically correlated with mathematics performance. Therefore, *mastery experience* and *verbal persuasion* positively

correlated with immigrant student mathematics performance, while *vicarious experience* and *physiological and emotional state* did not have significant associations.

4.2.5 Results 2

RQ2: To what extent do the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence, and home cultural competence*) correlate with immigrant student mathematics performance in an urban high school?

H2o: The dimensions of the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence, and home cultural competence*) are not statistically correlated with immigrant student mathematics performances in an urban high school.

H2a: At least one of the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence, and home cultural competence*) is statistically correlated with immigrant student mathematics performances in an urban high school.

The results of the regression estimates suggested that there were varying degrees of correlations between the six dimensions of acculturation and immigrant students' mathematics performance in an urban high school. First, *host cultural identity* exhibited a significant negative correlation with both state assessment scores and course grades. In contrast, *home cultural identity* had a significant positive correlation of strong magnitude with state assessment scores, but its correlation with course grades was not statistically significant. *Host country language* had no statistically significant correlation with course grades. However, it had a marginally

significant positive correlation of weak magnitude with state assessment scores but was not statistically significant at the 0.05 alpha level. Home country language was significantly positively correlated with state assessment scores but was not statistically significant with course grades. *Host cultural competence* had no significant correlation with the state assessment scores and course grades. Lastly, the results indicated that *home cultural competence* had a statistically significant negative correlation of strong magnitude with both state assessment scores and course grades; the latter had a weaker magnitude, but it was still statistically significant at the 0.05 significance level. The null hypothesis (H2o) was rejected as at least one of the six dimensions of acculturation was found to be statistically correlated with mathematics performance. In a nutshell, the findings of this study suggested that the *host cultural identity* and *home cultural competence* had negative correlations with state assessment scores, while *home cultural identity* and home country language had positive correlations with state assessment scores. *Host country language* had a marginally significant positive correlation with state assessment scores but not with course grades, and *host cultural competence* had no significant correlation with either state assessment scores or course grades.

4.2.6 Results 3

RQ3: Are there any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status?

H3o: There is no significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status.

H3a: There is a significant difference in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status.

The null hypothesis (H3o) was rejected as there were some differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, or socioeconomic status. Firstly, the results showed that being female had a significant positive moderation of strong magnitude on the correlation of the predictor variables and course grades but did not have a statistically significant moderation with the state assessment scores. Secondly, there were statistical differences associated with grade level. Being a 10th grader statistically negatively moderated the correlation with course grades and had marginal negative moderation effects on assessment scores, and being a 12th grader statistically negatively moderated the state assessment scores. Also, statistical differences were associated with age at arrival to the U.S. The results showed that the later the students arrived in the U.S., the more negative moderation effects they had on the state assessment performance, yet there was no significant moderation in course grades. Additionally, whether the student was eligible for free lunch was often an indication of their socioeconomic status, which did not show statistical moderation in their academic performance in both the state assessments and courses.

Furthermore, differences associated with parental education were also observed in the regression analysis. Parental education levels of high school or college positively moderated the correlation with assessment scores, while elementary school education negatively moderated the correlation marginally. Lastly, while some differences were associated with class size and immigration generation, the moderation effects were not as strong and not statistically significant. Smaller class sizes had marginally positive moderation effects on assessment scores,

and median class sizes had marginally positive moderation effects on course grades. Additionally, the first-generation immigrant had more positive moderation on the correlation with assessment scores but a slightly greater negative moderation effect with course grades compared to second-generation or third-generation immigrants. However, these moderations were weaker and showed no statistical significance compared to the previous moderating variables and did not show statistical significance.

4.3 Summary

Using survey data collected from urban high school students from the Northeast United States who were enrolled in a mathematics class or took math state standardized assessment test, this study examined the relationship between the four sources of self-efficacy in math, the six dimensions of acculturation, gender, grade level, age arrival in the U.S., parental education, immigration generation, socioeconomic status, and immigrant students' mathematics performance in the urban high school. After heteroskedasticity-robust standard errors were handled and multiple regressions were employed, the results of the study revealed that *mastery learning experience* and *verbal persuasion* of the four sources of self-efficacy were statistically significantly positively correlated with mathematics performance, while *vicarious learning experience* and *physiological and emotional state* had no statistically significant association. Among the six dimensions of acculturation, *home cultural identity* and home country language had statistically significant positive correlations with state assessment scores, while *host cultural identity* and *home cultural competence* had statistically significant negative correlations with both state assessment scores and course grades. *Host country language* had a marginally significant positive correlation of weak magnitude with state assessment scores but not with

course grades, while *host cultural competence* had no statistically significant correlation with either. Additionally, the findings suggested there were differences in results associated with gender, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status. Specifically, being female positively moderated the correlation between the predictor variables and course grades. Also, a later age of arrival to the U.S. was associated with stronger negative moderation effects on the correlation between the predictor variables and assessment scores. It was also worth noting that parental education levels of high school or college positively moderated the correlation with course grades, while elementary school education negatively moderated the correlation. Nevertheless, whether the student was eligible for free lunch or not, an indication of their socioeconomic status did not show statistical moderation in their academic performance in both the state assessments and courses. Moreover, class size had marginal positive effects on academic performance, with smaller class sizes showing slightly better performance on assessment scores and median class sizes being moderately more conducive to achieving higher course grades. In other words, smaller classes enhanced performance on standardized tests, while medium-sized classes could be more beneficial for better grades.

These results suggested that *mastery learning experience* and *verbal persuasion*, *host cultural identity*, *home cultural identity*, *home country language*, and *home cultural competence* were important sources of self-efficacy and acculturation to support immigrant students' mathematics performance with varying effects, especially in standardized assessment tests. The findings of the study also highlighted the importance of considering demographic and socioeconomic factors when exploring the associations between self-efficacy, acculturation, and academic performance among immigrant students and several generations of U.S.-born

immigrant descendants. The following discussion chapter further explored the interpretation and implication of the findings and how these results could be used to support immigrant students' mathematics education, inform policy and practice in schools, and provide recommendations for future research.

Chapter 5 Discussion

The purpose of this quantitative correlational study was to determine the relationships between the four sources of self-efficacy, the six dimensions of acculturation, and demographic factors in learning mathematics, and the mathematics performance among the immigrant students or minority U.S.-born immigrant descendants in an urban high school in the northeastern United States. Through multiple regression analysis, the research further examined any associations between the independent variables (i.e., composite scores of the four sources of self-efficacy in math, composite scores of the six dimensions of acculturation) and the dependent variables (i.e., state standardized assessment scores, end-of-year course grades). As aforementioned, the findings suggested that *mastery experience*, *verbal persuasion*, *host cultural identity*, *home cultural identity*, *home country language*, and *home cultural competence* were important sources of self-efficacy and acculturation to support immigrant students' mathematics performance with varying effects, especially in standardized assessment tests.

This discussion chapter further explored and discussed the findings in three sections. The first section provided the interpretations of the findings and investigated how the findings converged to or diverged from the theoretical framework. The second section evaluated and discussed any congruencies or disparities with the results from the existing literature review. The third section summarized the discussion and interpretation of the findings.

5.1 Interpretation of the Findings from the Theoretical Framework

According to the results of the multiple regressions from the study, five explanatory variables were identified as significant predictors of state assessment scores (*verbal persuasion*, *host cultural identity*, *home cultural identity*, *home country language*, and *home cultural*

competence), three explanatory variables were identified as significant predictors of end-of-year course grades (*mastery experience, host cultural identity, and home cultural competence*), and the two explanatory variables (*host cultural identity, and home cultural competence*) were identified as significant predictors on both state assessments scores and course grades. The findings suggested that *verbal persuasion* is a dominant source of self-efficacy, and *host cultural identity, home cultural identity, home country language, and home cultural competence* are important components of acculturation contributing to immigrant students' standardized assessment scores; and *mastery experience* is a dominant source of self-efficacy, and *host cultural identity, and home cultural competence* are critical factors in supporting immigrant students' performance in math courses. However, *vicarious learning experience, physiological and emotional state, host country language, and host cultural competence* did not show statistically significant associations with mathematics performance.

The findings of this study offered partial support for Bandura's self-efficacy theory (1977, 2006), which proposed that the four sources of self-efficacy play a crucial role in determining students' academic performance. In this study, *mastery learning experience* and *verbal persuasion* were positively correlated with mathematics performance, which was consistent with part of the theorized sources of self-efficacy theory. Past studies indicated that successful learning experiences provide learners with tangible proof of success, and multiple positive learning experiences can gradually build confidence in their ability to learn math, thus positively enhancing and affecting their math learning and performance (Schwarzer & Luszczynska, 2008). *Verbal persuasion*, such as feedback and praise from teachers, could boost students' confidence in their math abilities, which also led to better performance (Usher & Pajares, 2006). It's worth noting that a positive *mastery learning experience* had a highly

positive correlation with course grades and a highly significant correlation between greater *verbal persuasion* and higher assessment scores. The different results from the two models with different performance indicators were discussed later in this chapter.

However, the results of this study diverged from Bandura's theory (1977) in relation to *vicarious learning experience* and physiological and emotional states. While Bandura's theory (1977, 2000) suggested that *vicarious experience* and *physiological and emotional state* also play crucial roles in fostering self-efficacy beliefs and improving learning outcomes, the study's outcomes did not endorse *vicarious learning experience* and *physiological and emotional state* as significant sources of self-efficacy in influencing the math performance of immigrant students or students with an immigrant background. *Vicarious learning experiences*, such as observing others succeed, and *physiological and emotional states*, such as emotions, stress, and anxiety, did not have a significant impact on immigrant students' math performance.

Furthermore, the results also supported the idea that acculturation is a multidimensional construct that includes different dimensions of cultural identity, cultural competence, and language proficiency, impacting one's life in the host country and academic performance. According to Berry's (1997) and Zea and colleagues' (2011) theorized models, acculturation involved both maintaining one's original culture and adapting to the new culture of the host country. The findings revealed that *home cultural identity* and *home country language* are positively associated with state assessment scores, while *host cultural identity* and *home cultural competence* are negatively correlated. Maintaining immigrant students' cultural identity was recognized as a positive factor in adapting to a new culture, and maintaining proficiency in their native language could provide an advantage in comprehending mathematical concepts and problems presented to help them acquire math skills and knowledge. On the other hand,

immigrant students facing challenges to adapt to the new culture and identity could experience difficulty and adverse outcomes, including lower academic performance. The research aligned with the acculturation theories proposed by Schumann (1978), Berry (1997), and Zea et al. (2011) suggested that acculturation is a multifaceted construct and process that can affect an individual's life and academic achievements in various manners.

5.2 Evaluation and Discussion of the Research Questions

The current body of research on self-efficacy and acculturation in the mathematical performance of immigrant students and minority students with immigrant backgrounds revealed a mix of congruent and incongruent findings. The results were broadly consistent with the existing literature, but some disparities also existed.

5.2.1 Evaluation & Discussion 1

RQ1: To what extent do the four sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*) correlate with immigrant student mathematics performances in an urban high school?

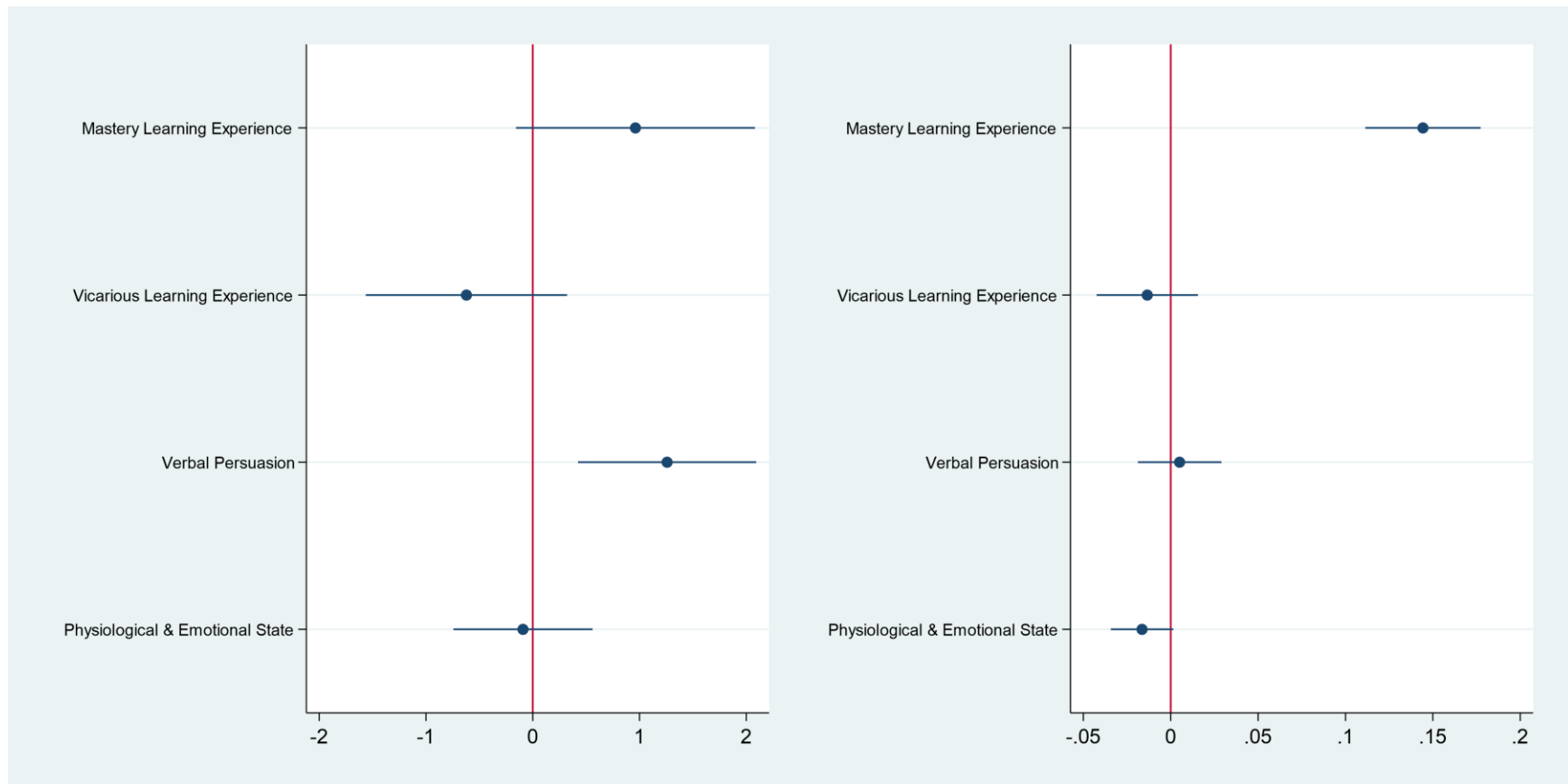
Among the four main sources of self-efficacy (*mastery experience, vicarious experience, verbal persuasion, and physiological and emotional states*), the mastery of learning experience and *verbal persuasion* of the four sources of self-efficacy were found to be positively correlated with mathematics performance, which was consistent with existing research (Usher & Pajares, 2009; Capa-Aydin et al., 2018; del Mar Haro-Soler, 2021). Capa-Aydin and colleagues (2018) collected self-reported data from 397 students and found that *mastery experience* directly influences students' academic self-efficacy and their cognitive skills in learning. This also

aligned with the findings and suggested that students who have a history of success in mathematics are more likely to believe in their ability to succeed in the subject, leading to better academic performance. In a more recent study, del Mar Haro-Soler (2021) employed a mixed-method approach to examine the relationship between teacher feedback and self-efficacy beliefs of 174 Spanish students in secondary education and revealed that *verbal persuasion* positively influences students' self-efficacy beliefs when the comments made by teachers are realistic and correspond to the student's real ability to translate. This was consistent with the findings indicating that teacher feedback can significantly impact students' self-efficacy beliefs and test performance. The findings suggested that *verbal persuasion* plays a critical role in building students' confidence, shaping their self-efficacy beliefs, and promoting and enhancing their academic performance.

However, the lack of statistical significance in the association between *vicarious learning experience* and *physiological and emotional state* with the mathematics performance of immigrant students was not common. Some recent studies suggested that *vicarious experience*, where individuals observe the successful performance of others, can positively impact self-efficacy and academic performance (Bartsch et al., 2012; Kudo & Mori, 2015). Bartsch and colleagues (2012) found that *vicarious experience* has a positive impact on students' self-efficacy beliefs and academic performance. Similarly, Kudo and Mori (2015) found that *vicarious experience* positively influences academic self-efficacy beliefs, which in turn leads to better academic performance. Likewise, some studies suggested that *physiological and emotional states* have a significant impact on academic performance (Casali et al., 2021). For instance, Casali and colleagues (2021) found that students who experienced more tremendous stress and anxiety have lower academic performance in math. However, in the current dissertation study, no significant

association was found between *vicarious experience* and *physiological and emotional state* with the mathematics performance of immigrant students. A study by Schneider and Preckel (2017) examined the relationships between self-efficacy, *vicarious experience*, and academic performance in a sample of German high school students. They found that *vicarious experience* has no direct effect on academic performance, although it does indirectly influence performance through its impact on self-efficacy. The lack of statistical significance of *vicarious experience* and *physiological and emotional state* in the current dissertation study might be due to the unique characteristics of the participant demographics, which requires further investigation of the potential reasons behind the findings.

Figure 5.1. Regression coefficient plot of the four sources of self-efficacy with state assessment scores (left) and course grades (right).



5.2.2 Evaluation & Discussion 2

RQ2: To what extent do the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence, and home cultural competence*) correlate with immigrant student mathematics performance in an urban high school?

Among the six dimensions of acculturation (*host cultural identity, home cultural identity, host country language, home country language, host cultural competence, and home cultural competence*), four of them showed significant correlations with the immigrant students' mathematics performance, especially on state standardized assessments. The findings indicated that *home cultural identity* and *home country language* were positively correlated with state assessment scores, which aligns with some existing research that emphasizes the importance of maintaining one's *home cultural identity* and *home language proficiency* (Broomes, 2013; Yu et al., 2019). For example, Broomes (2013) investigated the effects of *home country language* on academic achievement in primary education and found that students who speak a language other than or in addition to English at home are more likely to be proficient in reading, writing, and mathematics at Grade 6 compared to students who only speak English at home. This was in accordance with the findings that students who speak another language or more than one language at home have a broader range of cognitive and linguistic skills, which can positively impact their learning in school. Also, Yu and colleagues (2019) conducted a study on the acculturation process of immigrant adolescents in Canada and found that strong self-identification with one's culture of origin aids in the acculturation process. This, again, was in line with the findings that *home cultural identity* enhances learning and academic achievement.

The negative correlation between *host cultural identity* and participants' academic performance was also consistent with previous studies on cultural identity and learning; As students identified themselves more with the host country, their academic performance tended to decrease (Altugan, 2015). Although there was scarce research on the relationship between solely *host cultural identity* and academic performance, this finding was partially supported by some previous studies that found similar associations between cultural identity and academic learning, life, and overall well-being in the host country (Altugan, 2015; Byrd et al., 2018; Hahm et al., 2003; Phinney & Ong, 2007). For example, a study by Hahm and colleagues (2003) examined the relationship between cultural identity and mental health among Asian-American adolescents and found that those who identify more strongly with the American culture are more likely to report symptoms of depression, which impacts their school or work performance, compared to those who identify more strongly with their Asian heritage. Also, a study by Byrd and colleagues (2018) found that African American students who identify more strongly with their racial identity have higher academic achievements. Moreover, a study by Phinney and Ong (2007) found that students who have a strong *home* and *host cultural identity*, that is, a strong connection to both their heritage culture and the host culture, have better academic outcomes than those who identify solely with one culture. Several factors might explain this negative correlation between cultural identity and academic achievement. One explanation was that when students identified more with their home culture, they felt more connected to their roots and have a stronger sense of belonging. This could potentially lead to greater motivation and engagement in academic activities. In contrast, when students identified more with the host culture, they felt like outsiders and experienced cultural conflict, which led to disengagement and lower academic achievement. Another possible explanation was that cultural identity could influence the way

students approach learning and academic tasks, with different cultural values and beliefs shaping their attitudes and behaviors. Overall, the negative correlation between *host cultural identity* and state assessment scores and course grades suggested that cultural identity is an essential and complex factor to consider in understanding the academic performance of immigrant students who may experience unique challenges related to identity shift or integration.

Additionally, the marginally significant positive correlation between the *host country language* and state assessment scores was consistent with existing studies emphasizing the importance of English language proficiency for academic success (Cummins, 2021). One prominent scholar in this field was Jim Cummins, a Canadian researcher who wrote extensively on language development and academic achievement. In his work, Cummins argued that proficiency in the language of instruction is essential for academic success and that students who are not proficient in the language of instruction may struggle to understand academic content, ask questions, and express their thoughts and ideas effectively (Cummins, 2021). Also, in a study by Halle and colleagues (2018), English language proficiency was found to be a significant predictor of cognitive, behavioral, and academic achievement in a sample of immigrant children in the United States. Similarly, a study by Racca and Lasaten (2016) found that English language proficiency is positively associated with academic achievement in Philippine schools.

Nonetheless, the results of the current dissertation study revealed only marginal significance in the relationship. This suggested that while English language proficiency contributes to the academic success of immigrant students, other factors exert a more dominant impact on their learning and academic outcomes. *Host country language* did not emerge as one of the determining factors affecting academic performance. This interpretation was supported by some studies that found other dominant factors influencing the academic success of immigrant students

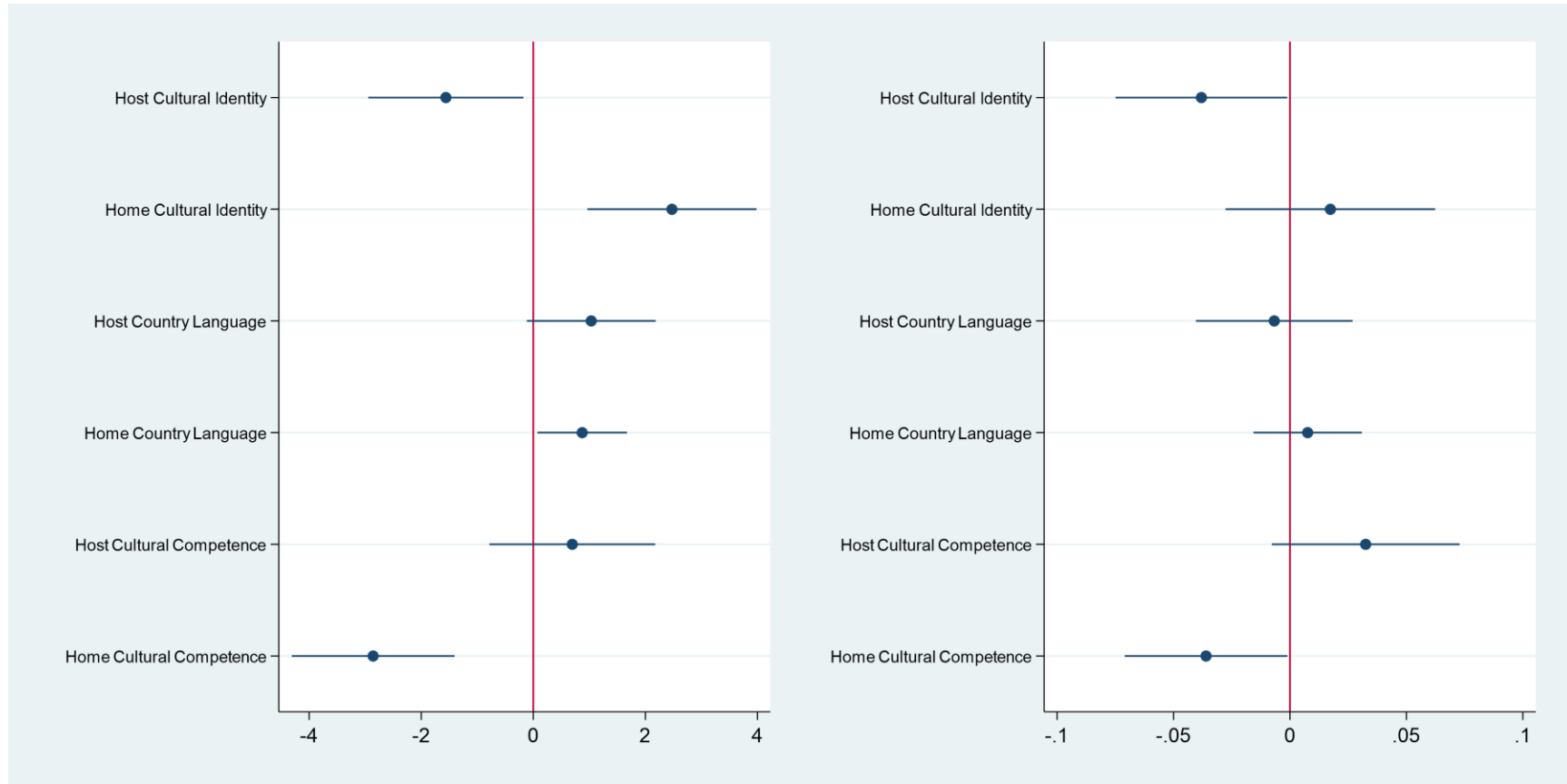
(Moon et al., 2019; Winterer et al., 2020). For example, a study by Moon and colleagues (2019) sampled 103 Korean and 100 Mexican immigrant students and found that parent education and length of stay in the United States significantly predict academic performance. Also, a systematic review of literature conducted by Winterer and colleagues (2020) explored factors that influence the academic success of Latinx students and found that institutional factors, such as supportive environments, family support, financial aid, and mentorship programs, significantly promote Latinx student success in STEM fields.

Nevertheless, the negative correlation between *home cultural competence* with both state assessment scores and course grades was unexpected and indicated that the state standardized assessments are problematic. Existing pedagogical practices promoted culturally relevant and responsive teaching to engage students from diverse backgrounds and enhance their learning (Blazar, 2021; Milner, 2021; Parnter & Simmons, 2022). However, the focus on standardized testing and a one-size-fits-all curriculum prioritized a narrow set of skills and knowledge that does not align with students' home cultures and experiences, leading to significantly negative correlations with underperformance on standardized assessments and course grades. If the context and problems of the curriculum and assessments only focused on one perspective and culture, students from different cultural backgrounds would find it difficult to connect the content knowledge, grasp the ideas, and comprehend the concepts. This was problematic for students from diverse backgrounds, as the skills and knowledge emphasized might not align with their home cultures and experiences. As a result, they might feel disconnected and lost in class and have lower scores on the assessments and performance in learning in class. In fact, many past studies revealed cultural bias in standardized assessments and unfairly disadvantaged certain cultural or linguistic groups (Rattani, 2016; Reynolds et al., 2021; Valencia, 2010). For example,

Rattani (2016) found that the SAT tests used in the United States are culturally biased against racial and ethnic minorities, particularly in the areas of reading comprehension and vocabulary. Reynolds and colleagues (2021) also noted that I.Q. tests in the U.S. are inherently biased against Blacks, Hispanics, and possibly other ethnic groups. Similarly, Valencia (2010) reviewed several studies investigating the cultural bias of standardized tests among Hispanic and Latino students. The studies found that standardized tests are often culturally biased against Hispanic and Latino students, particularly in the areas of language proficiency and cultural knowledge. Moreover, several studies have found evidence of cultural bias in the contents of textbooks and curricula used in schools (Cruz, 2002; Ndura, 2004). For example, Cruz (2002) indicated that history textbooks frequently ignore the contributions of African Americans, Native Americans, and other minority groups while presenting a Eurocentric and white-centered perspective of history. Also, a study conducted by Ndura (2004) revealed that ESL textbooks and instructional materials fail to reflect multiple perspectives and contain potential stereotypes and cultural biases, which significantly impact the attitudes and dispositions of ESL students towards themselves, others, and society. Furthermore, scholars also argued that the curriculum is often designed from a dominant cultural perspective and fails to incorporate the cultural experiences and knowledge of diverse students (Ladson-Billings, 2008). This narrow perspective of the curriculum was particularly detrimental to ELLs, who often struggled to understand and relate to the materials presented in class. Also, the lack of support and resources from teachers could make it hard to integrate learners' home cultures into their instruction and create a welcoming and inclusive classroom environment. Teachers unfamiliar with the diverse home cultural backgrounds of students unintentionally established an ineffective learning environment, potentially hindering students' connection to the learning process and negatively impacting their performance in class.

The findings revealed a demanding issue, cultural bias in the contents of textbooks, curricula, and standardized assessments used in schools, that must be addressed to ensure equitable education and accurate measurement of student learning and academic achievement. If a student's course grades or performance on standardized assessments were used to make high-stakes decisions, such as high school graduation or college admission, then cultural bias would lead to unfair outcomes and perpetuate inequitable education (Au, 2020; Tenam-Zemach et al., 2021).

Figure 5.2. Regression coefficient plot of the different aspects of acculturation with state assessment scores (left) and course grades (right).



5.2.3 Evaluation & Discussion 3

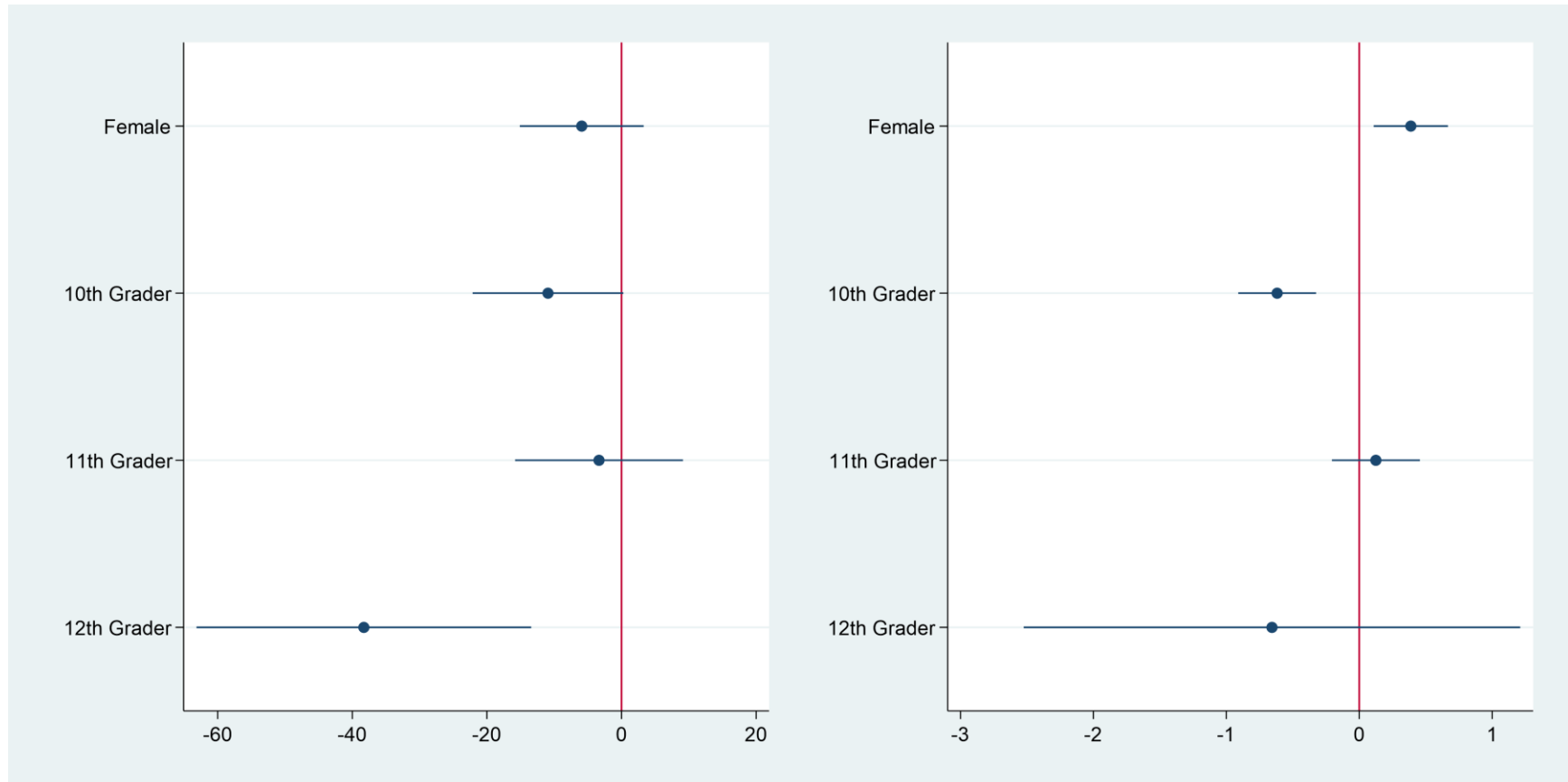
RQ3: Are there any differences in the findings associated with gender, class size, grade level, age at arrival to the U.S., immigrant generation, parental education, and socioeconomic status?

The finding that demographic and socioeconomic factors, such as gender, grade level, age at arrival, parental education, and immigrant generation, moderated the association between self-efficacy, acculturation, and academic performance was consistent with previous research that suggested these components could influence educational outcomes (Portes & Rumbaut, 2001; Rong & Preissle, 2008). First, being female students contributed to higher course grades since female students tend to have greater positive attitudes toward participating in class and completing classwork and homework, which aligned with research that showed that female students are more likely to participate in class, ask questions, and seek help from teachers when needed (Kobayashi, 2002). Yet, they did not necessarily translate to advantages in standardized assessment tests since the tests are designed to measure knowledge and skills across a broader spectrum and are less influenced by individual behaviors and attitudes (Halpern et al., 2007). The findings affirmed that although female students commonly excel in class participation and coursework completion, which can help them achieve better course grades, this might not necessarily translate to higher scores on standardized assessments. Also, some past research consistently showed that gender bias exists in teachers' grading (Berg et al., 2020; Hofer, 2015; Protivínský & München, 2018). A study by Protivínský and München (2018) showed that teachers may exhibit gender bias in grading practices, leading to unequal outcomes for male and female students in class. This bias manifested in ways that teachers gave more credits to female and native English-speaking students for the same work as their male or non-native English-speaking

peers because of their behaviors and attitudes in class (Protivínský & München, 2018). This aligned with the research finding that female students have significantly higher course grades than their male peers but no significance in the assessment scores.

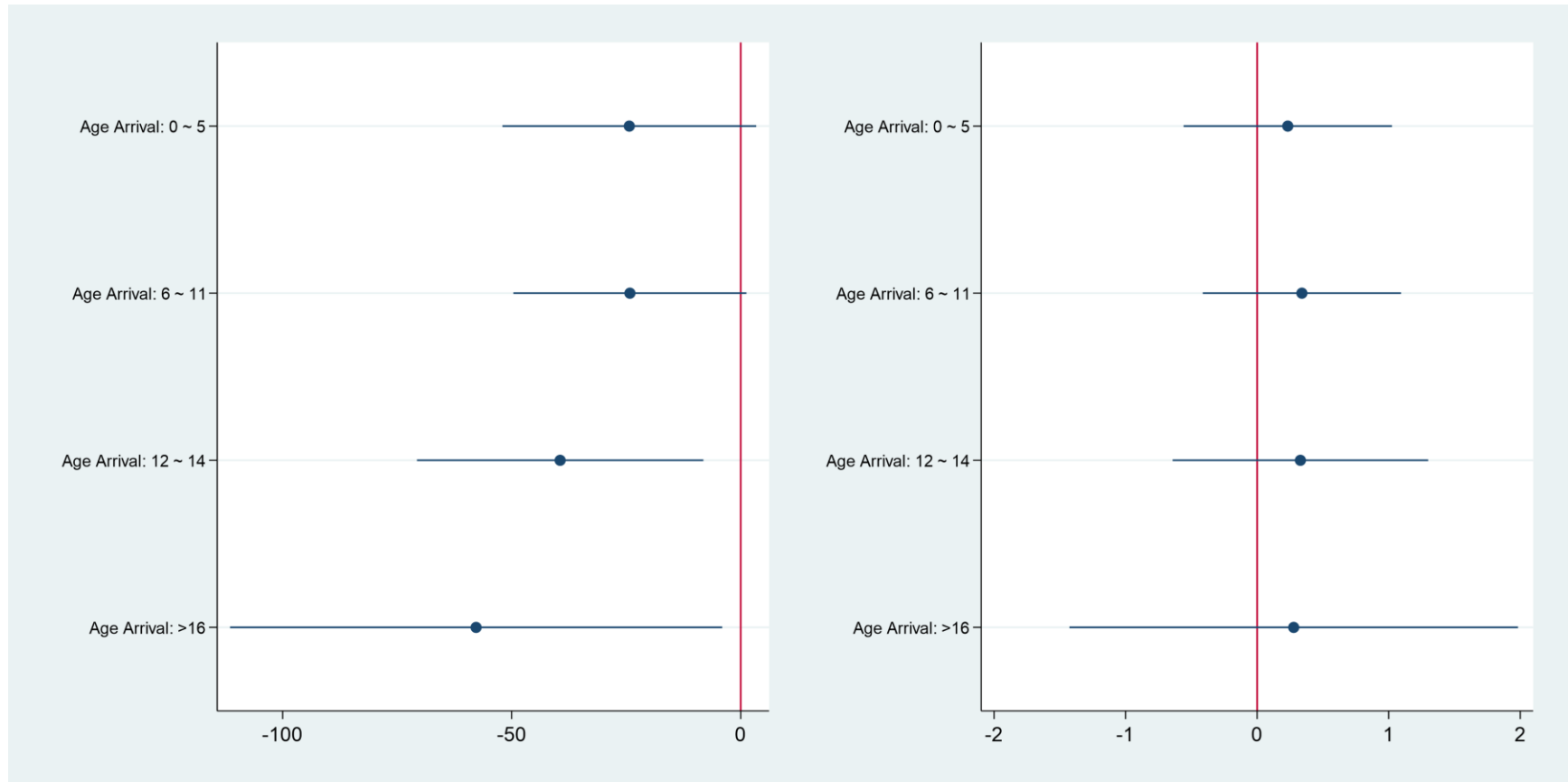
Second, being 10th graders exhibited lower course grades in the study, which was logical because graduation was not typically a concern for most 10th graders. They were generally less motivated than the students in higher grade levels to perform well in their courses. In a more recent study, Su and colleagues (2021) surveyed 751 students to examine the relationships between acculturative stress, academic performance, and quality of life among undergraduate, master's, and doctoral Chinese international students studying in the United States. They found that the lower the students' grade levels are, the higher levels of acculturative stress and lower academic performance and quality of life in the host country, which was consistent with the findings of this study. Then, being 12th graders demonstrated significantly lower assessment scores than 9th graders on the assessment tests. This might be because many 12th graders who took the assessments were the ones who previously failed the assessments in their 10th or 11th grades, and they were not provided additional support and intervention to improve their academic performance. The results suggested that grade level is an important moderator influencing immigrant student performance and should be considered when analyzing learning outcomes among high school students.

Figure 5.3. Regression coefficient plot of the moderating effects of gender and grade level on state assessment scores (left) and course grades (right).



Also, the findings revealed the relationship between the age of arrival for immigrant students in the United States and their performance on academic assessments. The regression models suggested that the later students arrive in the United States, the lower their assessment scores; however, for immigrant students who arrived between the ages of 0 and 11, the difference in their assessment scores was marginally negative moderation on assessment scores compared to that of U.S.-born students. Past research studies showed that there is a critical period for language acquisition, and students who arrive in the host country before puberty have a better chance of acquiring a second language with native-like proficiency (Hakuta et al., 2000). Also, a study by Portes and Rumbaut (2001) suggested that immigrant students who come to the host country between ages before puberty can retain their native culture and language, becoming fully bilingual and bicultural. Some studies also proposed a specific time window during childhood when the brain is particularly receptive to acquiring language and cultural values (Kovelman et al., 2008; Schulz & Grimm, 2019). They indicated that younger children tend to be more receptive to new languages and cultures, and they have more opportunities to interact with native speakers of their language outside of school. As a result, these students experience less acculturation stress and are more successful in navigating the new environment.

Figure 5.4. Regression coefficient plot of the moderating effects of Age of Arrival to the U.S. on state assessment scores (left) and course grades (right).



Moreover, the findings showed that the educational level of immigrant students' parents is a significant determinant of their achievement on standardized assessments. Specifically, students whose parents attended high school and college had higher assessment scores. Consistent with this, past research demonstrated that parental education is a crucial indicator of children's academic performance (Davis-Kean, 2005; Sirin, 2005). Immigrant students with parents who completed higher levels of education were more likely to have a broader range of knowledge and perspective as well as access to educational resources, including exposure to language, culture, and academic content, which contributed to their academic success (Portes & Rumbaut, 2001; Suárez-Orozco et al., 2008). A study by Fan and Chen (2001) also found that parental education is a significant predictor of children's academic achievement in math and reading, and this effect is particularly strong for immigrant students. Furthermore, a study by Kao and Tienda (1995) found that parental education is a more important predictor of academic achievement for immigrant students than for native-born students.

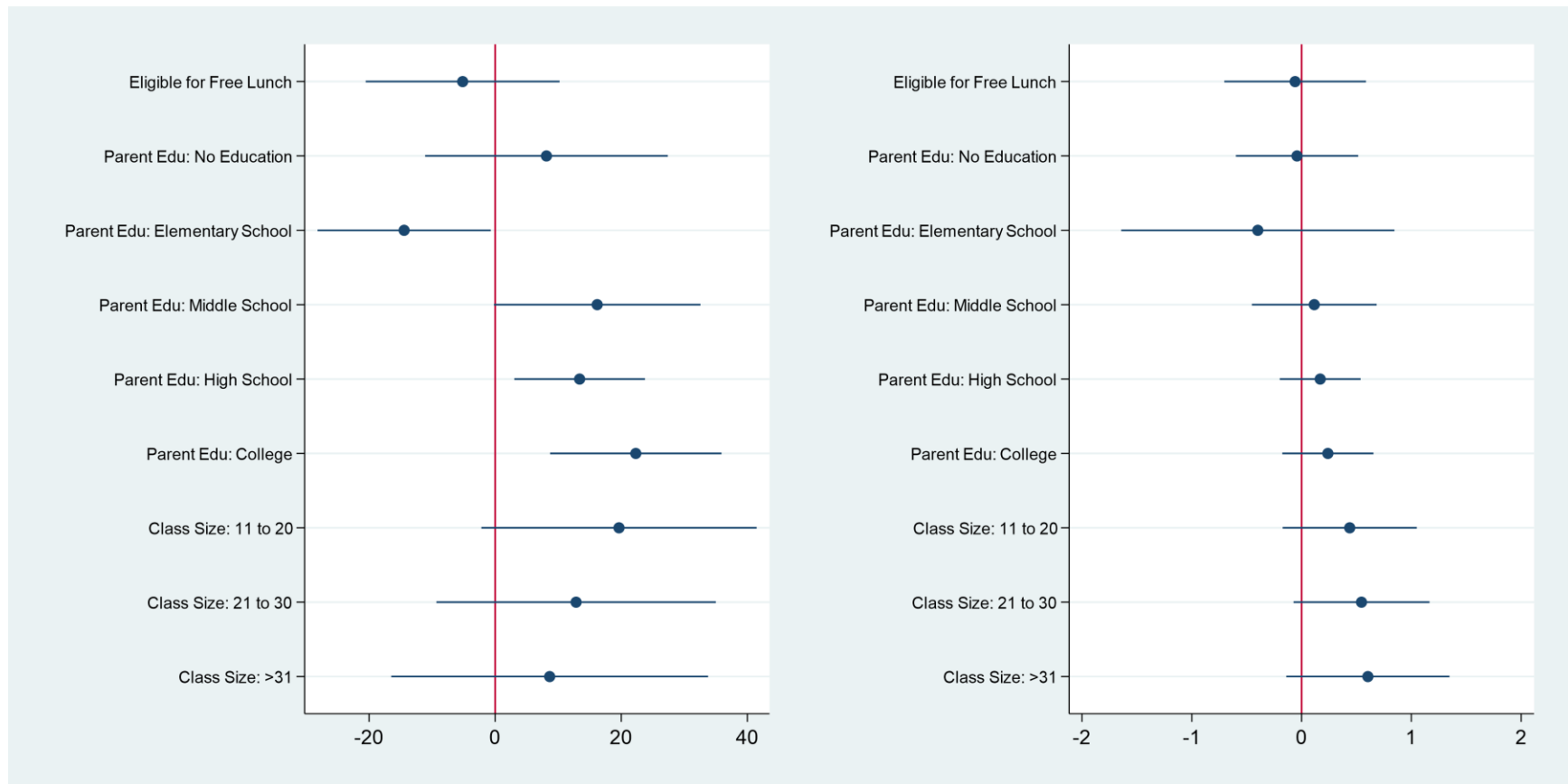
Furthermore, the study's results suggested that class size has moderation effects on the relationship between certain variables and academic performance indicators. The findings indicated that there were marginally positive moderation effects for different class sizes, where a class size of 11 to 20 resulted in marginally higher assessment scores, and a class size of 21 to 30 resulted in marginally higher course grades. This meant that the relationship between certain variables and academic performance indicators was influenced by the size of the class, suggesting that smaller classes are beneficial for certain types of learning or particular students. The results were consistent with previous research, which showed that smaller class sizes are associated with better academic outcomes (Finn et al., 2005). In this study, the smaller class size (11 to 20) had marginally positive moderation effects on standardized assessment scores, in

which the smaller class sizes allow for more individualized attention and teacher support (Blatchford et al., 2007), which can help address individual student needs and promote better test performance. The median class size (21 to 30) exhibited marginally positive moderation effects on the course grades. This aligned with the importance of discussions and peer collaboration in learning, cognitive development, and academic performance in class, as demonstrated by Fawcett & Garton (2005). However, the demographics of the student groups also matter. A study by Nye and colleagues (2000) indicated that while small classes have a positive effect on reading and mathematics achievement for all students, there was only weak evidence to suggest that the effects are greater for minority students in reading. No significant evidence supported the idea that small classes have a greater impact on students of low socioeconomic status. Again, the moderation effects in this study were only marginal, meaning that the relationship between the variables and academic performance indicators is not significantly impacted by class size. Therefore, the findings suggested that while smaller class sizes have some advantages, they are necessarily the most critical factor in predicting the academic performance of immigrant students or students with immigrant backgrounds.

Notwithstanding, the lack of statistical significance in the moderation of free lunch eligibility on the correlation with academic performance was somewhat surprising. Some previous studies showed that socioeconomic status significantly impacts academic outcomes (Reardon et al., 2019), but the findings suggested that this was not the case for immigrant students in urban high schools in the northeastern United States. Several factors might account for this discrepancy, including variations in the student demographics, school culture, or educational practices in the urban school. The student demographics in the urban high school might differ from those in the previous research, resulting in different effects of socioeconomic

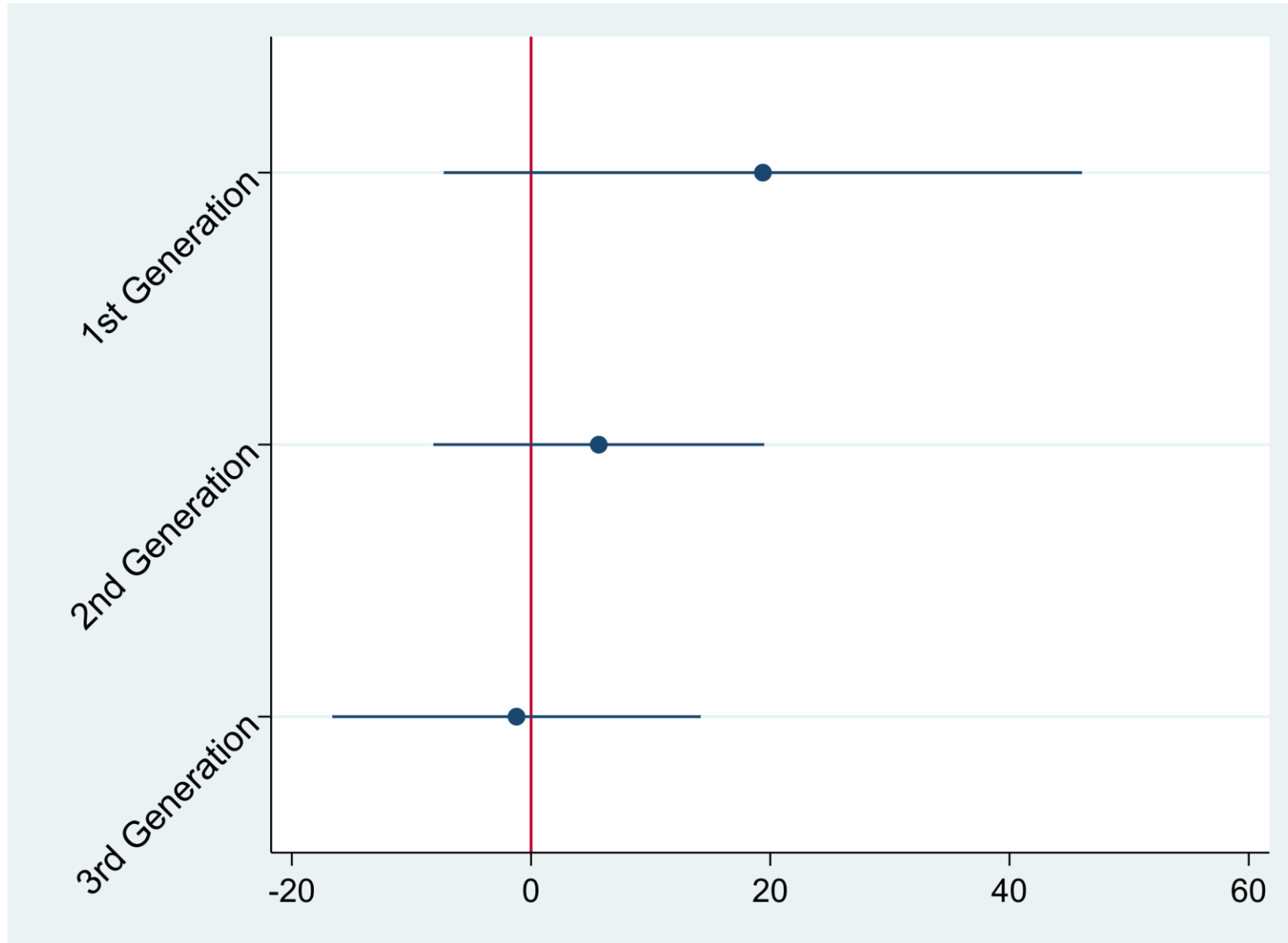
status on academic outcomes. School culture and educational practices in urban schools might also play a role in mitigating the moderative impact of socioeconomic status on academic performance. Additionally, some studies supported these findings, indicating that socioeconomic status does not significantly impact student academic performance when schools foster a positive climate and implement supportive educational practices (Thapa et al., 2013; Reynolds et al., 2011).

Figure 5.5. Regression coefficient plot of the moderating effects of other moderating variables on state assessment scores (left) and course grades (right).



In the regression models, although immigrant generations did not show statistically significant moderation effects on the correlations with the two performance indicators, first-generation immigrants seemed to have higher assessment scores compared to students from immigrant families who were born in the United States (see Figure 5.6). This finding was noteworthy because it challenged the common belief that being born in the U.S. conferred an academic advantage over immigrant students. Several factors might contribute to this phenomenon, including the motivation and aspirations of first-generation immigrants to succeed academically, the higher quality of education in their home country, or the emphasis on education within their home culture (Moon & Ruiz-Casares, 2019). First-generation immigrants could exhibit greater motivation to succeed academically because of the challenges they encounter upon immigrating to the U.S., including language barriers or discrimination. This motivation might translate into a stronger work ethic and a desire to perform well academically. Darling-Hammond (2015) mentioned in his book that the education system in the home country prioritized academic excellence, leading to a higher quality of education compared to that in the United States. Also, Moon and Ruiz-Casares (2019) noted that immigrant parents often place a high value on education as a means of upward mobility for their children. This emphasis on education could motivate first-generation immigrants to work harder and strive for academic success, potentially contributing to their higher assessment scores.

Figure 5.6. Regression coefficient plot of the moderating effects of immigrant generation on the state assessment scores



As alluded to in the preceding section, the varying results produced from the two models, which utilized the two different performance indicators, suggested that the state standardized assessments potentially may contain biases related to cultural knowledge and experience, and course grades may include biases related to individual judgment. Standardized assessments should be designed to be more objective and standardized; however, as aforementioned, many past and existing standardized assessments contained biases related to factors such as cultural knowledge and experience (Rattani, 2016; Reynolds et al., 2021; Valencia, 2010). Another study by Muhammad (2006) collected and analyzed sample SAT test documents and found that all five elements of cultural biases –race, gender, socioeconomic status, heritage, and language, are still present in the test. This suggested that standardized assessments cannot accurately measure the academic knowledge and skills of students who do not have dominant cultural knowledge and experience, leading to potential biases in the results. On the other hand, course grades also reflected biases stemming from the individual judgment of the teacher, which could introduce more variability, including factors like motivation and effort. While this might reduce some cultural biases present in assessments, it could also introduce other biases. A more recent study by Zaki and colleagues (2023) found that teacher grading practices for students are influenced by factors such as perceived effort, classroom behaviors, and relationship with the teacher, which may lead to variation in grades that does not necessarily reflect the students’ actual academic abilities or performance in the subject.

5.3 Summary

The discussion offered partial support for Bandura's self-efficacy theory, suggesting that *mastery learning experience* and *verbal persuasion* are positively associated with mathematics

performance among immigrant students and students with immigrant backgrounds. Yet, the study results did not support the roles of *vicarious learning experience* and *physiological and emotional states* in improving academic performance. Also, the findings showed that acculturation is a multidimensional and complex construct that includes various dimensions of cultural identity, cultural competence, and language proficiency, which impact one's life in the host country and academic performance. *Home cultural identity* and *home country language* were positively correlated with state assessment scores, while *host cultural identity* and *home cultural competence* were negatively correlated. Therefore, maintaining immigrant students' cultural identity and proficiency in their native language are important factors in adapting to a new culture and improving math performance. Additionally, the findings of the study suggested that demographic and socioeconomic factors, such as gender, grade level, age at arrival, and parental education, moderate the association between self-efficacy, acculturation, and academic performance among immigrant students in urban high schools in the Northeast United States.

The study also challenged certain prevalent assumptions, such as the idea that being competent in the host culture is necessary for academic learning and achievement. Also, the common belief that standardized assessments should be more objective and less biased, but this research showed that cultural biases still exist in state assessments. Course grades could also carry biases based on teacher judgment, leading to potential variations in grades that might not accurately reflect students' academic abilities. The bulk of the findings were in line with past and existing research and studies in the field and offered additional understanding regarding the elements that influence academic achievements in immigrant students. Some discrepancies could arise from differences in the demographic population. Nevertheless, the study added to the

growing body of research on the influence of self-efficacy, acculturation, and other variables on academic performance among immigrant students in the United States.

Chapter 6 Implications & Conclusions

As the previous chapters presented, the research study conducted in this dissertation revealed the relationships between the four sources of self-efficacy, the six dimensions of acculturation, and demographic factors in learning mathematics, and the mathematics performance among the immigrant students or minority U.S.-born students with immigrant backgrounds in an urban high school in the northeastern United States. In this chapter, the focus was on a comprehensive analysis of the implications, limitations, and conclusions drawn from the study.

The first section delved into the implications of the findings to provide a detailed account of the theoretical, methodological, research, and practical implications of the study. The results of the study held the potential to inform and shape future research, as well as to provide guidance to educators, school leaders, policymakers, and other stakeholders. By examining the implications of the findings, this section aimed to highlight the broader significance of the research and its contribution to the field. The second section of this chapter addressed the limitations of the study and provided a critical reflection on its methodological and theoretical limitations. This section aimed to provide a balanced view of the research by identifying and discussing the limitations. The final section drew together the implications and limitations of the study to present the conclusions to provide a concise and clear summary of the key findings of the research, relate them to the research questions and objectives, discuss contributions to the field, and suggest future directions for research.

6.1 Implications

This study's outcomes held profound implications across theoretical, methodological, research, and practical domains. The findings not only contributed to advancing academic knowledge but also offered actionable insights for educators, school administrators, policymakers, and various stakeholders. The theoretical implications underscored certain relationships between sources of self-efficacy, acculturation dimensions, and academic performance. Methodologically, the study highlighted the efficacy of regression analysis while acknowledging the need for broader sample representation. Research implications called for a deeper exploration of underlying mechanisms, contextual influences, and additional factors shaping immigrant students' academic experiences. On a practical level, educators were encouraged to prioritize specific sources of self-efficacy, acknowledge cultural backgrounds, address acculturation challenges, and be mindful of potential biases in assessments.

6.1.4 Theoretical Implications

The results of the research aided in the clarification that particular sources of self-efficacy and particular components of acculturation are associated with specific categories of mathematical performance, while some are not. Specifically, the research indicated that the source of *mastery experience* was positively correlated with immigrant students' course grades, and the source of *verbal persuasion* was linked to higher assessment scores, while other sources of self-efficacy, *vicarious experience* and *physiological and emotional state* were not. As such, the research results challenged the notion that self-efficacy universally correlates with academic performance and disproved the generalization that self-efficacy correlates with student academic performance in this specific context (Bandura, 1977, 1986, 2000).

Similarly, certain components of acculturation, such as *host cultural identity*, *home cultural identity*, *home country language*, and *home cultural competence*, were associated with state math assessment scores, and only *host cultural identity* and *home cultural competence* were associated with math course grades, while other aspects of acculturation, such as *host cultural competence*, did not have a significant correlation. The dissertation findings further affirmed that acculturation is a complex and multifaceted construct encompassing different dimensions of cultural identity, cultural competence, and language proficiency (Zea et al., 2011), which can have a significant impact on individuals' academic performance in the host country.

6.1.5 Methodological Implications

This quantitative research study employed regression analysis to examine the correlation between the predictor variables and criterion variables and determine the extent of this correlation. The study results indicated that regression analysis is an effective research method for determining the relationships between variables. However, the sample of the study was limited to one urban high school in the northeastern region of the United States, which may not be generalizable to other schools. Future studies should aim to replicate the research in different settings and across different contexts and with a larger sample size to increase the generalizability of the results.

In addition, it's essential to note that while regression analysis identifies correlations between variables, it does not establish causation. In this study, the researcher presented that certain sources of self-efficacy and acculturation are positively or negatively correlated with immigrant students' academic performance in mathematics, and some moderating variables moderate the correlations. However, these sources may not directly cause changes in academic

performance. For instance, although the study identified a positive correlation between *verbal persuasion* and assessment scores, it didn't imply that persuading students about their math capabilities directly leads to higher assessment scores. Future research should also consider using experimental designs or other methods that can establish causality to further examine the relationships between predictor variables and response variables.

6.1.6 Research Implications

The findings of this study opened avenues for future research that could significantly contribute to the existing concept and understanding of self-efficacy, acculturation, and academic performance among immigrant students. This section outlines key directions for prospective research, suggesting that adopting a mixed methods approach, conducting longitudinal studies, and conducting in-depth explorations of the mechanisms, contexts, and factors can provide a more nuanced and holistic comprehension of the relationships.

6.1.6.1 Mixed Methods Approach

Future researchers can benefit from adopting a mixed methods approach to provide a more comprehensive understanding of the complex relationships explored in this study. By combining quantitative correlational research with qualitative research methods, such as interviews or focus groups, researchers can delve deeper into the details and nuances of self-efficacy, acculturation, and other variables. Qualitative data can serve to enrich and validate the quantitative findings by providing a human dimension to statistical relationships, helping to interpret unexpected quantitative results, and adding depth and credibility to the overall research outcomes. Mixed methodologies allow for a contextual understanding that goes beyond

statistical associations, and the qualitative part can offer richer insights into the experiences and perspectives of immigrant students, providing a more holistic view of the factors influencing immigrant or minority student mathematics performance.

6.1.6.2 Longitudinal Studies

Also, future research can extend its horizons by adopting longitudinal exploration, capturing the evolving dynamics over time. By collecting data at multiple points throughout the years, researchers gain the ability to scrutinize and unravel the intricate ways in which variables and factors undergo transformation and interaction over extended periods. This approach fosters a more dynamic understanding of the phenomenon under investigation. Longitudinal studies also allow for tracking individual differences in trajectories of self-efficacy, acculturation, and academic performance across time. This personalized perspective can offer valuable insights into the diverse experiences of immigrant students with various backgrounds, shedding light on the factors contributing to varying trajectories. Such nuanced understandings are instrumental in creating interventions and constructing support systems to meet the unique needs of different student populations.

6.1.6.3 Exploring Mechanisms

Moreover, the research results suggested that not all sources of self-efficacy and dimensions of acculturation are equally important in predicting immigrant students' mathematics performance. While some factors positively correlated with assessment scores and course grades, some had negative associations, and others did not show a significant relationship. Although the current dissertation study provided explanations as to why the factors had different degrees and

directions of correlations and why some factors were more dominant than others, there might be other underlying reasons regarding the different degrees and directions of the relationships and the reasons why some sources of self-efficacy and dimensions of acculturation were more strongly related to mathematics than others in this context. In order to gain a better and more complete understanding of the underlying reasons, future research should aim to investigate and explore the underlying mechanisms further in-depth behind these relationships.

6.1.6.4 Exploring Contextual Factors

Furthermore, future research should consider the circumstances under which the sources of self-efficacy and dimensions of acculturation may have an influence on immigrant students' mathematics performance. As previously mentioned, it is possible that the relationship between these factors may vary depending on a range of different individual and contextual factors. It is necessary to further investigate the specific situations and conditions in which the predictor variables may impact the mathematics performance of immigrant students. Understanding the circumstances and contexts under which these factors are also crucial so researchers and educators can better tailor interventions and support systems to meet the specific needs of immigrants.

6.1.6.5 Exploring Other Factors

Additionally, future studies need to consider examining other factors that may influence immigrant students' mathematics performance beyond the variables studied. While the study focused on the four sources of self-efficacy, six dimensions of acculturation, and some potential moderating variables, it is possible that other variables or factors that could significantly

influence academic performance that were not included in the study, such as student learning agency (Mäkitalo, 2016), access to educational resources (Olayinka, 2016), or teacher quality (Rivera Rodas, 2019). For instance, research showed that the quality of teachers plays a vital role in foreseeing students' academic achievements (Darling-Hammond, 2000; Rivera Rodas, 2019). Different aspects of teacher quality, such as experience, pedagogical skills, and instructional practices, may also significantly influence the academic performance of immigrant students in mathematics. Also, both student learning agency and access to educational resources may significantly impact students' learning outcomes. When students are empowered to take an active role in their own learning and have access to high-quality educational resources, they may be more likely to achieve positive learning outcomes as well (Mäkitalo, 2016; Olayinka, 2016). Future research should aim to provide a more comprehensive understanding of the various factors that impact immigrant students' learning in mathematics.

6.1.7 Practical Implications

The study's findings implied numerous practical implications, providing actionable insights for educators, administrators, policymakers, parents, and all stakeholders. These implications aimed to guide the creation of an inclusive learning environment for immigrant students, effectively addressing a variety of challenges and fostering academic success.

6.1.7.1 Prioritizing Mastery Learning & Verbal Persuasion

First, educators must prioritize the *mastery learning experience* and *verbal persuasion* sources of self-efficacy, which significantly influence the math performance of immigrant students. The study revealed a significant correlation between the *mastery experience* and the

course performance of immigrant students. Thus, it is crucial for educators to design their teaching approaches in a way that fosters the development of students' confidence and self-efficacy in learning mathematics. One potential strategy is to scaffold the concepts and skills required to help learners develop mathematical thinking and grasp mathematical concepts (Lei et al., 2020). This involves breaking down complex topics into manageable sections using teaching tools or technologies and providing guidance and support as students work through each stage (Khali, 2019). By gradually building students' knowledge and skills, educators can help them to believe in their capabilities and increase their confidence in their ability to succeed in mathematics. In addition, teachers can utilize a variety of instructional approaches, such as student-centered teaching, problem-based learning, and collaborative learning (Gezim & Xhomara, 2020), to enhance students' self-efficacy in math and perform well in class. By doing so, teachers can create a supportive learning environment that encourages students to take risks gradually, persist through challenges, and ultimately achieve their academic goals.

Also, according to this study, *verbal persuasion* is the sole source of self-efficacy that demonstrated a significant correlation with state assessment scores. This result highlighted the importance for educators to acknowledge the influence of *verbal persuasion* on immigrant students' mathematics self-efficacy and utilize it to improve their performance on standardized tests. For example, educators can build students' confidence and increase their self-efficacy in mathematics by providing positive feedback and encouragement throughout the course of learning, especially prior to standardized testing. By highlighting students' strengths and acknowledging their efforts, teachers can instill a sense of pride and accomplishment in students, which can motivate them to continue to strive for success on the tests. Similarly, providing a variety of positive reinforcement and incentives, such as rewarding students for their progress

and achievements, can also be a powerful tool to reinforce desirable learning outcomes and increase self-efficacy (Metzler et al., 2001). Besides that, educators can use positive language that promotes a growth mindset and emphasizes the idea that intelligence and abilities can be developed through hard work and perseverance (Truax, 2018). By encouraging students to embrace challenges and view mistakes as opportunities for growth, teachers can help to cultivate a positive learning environment that supports students' self-efficacy and mathematics learning.

6.1.7.2 Culturally Relevance & Responsive Teaching

Secondly, educators should strive to recognize and value the home cultural backgrounds, identities, and languages of immigrant students, as these factors can significantly influence their standardized assessment scores. Educators should develop and implement culturally relevant and responsive teaching practices that incorporate students' *home cultural identity* and *home country language* in the classroom. For instance, teachers can use teaching materials and examples that reflect the students' cultural identity and experiences. They can also provide opportunities for students to use their home language in the classroom, such as through bilingual instruction or by allowing students to use their *home country language* to explain mathematical concepts (Cummins, 2005). By acknowledging and valuing immigrant students' *home cultural identities* and *home country languages*, educators can help these students feel more connected and engaged in the learning process, which can lead to improved academic performance. Creating a culturally responsive learning environment is crucial in fostering a sense of belonging for immigrant students, which can have a positive impact on their academic performance on standardized assessments.

6.1.7.3 Addressing Acculturation Stress & Issues

Also, the negative correlation between *host cultural identity* and academic performance suggests that educators should be aware of the potential challenges faced by immigrant students in adapting to a new culture, specifically acculturation stress and identity issues. Students from immigrant families may struggle to reconcile their own home cultural values, beliefs, and identity with those of the host country, which could lead to feelings of disorientation and anxiety that can interfere with their ability to learn (Sayad, 2018). Particularly if they are not given proper support and resources to help them navigate and negotiate their new identity in the host country. Thus, it is crucial for educators to be aware of the potential cultural or identity clashes that may occur in the classroom and to create appropriate support for students as they navigate their transition into a new cultural environment and negotiate their identity.

6.1.7.4 Mitigating Cultural Bias

Additionally, the significant negative correlations between *home cultural competence* with assessment scores and course grades suggested that the current state standardized assessments, curriculum, and course materials are culturally biased. Standardized assessments were created from the dominant cultural perspective and might not be culturally relevant or responsive to the experiences and backgrounds of immigrant students from diverse cultural backgrounds (Rattani, 2016; Reynolds et al., 2021). Also, the curriculum came under criticism for its inherent bias towards a dominant cultural viewpoint, neglecting to incorporate the diverse cultural viewpoints and knowledge of students from various backgrounds (Ladson-Billings, 2008). Thus, the practical implication for educators is to recognize and address potential cultural biases in the curriculum, course materials, and teaching practices. Educators should work toward

incorporating culturally relevant materials and perspectives into their teaching to better engage and support diverse student populations. The findings also highlighted the necessity for revisions in standardized testing. The state test creators must collaborate with classroom teachers to develop culturally relevant and responsive testing materials that accurately reflect the diverse cultural backgrounds and experiences of students. This requires careful consideration of the prominent cultural components that may impact students' performance on the assessments. Test graders should also approach the grading process with caution and mindfulness, recognizing the potential for cultural biases and the impact they may have on test scores. Educators, test creators, and administrators must work collaboratively to create a fair, inclusive, and equitable assessment system that accounts for the factors and promotes learning.

6.1.7.5 Gender Considerations

Moreover, educators should recognize the potential differences in academic performance in class between male and female students and try to create an inclusive learning environment that encourages all students to engage, participate, and ask questions, regardless of gender. Educators must provide additional support and resources to male students to help them participate more and actively engage in learning in class and complete their coursework. Other research also showed that female students tend to exhibit more positive attitudes towards participating in class, completing classwork and homework, asking questions, and seeking help from teachers when needed (Kobayashi, 2002). While female students may excel in participation and coursework completion, they may not retain the knowledge and concepts to perform well on assessments, which are more focused on objective measures of knowledge and skills. It is also essential to recognize that standardized assessments may not always be an accurate reflection of

a student's learning and academic achievement. Important decisions should not solely rely on standardized assessments. Educators and policy makers should take a balanced approach to evaluate student performance, taking into account both class participation, course completion, as well as formative assessment performances.

6.1.7.6 Support for Different Grade Levels

Also, the study showed that 10th graders tend to have lower course grades compared to students in higher grade levels, which might be because 10th graders are typically not as motivated as students in higher grade levels to perform well in their courses. A study also revealed that as students' grade levels decrease, their levels of acculturative stress increase, which is associated with lower academic performance and decreased quality of life in the host country (Su et al., 2021). Educators should take this into consideration and provide additional support and intervention to improve their learning in class. For example, educators may explore opportunities for students to graduate earlier than their peers through accelerated learning programs. This may motivate students to engage in learning and perform well in their courses in earlier years of high school, thus achieving academic success. On the other hand, the study indicated that 12th graders had significantly lower assessment scores than the other grade levels. The students who took the assessments in 12th grade were the ones who previously failed the assessments in 10th or 11th grade. It implied that these students might not receive the necessary support and intervention needed to improve and enhance their academic performance. In light of this, educators must provide additional support and proper intervention to help students who failed the 10th or 11th grade assessments. The interventions may include personalized academic counseling, extra tutoring, and tailored learning plans to address individual student needs

(Bulger, 2016). This also emphasized the importance of early intervention and support, which is critical to ensure that immigrant students are successful throughout their high school years. Research also indicated that students who receive support and intervention in the early stage of their high school years are more likely to succeed academically and graduate on time (Rumberger, 2012). For many immigrant students, in particular, early intervention and support can be essential in helping them navigate the challenges of adapting to a new cultural environment and education system. By providing early intervention, support, services, and targeted resources, educators can help these students overcome the different challenges they face and thrive in their new academic setting.

6.1.7.7 Support for Late Arrivals

Additionally, schools and educators should take into account the age at which immigrant students arrive in the United States and the critical period for language acquisition when designing programs and interventions to support their learning. The findings showed that immigrant students who arrive later in the United States tend to have lower assessment scores, highlighting the necessity for targeted interventions and support for these students. The interventions may include language development programs, cultural competency training for teachers, and providing academic and social-emotional support to help these students navigate the challenges of acculturation and adjustment to a new educational system (Elizalde-Utnick, 2010). The findings also suggested that policymakers should be aware of the diverse experiences and backgrounds of immigrant students and adjust the testing policies accordingly. Instead of creating one test that fits all, they should highlight the value of multiculturalism and multilingualism while assessing them. Government officials and policymakers also need to

develop policies for schools to provide opportunities for students with diverse backgrounds to maintain and celebrate their native cultures and experiences. Moreover, parents and guardians of immigrant families should also be mindful of the age at which their children arrive in the United States, as the age at which immigrant children arrive can have a significant impact on their academic and social outcomes (Rumbaut, 2004). Children who come to the U.S. at a younger age have an easier time adapting to their new environment, have better cognitive functions, and perform better later in assessments (Meyer et al., 2023).

6.1.7.8 Encouraging Parental Involvement

Furthermore, educators and policymakers should recognize the important role that parental education plays in the academic success of immigrant students or students with immigrant backgrounds. Strategies involving parental engagement and support, such as workshops and mentoring programs, should be implemented to equip parents with the tools and knowledge necessary to support their children's academic achievement (Gonzalez et al., 2018). Also, educators and policymakers should consider the cultural and linguistic barriers that may prevent immigrant parents from engaging with their children's education. For example, schools can provide language support and translation services to ensure that parents who may not speak English as their first language can still participate in school activities and support their children's academic progress. By providing parents with necessary support and knowledge, parents and guardians can play a more active role in their children's education and, in turn, improve their academic performance. Moreover, schools and districts can also provide additional resources and support for students whose parents have lower levels of education, including creating peer-assistant groups, after-school tutoring, mentorship, and access to enrichment programs (Vickers

et al., 2017). These initiatives can help level the playing field for students who face unique obstacles in their education and provide them with the support they need to succeed.

6.1.7.9 Class Size Considerations

Lastly, schools, parents, and educators may also want to be aware of the potential marginal moderation effects of class size on student academic learning and performance. Smaller class sizes benefit students in terms of test and standardized assessment preparation because they receive more individual attention and support from their teachers. Teachers may be able to provide more personalized instruction and feedback (Blatchford et al., 2007), which can help students improve their test-taking skills and perform better on assessments. On the other hand, median class size may allow for more peer collaboration, as students can work together in groups and share their knowledge and ideas, which can help students develop essential cognitive thinking, teamwork, collaboration, and communication skills (Fawcett & Garton, 2005), which are valuable for learning and academic success. The findings encourage school leaders and administrators to consider reducing class sizes for particular subjects or for students who struggle with test-taking while maintaining a median class size for other subjects that require more peer collaboration and group work. By being aware of the potential marginal moderation effects of class size on student academic learning and performance, classroom teachers and educators can make informed decisions when designing lesson plans and allocating resources to create an optimal learning environment for their students. Additionally, parents can use this knowledge to make informed decisions when selecting schools for their children.

6.2 Limitations

In pursuing academic rigor and empirical inquiry, it is imperative to recognize the inherent limitations of the research study. While this dissertation was grounded in established theories and employed a robust quantitative framework, it remained essential to conscientiously address and elucidate the limitations inherent in the research study. This acknowledgment served not only as an exercise in scholarly transparency but also as a testament to the nuanced complexities and contextual boundaries that influence the interpretation and applicability of the study's findings.

6.2.1 Generalizability

The findings were limited to certain groups of students since the study was conducted from one urban high school in the northeastern area of the United States within a specific period of time. The results might not be generalized to other settings or populations without caution. In this particular study, the participants were 324 urban high school 9th through 12th-grade students who took the state assessments or a high school math course between 2022 and 2023 in the northeastern area of the United States. Every high school has unique demographics and cultures, and the study focused only on high school students and did not include elementary and middle school or college students. The results of the study might not be generalizable to other age groups or other high schools in different regions or countries (Stuart et al., 2015). The findings might also only be applicable to the particular demographic characteristics of the students in the study, such as immigrant students or minority immigrant students with immigrant backgrounds, etc.

Also, the data for this study were collected between 2022 and 2023, and it might not necessarily be generalizable in another time period due to changes in educational policies, curriculum, assessment, or student demographics. As new information and developments emerged after the study's data collection period, the study's results could become outdated or inaccurate. It is crucial to consider the temporal context and recognize that educational landscapes are dynamic and subject to evolution and reform.

6.2.2 Sample Size

Also, it's essential to note the limitation concerning the sample size. While quantitative research often involves substantial sample sizes, this study involved a relatively modest sample of 324 urban high school students. The smaller sample size might heighten sensitivity to outliers and decrease statistical power, which increases the risk of Type II errors and reduces the validity and reliability of the findings (Bishara & Hittner, 2015). However, as previously mentioned, the self-efficacy and acculturation survey instruments had undergone rigorous development phases and demonstrated validity and reliability. Thus, despite the limitation of a smaller sample size, the measurement tools used in the study were already established, providing confidence in the accuracy and validity within the given context.

6.2.3 Reliance on Self-Reported Data

Moreover, the study relied on self-reported data from participants, which was subject to the honesty of respondents and their ability to provide thoughtful and accurate answers about their opinions and self-perceptions. The responses to each individual survey question were self-reported responses submitted by the participants. Bias might arise due to various factors, such as

social desirability, where participants might provide answers that they believe were socially acceptable or desirable rather than accurate. The participants could also have difficulty accurately recalling past events or experiences and provide inaccurate information or biased responses based on their own beliefs or perceptions of their academic abilities or their cultural background.

6.2.4 Correlational Research Design

Additionally, another limitation of this research study was related to the inherent nature of the quantitative statistical analysis performed. The study utilized a correlational research design, specifically through multiple regression analysis, to investigate the relationship between variables and the extent of that relationship. However, correlational research cannot establish causality (Curtis et al., 2016), which means that while the study identified relationships between variables, it could not determine whether one variable caused another. In the context of this research study, while the results suggested there are significant relationships between some sources of self-efficacy and components of acculturation, with moderating variables such as the age of arrival and parental education affecting student academic performance, the study could not determine whether one variable caused another. For example, the study found that the more *verbal persuasion* the students believed they received, the higher the assessment scores they obtained, but it did not determine whether the higher the assessment scores were caused by *verbal persuasion* from others.

6.2.5 Academic Performance Indicators

Furthermore, the study utilized standardized tests and course grades as academic performance indicators to measure immigrant students' mathematics performance, which might contain biases and did not capture the full range of performance or learning outcomes of the participants. One potential bias was cultural bias in standardized tests. Standardized assessments were developed and normed based on the performance of a specific population, which could not be representative of the cultural and linguistic diversity of immigrant students (Rattani, 2016; Reynolds et al., 2021; Valencia, 2010). Thus, they might not accurately measure the mathematics skills and knowledge of immigrant students, who might have different cultural and linguistic knowledge backgrounds. Another potential bias was grading bias in course grades as they were subjective measures that could be influenced by factors other than students' mathematics performance, such as teacher expectations, grading criteria, effort, and student behavior and attitude (Protivínský & Münich, 2018). Teachers might also unconsciously favor or disfavor certain students based on their appearance, race, ethnicity, or socioeconomic status, which could affect their grades (Dee & Gershenson, 2017). Moreover, standardized assessments and course grades might not capture the full range of learning outcomes that were important for immigrant students' mathematics performance, such as rate of growth or improvement, problem-solving skills, critical thinking, and creativity, as these elements were not measured in the context of this dissertation study.

6.2.6 Scope of Variables

Lastly, the study focused on the four sources of self-efficacy, six dimensions of acculturation, and some potential moderating variables, but there might be other factors that

influence immigrant students' mathematics performance that were not included in the study. For example, the study did not include variables related to teacher quality, which were found to potentially be an important predictor of academic achievement in urban schools (Rivera Rodas, 2019; Simon & Johnson, 2015). A study by Simon and Johnson (2015) indicated that high-poverty urban schools often have a high teacher turnover rate, which can potentially impact student learning. Also, student learning agency might play a crucial role in learning since some research showed students who have a high level of learning agency are more motivated and engaged in their studies, leading to better academic outcomes (Mäkitalo, 2016). Additionally, access to educational resources, such as technologies, textbooks, and academic support services, might play a significant role in student learning, particularly for students from disadvantaged backgrounds with limited access to these resources (Olayinka, 2016). However, the current study did not include variables related to learning agency, educational resources, and teacher quality, which limited the scope of the findings. Future research should take into account other factors that may play a role in determining academic achievement, as previously mentioned, to ensure a more comprehensive understanding of the topic.

6.3 Conclusions

U.S. urban high school students are underperforming in mathematics compared to their peers in other regions. As such, the purpose of this quantitative correlational study was to examine whether and to what extent the relationships between each of the four sources of self-efficacy, six dimensions of acculturation, some demographic moderating variables, and the mathematics performance using two separate indicators. The theoretical framework of the study

was built upon Bandura's four sources of self-efficacy (1977) and Zea and colleagues' acculturation (2003).

Numerous studies indicated that the four sources of self-efficacy have a significant impact on students' academic performances in various subjects (Hendricks, 2016; Loo & Choy, 2013; Webb-Williams, 2018), including mathematics (Awofala, 2023; Hall & Ponton, 2005; Zientek et al., 2019). In the present dissertation study, it was discovered that only two out of four sources of self-efficacy, *mastery experience* and *verbal persuasion*, were found to be statistically significant factors that impact the academic performance of immigrant high school students in the urban high school of the northeastern area of the United States. The study revealed that a higher *mastery experience* was correlated with higher course grades, and more positive *verbal persuasion* was correlated with higher state assessment scores. Although this finding was not unexpected, it highlighted the importance of these two sources of self-efficacy for improving and enhancing academic performance among immigrant high school students.

Among the six dimensions of acculturation, four of them showed significant correlations with immigrant students' mathematics performance on state standardized assessments, and one out of six showed significant correlation with course grades. *Home cultural identity* and *home country language* were positively correlated with state assessment scores, while *host cultural identity* and *home cultural competence* were negatively correlated. *Host country language* also showed a marginally significant positive correlation with academic achievement, but it might not be one of the determining factors affecting academic performance. The findings suggested that educators should strive to recognize and value the home cultural backgrounds, identities, and languages of immigrant students and implement culturally relevant and responsive teaching practices in the classroom. Also, educators should be aware of the potential challenges faced by

immigrant students in adapting to a new culture and create appropriate support for students as they navigate their transition into a new cultural environment and negotiate their identity. The study also implied potential cultural in standardized assessments due to negative correlations between *home cultural competence* and assessment scores.

Additionally, the findings revealed some moderating variables, such as gender, grade level, age at arrival to the U.S., parental education, are significantly influencing academic performance. Creating an inclusive learning environment with appropriate interventions that recognize and addresses the potential differences in academic performance among different grade levels, gender, as well as students who arrive in the U.S. at different ages is crucial for ensuring academic success. Also, parental education and engagement played a critical role in the academic success of immigrant students, and schools and districts should provide additional resources and support to help parents support their children's academic achievement. It is also important to recognize that either standardized assessments or course grades may not always be an accurate reflection of a student's learning and academic achievement, and educators and policymakers should take a balanced approach to evaluate student performance, taking into account both class participation, work completion, improvement rate, critical thinking skills, creativities, as well as formative assessment performances. With early intervention, support, services, and targeted resources, educators and policymakers can help immigrant students overcome the challenges they face and thrive in their new academic setting, regardless of their age or the age at which they arrived in the United States.

In conclusion, it is the hope that the findings of this research study do not only show the importance of the above-mentioned prominent factors regarding immigrant students' mathematics performance but that schools with a substantial population of immigrant students in

the urban area work toward educating their teachers, parents, and administrators on how to increase overall student self-efficacy and create a culturally relevant and responsive learning environment with the goal of improving academic learning. Finally, with the best interest of every individual student in mind, educators, parents, test creators, graders, administrators, policymakers, and other stakeholders are encouraged to work collaboratively to create a fair, inclusive, and equitable assessment system that accounts for the dominant factors and promotes learning—ultimately fostering better self-efficacy in learning mathematics and senses of belonging for immigrant students, which can lead to improved academic performance on standardized assessments and mathematics courses and beyond.

References

- “RSD Budget Information / 2021-22 Budget Information.” *Reading School District 2021-22 BUDGET INFORMATION*, 2002-2021 Blackboard, Inc., 23 June 2021, www.readingsd.org/budget.
- Adera, B., & Manning, M. L. (2013). Promoting social and cultural competence for students from diverse backgrounds with disabilities. *Multicultural Learning and Teaching*, 9(1), 67-82.
- Adeyemo, D. A. (2005). Parental involvement, interest in schooling and school environment as predictors of academic self-efficacy among fresh secondary school students in Oyo State, Nigeria.
- Aizer, A. (2009). 9. *Neighborhood Violence and Urban Youth* (pp. 275-308). University of Chicago Press.
- Akhtar, Z., & Niazi, H. K. (2011). The relationship between socio-economic status and learning achievement of students at secondary level. *International Journal of Academic Research*, 3(2), 956-961.
- Bartlett, L., & García, O. (2011). Additive schooling in subtractive times. *Dominican immigrant youth in the*.
- Akturk, A. O., & Ozturk, H. S. (2019). Teachers' TPACK Levels and Students' Self-Efficacy as Predictors of Students' Academic Achievement. *International Journal of Research in Education and Science*, 5(1), 283-294.
- AlJaser, A. M. (2017). Effectiveness of Using Flipped Classroom Strategy in Academic Achievement and Self-Efficacy among Education Students of Princess Nourah Bint Abdulrahman University. *English Language Teaching*, 10(4), 67-77.

- Altugan, A. S. (2015). The relationship between cultural identity and learning. *Procedia-Social and Behavioral Sciences*, 186, 1159-1162.
- An, S., Kulm, G., & Wu, Z. (2004). The pedagogical content knowledge of middle school, mathematics teachers in China and the US. *Journal of mathematics teacher education*, 7(2), 145-172.
- Anand, V. (2007). A study of time management: The correlation between video game usage and academic performance markers. *CyberPsychology & Behavior*, 10(4), 552-559.
- Areba, E. M., Watts, A. W., Larson, N., Eisenberg, M. E., & Neumark-Sztainer, D. (2021). Acculturation and ethnic group differences in well-being among Somali, Latino, and Hmong adolescents. *American Journal of Orthopsychiatry*, 91(1), 109.
- Andrade, M. (2018). *The Roles of Academic and Bicultural Self-Efficacy on Academic Achievement among Hispanic Students*. California State University, Fresno.
- Ansong, D., Eisensmith, S. R., Okumu, M., & Chowa, G. A. (2019). The importance of self-efficacy and educational aspirations for academic achievement in resource-limited countries: Evidence from Ghana. *Journal of adolescence*, 70, 13-23.
- Ardura, D., & Galán, A. (2019). The interplay of learning approaches and self-efficacy in secondary school students' academic achievement in science. *International Journal of Science Education*, 41(13), 1723-1743.
- Areba, E. M., Watts, A. W., Larson, N., Eisenberg, M. E., & Neumark-Sztainer, D. (2021). Acculturation and ethnic group differences in well-being among Somali, Latino, and Hmong adolescents. *American Journal of Orthopsychiatry*, 91(1), 109.
- Arnold, K. R. (2011). *Anti-immigration in the United States: AR* (Vol. 1). ABC-CLIO.

- Arslan, A. (2012). Predictive Power of the Sources of Primary School Students' Self-Efficacy Beliefs on Their Self-Efficacy Beliefs for Learning and Performance. *Educational Sciences: Theory and Practice*, 12(3), 1915-1920.
- Ashcraft, M. H. (2002). Math anxiety: Personal, educational, and cognitive consequences. *Current Directions in Psychological Science*, 11, 181–185.
- Assari, S., Mardani, A., Maleki, M., Boyce, S., & Bazargan, M. (2021). Black-White Achievement Gap: Role of Race, School Urbanity, and Parental Education. *Pediatric Health, Medicine and Therapeutics*, 12, 1.
- Au, W. (2020). Testing for whiteness? How high-stakes, standardized tests promote racism, undercut diversity, and undermine multicultural education. In *Visioning Multicultural Education* (pp. 99-113). Routledge.
- Awofala, A. O. A. (2023). Examining Sources of Mathematics Self-Efficacy Beliefs of Senior Secondary School Students. *ASEAN Journal of Science and Engineering Education*, 3(3), 229-244.
- Bailey, Martha J., and Susan M. Dynarski. 2011. “Inequality in Postsecondary Education.” Pp. 117–32 in *Whither Opportunity? Rising Inequality, Schools, and Children’s Life Chances*, edited by G. J.
- Baird, K. (2012). Class in the classroom: The relationship between school resources and math performance among low socioeconomic status students in 19 rich countries. *Education Economics*, 20(5), 484-509.
- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, 84(2), 191.

- Bandura, A. (1978). The self system in reciprocal determinism. *American psychologist*, 33(4), 344.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American psychologist*, 37(2), 122.
- Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, 1986(23-28).
- Bandura, A. (1989). Human agency in social cognitive theory. *American psychologist*, 44(9), 1175.
- Bandura, A. (1989). Human agency in social cognitive theory. *American psychologist*, 44(9), 1175.
- Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Developmental psychology*, 25(5), 729.
- Bandura, A. (1998). Exercise of agency in personal and social change. *Behavior and cognitive therapy today*, 1-29.
- Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian journal of social psychology*, 2(1), 21-41.
- Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current directions in psychological science*, 9(3), 75-78.
- Bandura, A. (2000). Self-efficacy: The foundation of agency. *Control of human behavior, mental processes, and consciousness: Essays in honor of the 60th birthday of August Flammer*, 16.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, 52(1), 1-26.

- Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents*, 5(1), 307-337.
- Bandura, A., & Wessels, S. (1994). Self-efficacy.
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child development*, 72(1), 187-206.
- Barroso, C., Ganley, C. M., McGraw, A. L., Geer, E. A., Hart, S. A., & Daucourt, M. C. (2021). A meta-analysis of the relation between math anxiety and math achievement. *Psychological Bulletin*, 147(2), 134.
- Bartlett, L., & García, O. (2011). Additive schooling in subtractive times. *Dominican immigrant youth in the*.
- Bartsch, R. A., Case, K. A., & Meerman, H. (2012). Increasing academic self-efficacy in statistics with a live vicarious experience presentation. *Teaching of Psychology*, 39(2), 133-136.
- Bausch, S., Michel, A., & Sonntag, K. (2014). How gender influences the effect of age on self-efficacy and training success. *International Journal of Training and Development*, 18(3), 171-187.
- Behind, N. C. L. (2002). No child left behind act. *Washington, DC: US Department of Education*.
- Berg, P., Palmgren, O., & Tyrefors, B. (2020). Gender grading bias in junior high school mathematics. *Applied Economics Letters*, 27(11), 915-919.
- Berry, J. W., & Sam, D. L. (1997). Acculturation and adaptation. *Handbook of cross-cultural psychology*, 3(2), 291-326.

- Bingenheimer, J. B., Brennan, R. T., & Earls, F. J. (2005). Firearm violence exposure and serious violent behavior. *Science*, 308(5726), 1323-1326.
- Bishara, A. J., & Hittner, J. B. (2015). Reducing Bias and Error in the Correlation Coefficient Due to Nonnormality. *Educational and Psychological Measurement*, 75(5), 785-804.
<https://doi.org/10.1177/0013164414557639>
- Blackman, J., & Wasserman, H. M. (2016). This article examines the significance of the United States Supreme Court decisions in *Meyer v. Nebraska* and *Pierce v. Society of the Sisters* under the backdrop of shifting views on what constitutes appropriate state regulation of education. On its face, the question of how a state may regulate education may not seem so controversial. However, the idea that. *HASTINGS CONSTITUTIONAL LAW QUARTERLY*, 43(2).
- Blatchford, P., Russell, A., Bassett, P., Brown, P., & Martin, C. (2007). The effect of class size on the teaching of pupils aged 7–11 years. *School effectiveness and school improvement*, 18(2), 147-172.
- Blazar, D. (2021). Teachers of Color, Culturally Responsive Teaching, and Student Outcomes: Experimental Evidence from the Random Assignment of Teachers to Classes. EdWorkingPaper No. 21-501. *Annenberg Institute for School Reform at Brown University*.
- Bloomfield, J., & Fisher, M. J. (2019). Quantitative research design. *Journal of the Australasian Rehabilitation Nurses Association*, 22(2), 27-30.
- Bowers, A. J., & Urick, A. (2011). Does high school facility quality affect student achievement? A two-level hierarchical linear model. *Journal of Education Finance*, 72-94.

- Brace, A. L. (2011). Cultural competence and its impact on student academic achievement in urban elementary schools.
- Bratsberg, B., Barth, E., & Raaum, O. (2006). Local unemployment and the relative wages of immigrants: Evidence from the current population surveys. *The Review of Economics and Statistics*, 88(2), 243-263.
- Brodin, J., & Renblad, K. (2020). Improvement of preschool children's speech and language skills. *Early child development and care*, 190(14), 2205-2213.
- Broomes, O. P. (2013). More than a New Country: Effects of Immigration and Home Language on Elementary Students' Academic Achievement over Time. *Education Policy Analysis Archives*, 21(48), n48.
- Buchmann, C., & Parrado, E. A. (2006). Educational achievement of immigrant-origin and native students: A comparative analysis informed by institutional theory. In *The impact of comparative education research on institutional theory*. Emerald Group Publishing Limited.
- Buchmann, C., Condrón, D. J., & Roscigno, V. J. (2010). Shadow education, American style: Test preparation, the SAT and college enrollment. *Social forces*, 89(2), 435-461.
- Buckley, J., Schneider, M., & Shang, Y. (2004). The Effects of School Facility Quality on Teacher Retention in Urban School Districts. *National Clearinghouse for Educational Facilities*.
- Budiman, A., Tamir, C., Mora, L., & Noe-Bustamante, L. (2020). *Immigrants in America: KEY charts and facts*. Pew Research Center's Hispanic Trends Project. <https://www.pewresearch.org/hispanic/2020/08/20/facts-on-u-s-immigrants/>.

- Bulger, M. (2016). Personalized learning: The conversations we're not having. *Data and Society*, 22(1), 1-29.
- Burdick-Will, J. (2018). Neighborhood violence, peer effects, and academic achievement in Chicago. *Sociology of education*, 91(3), 205-223.
- Burkholder, Z. (2011). *Color in the classroom: How American schools taught race, 1900-1954*. Oxford University Press.
- Byrd, C. M., & Chavous, T. M. (2009). Racial identity and academic achievement in the neighborhood context: A multilevel analysis. *Journal of Youth and Adolescence*, 38, 544-559.
- Caffarella, R. S. (2010). Viewing Cultural Barriers as Opportunities to Enhance Learning: An International Perspective.
- Camarota, S. A., Griffith, B., & Zeigler, K. (2017). *Mapping immigration's impact on public schools*. Washington, DC: Center for Immigration Studies.
- Capa-Aydin, Y., Uzuntiryaki-Kondakci, E., & Ceylandag, R. (2018). The relationship between vicarious experience, social persuasion, physiological state, and chemistry self-efficacy: The role of mastery experience as a mediator. *Psychology in the Schools*, 55(10), 1224-1238.
- Carhill, A., Suárez-Orozco, C., & Páez, M. (2008). Explaining English language proficiency among adolescent immigrant students. *American Educational Research Journal*, 45(4), 1155-1179.
- Casali, N., Feraco, T., Ghisi, M., & Meneghetti, C. (2021). "Andrà tutto bene": Associations between character strengths, psychological distress and self-efficacy during Covid-19 lockdown. *Journal of Happiness Studies*, 22(5), 2255-2274.

- Chapa, J., & De La Rosa, B. (2006). The problematic pipeline: Demographic trends and Latino participation in graduate science, technology, engineering, and mathematics programs. *Journal of Hispanic Higher Education*, 5(3), 203-221.
- Chapman-Hilliard, C., Beasley, S. T., McClain, S., Cokley, K. O., Nioplias, A., & Taylor, D. S. (2016). Do culturally empowering courses matter? An exploratory examination of cultural identity and academic motivation among Black collegians. *Journal of Pan African Studies*, 9(8), 43-63.
- Chavez, E. L., Edwards, R., & Oetting, E. R. (1989). Mexican American and white American school dropouts' drug use, health status, and involvement in violence. *Public Health Reports*, 104(6), 594.
- Chen, Y. F., & Peng, S. S. (2008). University students' Internet use and its relationships with academic performance, interpersonal relationships, psychosocial adjustment, and self-evaluation. *CyberPsychology & Behavior*, 11(4), 467-469.
- Cheng, M. T., Lin, Y. W., & She, H. C. (2015). Learning through playing Virtual Age: Exploring the interactions among student concept learning, gaming performance, in-game behaviors, and the use of in-game characters. *Computers & Education*, 86, 18-29.
- Cheng, Y. Y. (2020). Academic self-efficacy and assessment. *Educational Psychology*, 40(4), 389-391.
- Chevalier, A. (2004). Parental education and child's education: A natural experiment. *Available at SSRN 553922*.
- Chiu, J., Economos, J., Markson, C., Raicovi, V., Howell, C., Morote, E. S., & Inserra, A. (2016). Which matters most? Perceptions of family income or parental education on academic achievement. *New York Journal of Student Affairs*, 16(2), 3.

- Chu, H., & Brown, C. S. (2017). Stereotype threat among Latino school age children. *International Journal of Social Science and Humanity*, 7(5), 278-281.
- Chu, L. L. (2003). The effects of web page design instruction on computer self-efficacy of preservice teachers and correlates. *Journal of Educational Computing Research*, 28(2), 127-142.
- Chyung, S. Y. Y. (2007). Age and gender differences in online behavior, self-efficacy, and academic performance. *Quarterly Review of Distance Education*, 8(3), 213.
- Clark, D., & Martorell, P. (2014). The signaling value of a high school diploma. *Journal of Political Economy*, 122(2), 282-318.
- Clark, J. S. (2012). Notions of Citizenship: Discussing Race in the Shortridge High School Senate, 1900–1928. In *Histories of social studies and race* (pp. 79-97). Palgrave Macmillan, New York.
- Claxton, G. (2013). *What's the point of school?: Rediscovering the heart of education*. Simon and Schuster.
- Collier, V. P. (1995). Acquiring a second language for school. *Directions in language and education*, 1(4), n4.
- Conn, V. S. (1998). Older adults and exercise: Path analysis of self-efficacy related constructs. *Nursing research*, 47(3), 180-189.
- Creswell, J. W. (2020). *Educational Research*. Pearson Education, Limited.
- Cruz, B. C. (2002). Don Juan and rebels under palm trees: Depictions of Latin Americans in US history textbooks. *Critique of Anthropology*, 22(3), 323-342.

- Cummins, J. (1991). Language development and academic learning. In L. M. Malavé & G. Duquette (Eds.), *Language, culture, & cognition* (pp. 161–175). Clevedon, UK: Multilingual Matters.
- Cummins, J. (2000). *Language, power, & pedagogy*. Clevedon, UK: Multilingual Matters.
- Cummins, J. (2005). A proposal for action: Strategies for recognizing heritage language competence as a learning resource within the mainstream classroom. *Modern Language Journal*, 585-592.
- Cummins, J. (2021). 4 Language Proficiency and Academic Achievement. In *Rethinking the Education of Multilingual Learners* (pp. 37-59). Multilingual Matters.
- Curtis, E. A., Comiskey, C., & Dempsey, O. (2016). Importance and use of correlational research. *Nurse researcher*, 23(6).
- Darling-Hammond, L. (2000). Teacher quality and student achievement. *Education policy analysis archives*, 8, 1-1.
- Darling-Hammond, L. (2015). *The flat world and education: How America's commitment to equity will determine our future*. Teachers College Press.
- Davis-Kean, P. E. (2005). The influence of parent education and family income on child achievement: the indirect role of parental expectations and the home environment. *Journal of family psychology*, 19(2), 294.
- de Fátima Goulão, M. (2014). The Relationship between Self-Efficacy and Academic Achievement in Adults' Learners. *Athens journal of Education*, 1(3), 237-246.
- de Mamani, A. W., Weintraub, M. J., Maura, J., de Andino, A. M., Brown, C. A., & Gurak, K. (2017). Acculturation styles and their associations with psychiatric symptoms and quality of life in ethnic minorities with schizophrenia. *Psychiatry research*, 255, 418-423.

- DeCapua, A., Smathers, W., & Tang, F. (2009). Students with limited or interrupted schooling: A guide for educators. Ann Arbor: University of Michigan Press.
- Dee, T., & Gershenson, S. (2017). Unconscious Bias in the Classroom: Evidence and Opportunities, 2017. *Stanford Center for Education Policy Analysis*.
- del Mar Haro-Soler, M. (2021). How Can Translation Teachers Care for Their Students? A Case Study on Verbal Persuasion and Translation Students' Self-Efficacy Beliefs. *New Voices in Translation Studies*, 24.
- Delgado, R., & Stefancic, J. (2017). *Critical race theory*. New York University Press.
- Deye, A. (2015). US infrastructure public-private partnerships: ready for takeoff?. *Kennedy School Review*, 15, 6-12.
- Duncan, Greg J., Ariel Kalil, and Kathleen M. ZiolGuest. 2017. “Increasing Inequality in Parent Incomes and Children’s Schooling.” *Demography* 54(5):1603–26.
- Dupriez, V., Delvaux, B., & Lothaire, S. (2016). Teacher shortage and attrition: Why do they leave?. *British Educational Research Journal*, 42(1), 21-39.
- Durand, T. M. (2011). Latina mothers' cultural beliefs about their children, parental roles, and education: Implications for effective and empowering home-school partnerships. *Urban Review: Issues and Ideas in Public Education*, 43(2), 255-278. doi:10.1007/s11256-010-0167-5
- Eisenkopf, G. (2010). Peer effects, motivation, and learning. *Economics of Education Review*, 29(3), 364-374.
- Elizalde-Utnick, G. (2010). Immigrant families: Strategies for school support. *Principal Leadership*, 10(5), 12-16.

- Elliott, L., & Bachman, H. J. (2018). SES disparities in early math abilities: The contributions of parents' math cognitions, practices to support math, and math talk. *Developmental Review, 49*, 1-15.
- Ellis, F. H. (1954). Historical Account of German Instruction in the Public Schools of Indianapolis 1869-1919. *The Indiana Magazine of History*, 119-138.
- Epstein, D., & Miller, R. T. (2011). Elementary school teachers and the crisis in STEM education. *The Education Digest, 77*(1), 4.
- Espino, M., Pereda, J., Recon, J., Perculeza, E., & Umali, C. (2017). Mathematics anxiety and its impact on the course and career choice of grade 11 students. *International Journal of Education, Psychology and Counselling, 2*(5), 99-119.
- Fallace, T., & Fantozzi, V. (2013). Was there really a social efficiency doctrine? The uses and abuses of an idea in educational history. *Educational Researcher, 42*(3), 142-150.
- Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational psychology review, 1*-22.
- Fang, L. (2020). Acculturation and academic achievement of rural to urban migrant youth: The role of school satisfaction and family closeness. *International Journal of Intercultural Relations, 74*, 149-160.
- Farinde-Wu, A. (2018). # Blackwomenatwork: Teaching and retention in urban schools. *The Urban Review, 50*(2), 247-266.
- Fawcett, L. M., & Garton, A. F. (2005). The effect of peer collaboration on children's problem-solving ability. *British journal of educational psychology, 75*(2), 157-169.

- Finn, J. D., Gerber, S. B., & Boyd-Zaharias, J. (2005). Small classes in the early grades, academic achievement, and graduating from high school. *Journal of Educational Psychology, 97*(2), 214.
- Fisher, P. H., Dobbs-Oates, J., Doctoroff, G. L., & Arnold, D. H. (2012). Early math interest and the development of math skills. *Journal of Educational Psychology, 104*(3), 673.
- Fonseca, D., Martí, N., Redondo, E., Navarro, I., & Sánchez, A. (2014). Relationship between student profile, tool use, participation, and academic performance with the use of Augmented Reality technology for visualized architecture models. *Computers in human behavior, 31*, 434-445.
- Fox, A. B., Rosen, J., & Crawford, M. (2009). Distractions, distractions: does instant messaging affect college students' performance on a concurrent reading comprehension task?. *CyberPsychology & Behavior, 12*(1), 51-53.
- Francis, J., & Barnett, W. S. (2019). Relating preschool class size to classroom quality and student achievement. *Early Childhood Research Quarterly, 49*, 49-58.
- Franklin, J. H. (1956). History of racial segregation in the United States. *The Annals of the American Academy of Political and Social Science, 304*(1), 1-9.
- Gebauer, M. M., McElvany, N., Bos, W., Köller, O., & Schöber, C. (2019). Determinants of academic self-efficacy in different socialization contexts: investigating the relationship between students' academic self-efficacy and its sources in different contexts. *Social Psychology of Education, 1*-20.
- Gezim, B. A. R. A., & Xhomara, N. (2020). The effect of student-centered teaching and problem-based learning on academic achievement in science. *Journal of Turkish Science Education, 17*(2), 180-199.

- Gonzalez, C., Morawska, A., & Haslam, D. M. (2018). Enhancing initial parental engagement in interventions for parents of young children: A systematic review of experimental studies. *Clinical Child and Family Psychology Review*, 21, 415-432.
- Goodman, J., Gurantz, O., & Smith, J. (2020). Take two! SAT retaking and college enrollment gaps. *American Economic Journal: Economic Policy*, 12(2), 115-58.
- Gully, S., & Chen, M. (2010). Individual differences, attribute-treatment interactions, and training outcomes. *Learning, training, and development in organizations*, 3-64.
- Gutfreund, Z. (2017). Immigrant education and race: alternative approaches to “Americanization” in Los Angeles, 1910–1940. *History of Education Quarterly*, 57(1), 1-38.
- Guzy, A. (2016). AP, Dual Enrollment, and the Survival of Honors Education. *Journal of the National Collegiate Honors Council*, 17(2), 3-11.
- Hahm, H. C., Lahiff, M., & Guterman, N. B. (2003). Acculturation and parental attachment in Asian-American adolescents’ alcohol use. *Journal of Adolescent Health*, 33(2), 119-129.
- Hakuta, K., Butler, Y. G., & Witt, D. (2000). How Long Does It Take English Learners To Attain Proficiency?.
- Hall, J. M., & Ponton, M. K. (2005). Mathematics self-efficacy of college freshman. *Journal of developmental education*, 28(3), 26.
- Halle, T., Hair, E., Wandner, L., McNamara, M., & Chien, N. (2012). Predictors and outcomes of early versus later English language proficiency among English language learners. *Early childhood research quarterly*, 27(1), 1-20.

- Halpern, D. F., Benbow, C. P., Geary, D. C., Gur, R. C., Hyde, J. S., & Gernsbacher, M. A. (2007). The science of sex differences in science and mathematics. *Psychological science in the public interest*, 8(1), 1-51.
- Han, J., Chu, X., Song, H., & Li, Y. (2015). Social capital, socioeconomic status and self-efficacy. *Applied Economics and Finance*, 2(1), 1-10.
- Hargis, J. (2001). Can students learn science using the internet?. *Journal of Research on Computing in Education*, 33(4), 475-487.
- Hanushek, E. A., & Luque, J. A. (2003). Efficiency and equity in schools around the world. *Economics of education Review*, 22(5), 481-502.
- Harding, D. J. (2010). *Living the drama: Community, conflict, and culture among inner-city boys*. University of Chicago Press.
- Hartman, A. (2008). *Education and the Cold War: The battle for the American school*. Palgrave Macmillan.
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-based nursing*, 18(3), 66-67.
- Heaverlo, C. A., Cooper, R., & Lannan, F. S. (2013). STEM DEVELOPMENT: PREDICTORS FOR 6TH-12TH GRADE GIRLS' INTEREST AND CONFIDENCE IN SCIENCE AND MATH. *Journal of Women and Minorities in Science and Engineering*, 19(2).
- Heck, A., & Van Gastel, L. (2006). Mathematics on the threshold. *International Journal of mathematical education in science and technology*, 37(8), 925-945.
- Hendricks, K. S. (2016). The sources of self-efficacy: Educational research and implications for music. *Update: Applications of Research in Music Education*, 35(1), 32-38.

- Hernandez, C. (2007). Home language use and Hispanic academic achievement: Evidence from Texas high schools. *Penn McNair Research Journal*, 1(1), 4.
- Hidayah, A. (2022). *The Relationship between Students' Self-Efficacy and Their Speaking Ability (A Quantitative Correlational Study)* (Bachelor's thesis, Jakarta: FITK UIN Syarif Hidayatullah Jakarta).
- Hill, H. C. (1919). The americanization movement. *American Journal of sociology*, 24(6), 609-642.
- Hilliard, N., Phillips, L., Howland, S., Yankov, A., Corley, C. D., & Hodas, N. O. (2018). Few-shot learning with metric-agnostic conditional embeddings. *arXiv preprint arXiv:1802.04376*.
- Hofer, S. I. (2015). Studying gender bias in physics grading: The role of teaching experience and country. *International Journal of Science Education*, 37(17), 2879-2905.
- Holland, D. & Eisenhart, M. (1990). *Educated in romance: Women, achievement, and college culture*. Chicago: University of Chicago Press.
- Hopkins, M., Martinez-Wenzl, M., Aldana, U. S., & Gándara, P. (2013). Cultivating capital: Latino newcomer young men in a US urban high school. *Anthropology & Education Quarterly*, 44(3), 286-303.
- Hos, R. (2020). The lives, aspirations, and needs of refugee and immigrant students with interrupted formal education (SIFE) in a secondary newcomer program. *Urban Education*, 55(7), 1021-1044.
- Howard, G. R. (2016). *We can't teach what we don't know: White teachers, multiracial schools*. Teachers College Press.

- Huang, C. (2013). Gender differences in academic self-efficacy: A meta-analysis. *European journal of psychology of education, 28*(1), 1-35.
- Huang, K. T., Ball, C., Cotten, S. R., & O'Neal, L. (2020). Effective experiences: A social cognitive analysis of young students' technology self-efficacy and STEM attitudes. *Social Inclusion, 8*(2), 213-221.
- Hwang, M. H., Choi, H. C., Lee, A., Culver, J. D., & Hutchison, B. (2016). The relationship between self-efficacy and academic achievement: A 5-year panel analysis. *The Asia-Pacific Education Researcher, 25*(1), 89-98.
- Jackson, C. D., and Leffingwell, R. J. (1999). The role of instructors in creating math anxiety in students from kindergarten through college. *Math. Teacher 92*, 583–586.
- Jennings, J., & Rentner, D. S. (2006). Ten big effects of the No Child Left Behind Act on public schools. *Phi Delta Kappan, 88*(2), 110-113.
- Jimenez-Castellanos, O. (2012). Revisiting the Coleman Report: Deficit ideologies and federal compensatory funding in low-income Latino school communities. *Association of Mexican American Educators Journal, 6*(2).
- Jo, S., & Son, J. W. (2021). 'I Can Create and Eat it for Snack': How Can Cooking Activities Support Early Math Learning?. *Early Childhood Education Journal, 1-15*.
- Joët, G., Usher, E. L., & Bressoux, P. (2011). Sources of self-efficacy: An investigation of elementary school students in France. *Journal of educational psychology, 103*(3), 649.
- Kanno, Y. (2018). High-performing English learners' limited access to four-year college. *Teachers College Record, 120*(4), 1-46.

- Kanno, Y., & Kangas, S. E. (2014). "I'm not going to be, like, for the AP" English language learners' limited access to advanced college-preparatory courses in high school. *American Educational Research Journal*, 51(5), 848-878.
- Kao, G., & Tienda, M. (1995). Optimism and achievement: The educational performance of immigrant youth. *Social science quarterly*, 1-19.
- Kelley, K., & Bolin, J. H. (2013). Multiple regression. In *Handbook of quantitative methods for educational research* (pp. 69-101). Brill.
- Kerr, R. (2014). "Advanced Classes? They're Only for White Kids": How One Kansas School Is Changing the Face of Honors and Advanced Placement Courses. *Action in Teacher Education*, 36(5-6), 480-489.
- Khali, M., & Khalil, U. (2019). Geogebra as a Scaffolding Tool for Exploring Analytic Geometry Structure and Developing Mathematical Thinking of Diverse Achievers. *International Electronic Journal of Mathematics Education*, 14(2), 427-434.
- Kibler, A. (2008). Speaking like a "good American": National identity and the legacy of German-language education. *Teachers College Record*, 110(6), 1241-1268.
- Kleck, G., & Jackson, D. (2016). What kind of joblessness affects crime? A national Case—Control study of serious property crime. *Journal of quantitative criminology*, 32(4), 489-513.
- Klein, E. M., Müller, K. W., Wölfling, K., Dreier, M., Ernst, M., & Beutel, M. E. (2020). The relationship between acculturation and mental health of 1st generation immigrant youth in a representative school survey: does gender matter?. *Child and Adolescent Psychiatry and Mental Health*, 14(1), 1-10.

- Klemenčič, M. (2015). What is student agency? An ontological exploration in the context of research on student engagement. *Student engagement in Europe: Society, higher education and student governance*, 11-29.
- Kliebard, H. M. (2004). *The struggle for the American curriculum, 1893-1958*. Psychology Press.
- Klonoff, E. A., & Landrine, H. (2000). Revising and improving the African American acculturation scale. *Journal of Black Psychology*, 26(2), 235-261.
- Kobayashi, Y. (2002). The role of gender in foreign language learning attitudes: Japanese female students' attitudes towards English learning. *Gender and education*, 14(2), 181-197.
- Koch, B., Slate, J. R., & Moore, G. (2012). Perceptions of students in developmental classes. *Community College Enterprise*, 18(2), 62-82.
- Kovelman, I., Baker, S. A., & Petitto, L. A. (2008). Age of first bilingual language exposure as a new window into bilingual reading development. *Bilingualism: language and cognition*, 11(2), 203-223.
- Kubey, R. W., Lavin, M. J., & Barrows, J. R. (2001). Internet use and collegiate academic performance decrements: Early findings. *Journal of communication*, 51(2), 366-382.
- Kudo, H., & Mori, K. (2015). A preliminary study of increasing self-efficacy in junior high school students: Induced success and a vicarious experience. *Psychological Reports*, 117(2), 631-642.
- Kuh, G. D., & Hu, S. (2001). The relationships between computer and information technology use, selected learning and personal development outcomes, and other college experiences. *Journal of College Student Development*.

- Kumar, R., & Lal, R. (2006). The Role of Self-Efficacy and Gender Difference among the Adolescents. *Journal of the Indian Academy of Applied Psychology*, 32(3), 345–350.
- Labaree, D. F. (2008). 1 Public Schools for Private Advantage: Conflicting Goals and the Impact on Education. In *How to succeed in school without really learning* (pp. 15-52). Yale University Press.
- Labaree, D. F. (2012). *Someone has to fail: The zero-sum game of public schooling*. Harvard University Press.
- Ladson-Billings, G. (2008). Yes, but how do we do it?": Practicing culturally relevant pedagogy. *City kids, city schools: More reports from the front row*, 162-177.
- Ladson-Billings, G. (2013). Critical race theory—What it is not!. In *Handbook of critical race theory in education* (pp. 54-67). Routledge.
- Lane, C., Kim, M., & Schrynemakers, I. (2020). American acculturation and academic performance: Analyzing the relationship between years living in the United States and freshman composition grades at a diverse community college. *Community College Journal of Research and Practice*, 44(9), 677-689.
- Lee, J. (2009). Universals and specifics of math self-concept, math self-efficacy, and math anxiety across 41 PISA 2003 participating countries. *Learning and Individual Differences*, 19, 355–365.
- Lee, S. J. (2012). New talk about ELL students. *Phi Delta Kappan*, 93(8), 66-69.
- Lehman, E., De Jong, D., & Baron, M. (2018). Investigating the Relationship of Standards-Based Grades vs. Traditional-Based Grades to Results of the Scholastic Math Inventory at the Middle School Level. *Education Leadership Review of Doctoral Research*, 6, 1-16.

- Lei, Q., Xin, Y. P., Morita-Mullaney, T., & Tzur, R. (2020). Instructional Scaffolds in Mathematics Instruction for English Learners With Learning Disabilities: An Exploratory Case Study. *Learning Disabilities: A Contemporary Journal*, 18(1), 123-144.
- LeMay, M. C., Barkan, E. R., & Lemay, M. R. (Eds.). (1999). *US immigration and naturalization laws and issues: A documentary history*. Greenwood Publishing Group.
- Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence. *Journal of counseling psychology*, 31(3), 356.
- Levin, H. (2005). The social costs of inadequate education. *Columbia University Teachers College*, www.tc.columbia.edu/i/a/3082_SocialCostsofInadequetEducation.pdf.
- Lewis, L. (2000). *Condition of America's public school facilities, 1999*. US Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.
- Lewis, L. (2000). *Condition of America's public school facilities, 1999*. US Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics.
- Li, Y. (2008). Mathematical preparation of elementary school teachers: Generalists versus content specialists. *School Science and Mathematics*, 108(5), 169-173.
- Lilla, N., Thürer, S., Nieuwenboom, W., & Schüpbach, M. (2021). Exploring Academic Self-Concepts Depending on Acculturation Profile. Investigation of a Possible Factor for Immigrant Students' School Success. *Education Sciences*, 11(8), 432.
- Lin, J. H. T., Wu, D. Y., & Tao, C. C. (2018). So scary, yet so fun: The role of self-efficacy in enjoyment of a virtual reality horror game. *New Media & Society*, 20(9), 3223-3242.

- Lindholm-Leary, K., & Block, N. (2010). Achievement in predominantly low SES/Hispanic dual language schools. *International Journal of Bilingual Education and Bilingualism*, 13(1), 43-60.
- Linn, R. L., Baker, E. L., & Betebenner, D. W. (2002). Accountability systems: Implications of requirements of the no child left behind act of 2001. *Educational researcher*, 31(6), 3-16.
- Lipnevich, A. A., Guskey, T. R., Murano, D. M., & Smith, J. K. (2020). What do grades mean? Variation in grading criteria in American college and university courses. *Assessment in education: Principles, policy & practice*, 27(5), 480-500.
- Loo, C. W., & Choy, J. L. F. (2013). Sources of self-efficacy influencing academic performance of engineering students. *American Journal of Educational Research*, 1(3), 86-92.
- Ma, L. (2010). *Knowing and teaching elementary mathematics: Teachers' understanding of fundamental mathematics in China and the United States*. Routledge.
- Ma, L. (2013). A critique of the structure of US elementary school mathematics. *Notices of the AMS*, 60(10), 1282-1296.
- Mäkitalo, Å. (2016). On the notion of agency in studies of interaction and learning. *Learning, Culture and Social Interaction*, 10, 64-67.
- Maloney, E. A., & Beilock, S. L. (2012). Math anxiety: Who has it, why it develops, and how to guard against it. *Trends in Cognitive Sciences*, 16, 404–406.
- Maloney, E. A., Ramirez, G., Gunderson, E. A., Levine, S. C., & Beilock, S. L. (2015). Intergenerational effects of parents' math anxiety on children's math achievement and anxiety. *Psychological Science*, 26(9), 1480-1488.

- Marin, G., & Gamba, R. J. (1996). A new measurement of acculturation for Hispanics: The Bidimensional Acculturation Scale for Hispanics (BAS). *Hispanic Journal of Behavioral Sciences*, 18(3), 297-316.
- Martin, P. (2009). *Immigration to the United States* (pp. 3-18). Yale University Press.
- Martinez-Taboada, C., Mera, M. J., Amutio, A., Castañeda, X., Felt, E., & Nicolae, G. (2017). The impact of cultural dissonance and acculturation orientations on immigrant students' academic performance. *Universitas Psychologica*, 16, 6-19.
- Mazana, Y. M., Suero Montero, C., & Olifage, C. R. (2019). Investigating students' attitude towards learning mathematics.
- Mejia-Smith, B., & Gushue, G. V. (2017). Latina/o college students' perceptions of career barriers: Influence of ethnic identity, acculturation, and self-efficacy. *Journal of Counseling & Development*, 95(2), 145-155.
- Melkonian, M., Areepattamannil, S., Menano, L., & Fildago, P. (2019). Examining acculturation orientations and perceived cultural distance among immigrant adolescents in Portugal: links to performance in reading, mathematics, and science. *Social Psychology of Education*, 22(4), 969-989.
- Mercado, G., & Trumbull, E. (2018). Mentoring beginning immigrant teachers: How culture may impact the message. *International journal of psychology*, 53, 44-53.
- Mirel, J. (2010). *Patriotic pluralism: Americanization education and European immigrants*. Harvard University Press.
- Metzler, C. W., Biglan, A., Rusby, J. C., & Sprague, J. R. (2001). Evaluation of a comprehensive behavior management program to improve school-wide positive behavior support. *Education and treatment of Children*, 448-479.

- Meyer, O. L., Eng, C. W., Ko, M. J., Chan, M. L., Ngo, U., Gilsanz, P., ... & Whitmer, R. A. (2023). Generation and age of immigration on later life cognitive performance in KHANDLE. *International psychogeriatrics*, 35(1), 17-28.
- Milner, H. R. (2011). Culturally relevant pedagogy in a diverse urban classroom. *The Urban Review*, 43, 66-89.
- Moní, Y., Mealy, M., Del Ama, J. C., & Conway, J. M. (2018). Bidimensional acculturation and academic success among Latina/o college students. *Journal of Latina/o Psychology*, 6(3), 220.
- Monrad, M. (2007). High School Dropout: A Quick Stats Fact Sheet. *National High School Center*.
- Moon, J., & Ruiz-Casares, M. (2019). Family's Migration Experience and Distress Among Asian-Canadian Immigrant Youth. *Journal of Comparative Family Studies*, 50(1), 7-32.
- Moon, S. S., Kang, S. Y., & An, S. (2009). Predictors of immigrant children's school achievement: A comparative study. *Journal of Research in Childhood Education*, 23(3), 278-289.
- Mora, T., & Oreopoulos, P. (2011). Peer effects on high school aspirations: Evidence from a sample of close and not-so-close friends. *Economics of Education Review*, 30(4), 575-581.
- Motti-Stefanidi, F., Masten, A., & Asendorpf, J. B. (2015). School engagement trajectories of immigrant youth: Risks and longitudinal interplay with academic success. *International journal of behavioral development*, 39(1), 32-42.
- Mozahem, N. A. (2020). Social cognitive theory and women's career choices: an agent—based model simulation. *Computational and Mathematical Organization Theory*, 1-26.

- Mozahem, N. A., Boulad, F. M., & Ghanem, C. M. (2021). Secondary school students and self-efficacy in mathematics: Gender and age differences. *International Journal of School & Educational Psychology*, 9(sup1), S142-S152.
- Muhammad, K. (2006). Don't Fail Me Because I'm Different: Cultural Bias in the SATs
- Muo, M. C. (1994). *The passage of the 1968 Bilingual Education Act and its aftermath: A legislative systems analysis* (Doctoral dissertation, Howard University).
- Mutlu, Y. (2019). Math Anxiety in Students with and without Math Learning Difficulties. *International Electronic Journal of Elementary Education*, 11(5), 471-475.
- National Governors Association. (2010). Common core state standards. *Washington, DC*.
- Ndura, E. (2004). ESL and cultural bias: An analysis of elementary through high school textbooks in the Western United States of America.
- Ngussa, B. M., & Mbuti, E. E. (2017). The Influence of Humour on Learners' Attitude and Mathematics Achievement: A Case of Secondary Schools in Arusha City, Tanzania. *Journal of Educational Research*, 2(3), 170 -181.
- Nye, B. A., Hedges, L. V., & Konstantopoulos, S. (2000). Do the disadvantaged benefit more from small classes? Evidence from the Tennessee class size experiment. *American journal of education*, 109(1), 1-26.
- Oikarainen, A., Mikkonen, K., Kenny, A., Tomietto, M., Tuomikoski, A. M., Meriläinen, M., ... & Kääriäinen, M. (2019). Educational interventions designed to develop nurses' cultural competence: A systematic review. *International journal of nursing studies*, 98, 75-86.
- Olayinka, A. R. B. (2016). Effects of Instructional Materials on Secondary Schools Students' Academic Achievement in Social Studies in Ekiti State, Nigeria. *World Journal of Education*, 6(1), 32-39.

- O'Leary, K., Fitzpatrick, C. L., & Hallett, D. (2017). Math anxiety is related to some, but not all, experiences with math. *Frontiers in psychology*, 8, 2067.
- Olivier, E., Archambault, I., De Clercq, M., & Galand, B. (2019). Student self-efficacy, classroom engagement, and academic achievement: Comparing three theoretical frameworks. *Journal of youth and adolescence*, 48(2), 326-340.
- Orfield, G., Ee, J., Frankenberg, E., & Siegel-Hawley, G. (2016). "Brown" at 62: School Segregation by Race, Poverty and State. *Civil Rights Project-Proyecto Derechos Civiles*.
- Ovando, C. J. (2003). Bilingual education in the United States: Historical development and current issues. *Bilingual research journal*, 27(1), 1-24.
- Owens, A. (2018). Income segregation between school districts and inequality in students' achievement. *Sociology of Education*, 91(1), 1-27.
- Ozkal, N. (2019). Relationships between self-efficacy beliefs, engagement and academic performance in math lessons. *Cypriot Journal of Educational Sciences*, 14(2), 190-200.
- Parnter, C., & Simmons III, R. (2022). Mentoring and Supporting Students Using Culturally Relevant School Leadership. *RACE Mentoring and P-12 Educators: Practitioners Contributing to Scholarship*, 35.
- Patterson, C. A., Papa, L. A., Reveles, A. K., & Domenech Rodríguez, M. M. (2018). Undergraduate student change in cultural competence: Impact of a multicultural psychology course. *Scholarship of Teaching and Learning in Psychology*, 4(2), 81.
- Pattillo, Mary. 2005. "Black Middle-Class Neighborhoods." *Annual Review of Sociology* 31:305–29.

- Peguro, A. A., & Jiang, X. (2014). Social control across immigrant generations: Adolescent violence at school and examining the immigrant paradox. *Journal of Criminal Justice*, 42(3), 276-287.
- Pennsylvania Department of Education. (2022). Keystone Exams. Retrieved June 20, 2022, from <https://www.education.pa.gov/K-12/Assessment%20and%20Accountability/Keystones/Pages/default.aspx>
- Pew Research Center. (2019). *Educational attainment of Hispanic population in the U.S., 2017*. Pew Research Center's Hispanic Trends Project. <https://www.pewresearch.org/hispanic/chart/u-s-hispanics-education/>.
- Phinney, J. S., & Ong, A. D. (2007). Conceptualization and measurement of ethnic identity: Current status and future directions. *Journal of counseling Psychology*, 54(3), 271.
- Phonapichat, P., Wongwanich, S., & Sujiva, S. (2014). An analysis of elementary school students' difficulties in mathematical problem solving. *Procedia-Social and Behavioral Sciences*, 116, 3169-3174.
- Porter, A., McMaken, J., Hwang, J., & Yang, R. (2011). Common core standards: The new US intended curriculum. *Educational researcher*, 40(3), 103-116.
- Portes, A., & Rumbaut, R. G. (2001). *Legacies: The story of the immigrant second generation*. Univ of California Press.
- Potochnick, S. (2018). The academic adaptation of immigrant students with interrupted schooling. *American Educational Research Journal*, 55(4), 859-892.
- Powell Jr, L. F. (1981). Plyler v. Doe.
- Price, C. (1966). 'White' Restrictions on 'Coloured' Immigration. *Race*, 7(3), 217-234.

- Protivínský, T., & Münich, D. (2018). Gender bias in teachers' grading: What is in the grade. *Studies in Educational Evaluation*, 59, 141-149.
- Purnell, L. D. (2016). The Purnell model for cultural competence. In *Intervention in mental health-substance use* (pp. 57-78). CRC Press.
- Racca, R. M. A. B., & Lasaten, R. C. S. (2016). English language proficiency and academic performance of Philippine science high school students. *International Journal of Languages, Literature and Linguistics*, 2(2), 44-49.
- Ramirez, G., Shaw, S. T., & Maloney, E. A. (2018). Math anxiety: Past research, promising interventions, and a new interpretation framework. *Educational Psychologist*, 53(3), 145-164.
- Rattani, S. A. (2016). SAT: does racial bias exist?. *Creative Education*, 7(15), 2151-2162.
- Reardon, S. F., Kalogrides, D., & Shores, K. (2019). The geography of racial/ethnic test score gaps. *American Journal of Sociology*, 124(4), 1164-1221.
- Reyna, V. F., & Brainerd, C. J. (2007). The importance of mathematics in health and human judgment: Numeracy, risk communication, and medical decision making. *Learning and Individual Differences*, 17(2), 147-159.
- Reynolds, A. J., Temple, J. A., Ou, S. R., Arteaga, I. A., & White, B. A. (2011). School-based early childhood education and age-28 well-being: Effects by timing, dosage, and subgroups. *Science*, 333(6040), 360-364.
- Rivera Rodas, E. I. (2019). Separate and Unequal--Title I and Teacher Quality. *Education policy analysis archives*, 27(14), n14.
- Robertson, J. (2017). Rethinking learner and teacher roles: Incorporating student voice and agency into teaching practice. *Journal of Initial Teacher Inquiry*, 3, 41–44.

- Robinson, C., & Taylor, C. (2007). Theorizing student voice: Values and perspectives. *Improving Schools*, 10, 5–17. doi:10.1177/1365480207073702
- Roessingh, H. (2008). Variability in ESL outcomes: The influence of age on arrival and length of residence on achievement in high school. *TESL Canada Journal*, 87-107.
- Rong, X. L., & Preissle, J. (2008). *Educating immigrant students in the 21st century: What educators need to know*. Corwin Press.
- Rosson, M. B., Carroll, J. M., & Sinha, H. (2011). Orientation of undergraduates toward careers in the computer and information sciences: Gender, self-efficacy and social support. *ACM Transactions on Computing Education (TOCE)*, 11(3), 1-23.
- Rowan-Kenyon, H. T., Bell, A., & Perna, L. W. (2008). How parents shape college opportunity for their children: Variations by socioeconomic status. *Journal of Higher Education*, 79, 564-586.
- Rowan-Kenyon, H. T., Bell, A., & Perna, L. W. (2008). How parents shape college opportunity for their children: Variations by socioeconomic status. *Journal of Higher Education*, 79, 564-586.
- RSD. (2022). About RSD. (n.d.). Retrieved June 30, 2022, from <https://www.readingsd.org/domain/45>
- Rumbaut, R. G. (2004). Ages, life stages, and generational cohorts: decomposing the immigrant first and second generations in the United States 1. *International migration review*, 38(3), 1160-1205.
- Rumberger, R. W. (2012). *Dropping out: Why students drop out of high school and what can be done about it*. Harvard University Press.

- Rury, J. L. (2015). Trouble in suburbia: localism, schools and conflict in postwar Johnson County, Kansas. *History of Education Quarterly*, 55(2), 133-163.
- Rutberg, S., & Bouikidis, C. D. (2018). Focusing on the fundamentals: A simplistic differentiation between qualitative and quantitative research. *Nephrology Nursing Journal*, 45(2), 209-213.
- Salili, F., Chiu, C. Y., & Lai, S. (2001). The influence of culture and context on students' motivational orientation and performance. In *Student motivation* (pp. 221-247). Springer, Boston, MA.
- Schmitt, N., Keeney, J., Oswald, F. L., Pleskac, T. J., Billington, A. Q., Sinha, R., & Zorzie, M. (2009). Prediction of 4-year college student performance using cognitive and noncognitive predictors and the impact on demographic status of admitted students. *Journal of Applied Psychology*, 94(6), 1479.
- Samavi, S. A., Ebrahimi, K., & Javdan, M. (2017). Relationship between academic engagements, self-efficacy and academic motivation with academic achievement among high school students in Bandar Abbas. *Biquarterly Journal of Cognitive Strategies in Learning*, 4(7), 71-92.
- Sana, F., Weston, T., & Cepeda, N. J. (2013). Laptop multitasking hinders classroom learning for both users and nearby peers. *Computers & Education*, 62, 24-31.
- Santiago, C. D., Gudiño, O. G., Baweja, S., & Nadeem, E. (2014). Academic achievement among immigrant and US-born Latino adolescents: Associations with cultural, family, and acculturation factors. *Journal of community psychology*, 42(6), 735-747.
- Sayad, A. (2018). *The suffering of the immigrant*. John Wiley & Sons.
- Schulz, P., & Grimm, A. (2019). The age factor revisited: Timing in acquisition interacts with age of onset in bilingual acquisition. *Frontiers in psychology*, 9, 2732.

- Schumann, J. H. (1986). Research on the acculturation model for second language acquisition. *Journal of multilingual & multicultural development*, 7(5), 379-392.
- Schwartz, A. E., Laurito, A., Laco, J., Sharkey, P., & Ellen, I. G. (2016). The Academic Effects of Chronic Exposure to Neighborhood Violence.
- Schwarzer, R., & Luszczynska, A. (2008). Self efficacy.
- Seeram, E. (2019). An overview of correlational research. *Radiologic technology*, 91(2), 176-179.
- Selden, S. (2000). Eugenics and the social construction of merit, race and disability. *Journal of Curriculum Studies*, 32(2), 235-252.
- Selmer, J., & Luring, J. (2015). Host country language ability and expatriate adjustment: The moderating effect of language difficulty. *The International Journal of Human Resource Management*, 26(3), 401-420.
- Shahzad, K., & Naureen, S. (2017). Impact of Teacher Self-Efficacy on Secondary School Students' Academic Achievement. *Journal of Education and Educational Development*, 4(1), 48-72.
- Sharkey, P. (2010). The acute effect of local homicides on children's cognitive performance. *Proceedings of the National Academy of Sciences*, 107(26), 11733-11738.
- Sharkey, Patrick, and Jacob W. Faber. 2014. “Where, When, Why, and for Whom Do Residential Contexts Matter? Moving Away from the Dichotomous Understanding of Neighborhood Effects.” *Annual Review of Sociology* 40:559–79.
- Sherman, R. C., End, C., Kraan, E., Cole, A., Campbell, J., Birchmeier, Z., & Klausner, J. (2000). The Internet gender gap among college students: forgotten but not gone?. *CyberPsychology & Behavior*, 3(5), 885-894.

- Shonkoff, J. P., Phillips, D. A., & National Research Council. (2000). Promoting healthy development through intervention. In *From neurons to neighborhoods: The science of early childhood development*. National Academies Press (US).
- Sielke, C. C. (2001). Funding school infrastructure needs across the states. *Journal of Education Finance*, 27(2), 653-662.
- Silver, B. R., Lopez, F., Kalaivanan, T., & Krietzberg, L. (2021). Second-generation immigrant students and the senior-year transition. *Journal of Student Affairs Research and Practice*, 58(4), 388-400.
- Silver, B. R., Lopez, F., Kalaivanan, T., & Krietzberg, L. (2021). Second-generation immigrant students and the senior-year transition. *Journal of Student Affairs Research and Practice*, 58(4), 388-400.
- Simon, N., & Johnson, S. M. (2015). Teacher turnover in high-poverty schools: What we know and can do. *Teachers College Record*, 117(3), 1-36.
- Simpson, R. L., Lacava, P. G., & Sampson Graner, P. (2004). The no child left behind act: Challenges and implications for educators. *Intervention in school and clinic*, 40(2), 67-75.
- Singh, J. K. N., & Jack, G. (2022). The role of language and culture in postgraduate international students' academic adjustment and academic success: qualitative insights from Malaysia. *Journal of International Students*, 12(2).
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of educational research*, 75(3), 417-453.
- Sitkoff, H. (2001). Segregation, desegregation, resegregation: African American education, a guide to the literature. *OAH Magazine of History*, 15(2), 6-13.

- Skaalvik, E. M., Federici, R. A., & Klassen, R. M. (2015). Mathematics achievement and self-efficacy: Relations with motivation for mathematics. *International Journal of Educational Research*, 72, 129-136.
- Sosa Díaz, M. J., Guerra Antequera, J., & Cerezo Pizarro, M. (2021). Flipped Classroom in the Context of Higher Education: Learning, Satisfaction and Interaction. *Education Sciences*, 11(8), 416.
- Steinberg, A., Johnson, C., & Pennington, H. (2006). Addressing America's Dropout Challenge. *State efforts to boost graduation rates require federal support*. Retrieved May, 22, 2010.
- Stuart, E. A., Bradshaw, C. P., & Leaf, P. J. (2015). Assessing the Generalizability of Randomized Trial Results to Target Populations. *Prevention Science : The Official Journal of the Society for Prevention Research*, 16(3), 475.
<https://doi.org/10.1007/s11121-014-0513-z>
- Su, Z., McDonnell, D., Shi, F., Liang, B., Li, X., Wen, J., ... & Yang, L. (2021). Chinese international students in the United States: The interplay of students' acculturative stress, academic standing, and quality of life. *Frontiers in Psychology*, 12, 625863.
- Suárez-Orozco, C., Suárez-Orozco, M. M., & Todorova, I. (2008). *Learning a new land: Immigrant students in American society*. Harvard University Press.
- Takanishi, R., & Kauerz, K. (2008). PK inclusion: Getting serious about a P-16 education system. *Phi Delta Kappan*, 89(7), 480-487.
- Takeuchi, M. A. (2018). Power and identity in immigrant parents' involvement in early years mathematics learning. *Educational Studies in Mathematics*, 97(1), 39-53.

- Talpade, M., & Talpade, S. (2020). Sankofa scale validation: Culturally relevant pedagogy, racial identity, academic confidence, and success. *Journal of Instructional Pedagogies*, 23.
- Tatar, A. E., & Düşteğör, D. (2020). Prediction of academic performance at undergraduate graduation: Course grades or grade point average?. *Applied sciences*, 10(14), 4967.
- Tawafak, R. M., Romli, A. B., bin Abdullah Arshah, R., & Almaroof, R. A. S. (2018). Assessing the impact of technology learning and assessment method on academic performance. *EURASIA Journal of Mathematics, Science and Technology Education*, 14(6), 2241-2254.
- Tenam-Zemach, M., Conn, D. R., & Parkison, P. T. (2021). *Unraveling the assessment industrial complex: Understanding how testing perpetuates inequity and injustice in America*. Routledge.
- Thapa, A., Cohen, J., Guffey, S., & Higgins-D'Alessandro, A. (2013). A review of school climate research. *Review of educational research*, 83(3), 357-385.
- Truax, M. L. (2018). The impact of teacher language and growth mindset feedback on writing motivation. *Literacy Research and Instruction*, 57(2), 135-157.
- Tsai, J. L., Ying, Y. W., & Lee, P. A. (2000). The meaning of “being Chinese” and “being American” variation among Chinese American young adults. *Journal of Cross-Cultural Psychology*, 31(3), 302-332.
- Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: Four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The elementary school journal*, 110(2), 228-245.

- Tu, J. C., & Chu, K. H. (2020). Analyzing the Relevance of Peer Relationship, Learning Motivation, and Learning Effectiveness—Design Students as an Example. *Sustainability*, 12(10), 4061.
- Tzu-Ling, H. (2019). Gender differences in high-school learning experiences, motivation, self-efficacy, and career aspirations among Taiwanese STEM college students. *International Journal of Science Education*, 41(13), 1870-1884.
- U.S. Census Bureau. (2021). *Educational Attainment*. U.S. Department of Commerce. Retrieved September 3, 2021, from <https://www.census.gov/topics/education/educational-attainment.html>.
- U.S. Census Bureau. (2021). *Inequalities Persist Despite Decline in Poverty For All Major Race and Hispanic Origin Groups*. U.S. Department of Commerce. Retrieved September 6, 2021 <https://www.census.gov/library/stories/2020/09/poverty-rates-for-blacks-and-hispanics-reached-historic-lows-in-2019.html>.
- U.S. Census Bureau. (2021). *Quick Facts*. U.S. Department of Commerce. Retrieved September 3, 2021, from <https://www.census.gov/quickfacts/fact/table/US/RHI725219>.
- U.S. Census Bureau. (2021). *Educational Attainment*. U.S. Department of Commerce. Retrieved September 3, 2021, from <https://www.census.gov/topics/education/educational-attainment.html>.
- U.S. Census Bureau. (2021). *Inequalities Persist Despite Decline in Poverty For All Major Race and Hispanic Origin Groups*. U.S. Department of Commerce. Retrieved September 6, 2021 <https://www.census.gov/library/stories/2020/09/poverty-rates-for-blacks-and-hispanics-reached-historic-lows-in-2019.html>.

- U.S. Census Bureau. (2021). *Quick Facts*. U.S. Department of Commerce. Retrieved September 3, 2021, from <https://www.census.gov/quickfacts/fact/table/US/RHI725219>.
- U.S. Department of Education. (2019). *The Nation's Report Card: 2019 Mathematics Pennsylvania*. National Assessment of Educational Statistics. <https://nces.ed.gov/nationsreportcard/subject/publications/stt2019/pdf/2020013PA8.pdf>.
- U.S. Department of Education. (2020). *Mathematics Performance*. National Assessment of Educational Statistics. https://nces.ed.gov/programs/coe/pdf/coe_cnc.pdf.
- U.S. Department of Education. 2016. *The Condition of Education 2016*. Washington, DC: U.S. Department of Education.
- U. S. Department of Labor (2023, November 17). *Median weekly earnings \$721 for workers without high school diploma, \$1,864 for advanced degree*. U.S. Bureau of Labor Statistics. Retrieved January 28, 2024, from <https://www.bls.gov/opub/ted/2023/median-weekly-earnings-721-for-workers-without-high-school-diploma-1864-for-advanced-degree.htm#:~:text=In%20the%20third%20quarter%20of%202023%2C%20full%2Dtime,with%20some%20college%20or%20an%20associate%20degree>.
- Urdan, T., & Teramoto, D. (2021). Ethnic Identity, Implicit Associations, and Academic Motivation of Hispanic Adolescents. *Adolescents*, 1(3), 252-266.
- Usher, E. L., & Pajares, F. (2006). Sources of academic and self-regulatory efficacy beliefs of entering middle school students. *Contemporary educational psychology*, 31(2), 125-141.
- Usher, E. L., & Pajares, F. (2009). Sources of self-efficacy in mathematics: A validation study. *Contemporary educational psychology*, 34(1), 89-101.

- Valadez, J. R. (2008). Shaping the educational decisions of Mexican immigrant high school students. *American Educational Research Journal*, 45(4), 834-860.
- Valdes, G. M. (1981). A Historical Approach to Legal Aspects of Bilingual Education.
- Valencia, R. R. (2010). *Dismantling contemporary deficit thinking: Educational thought and practice*. Routledge.
- Valencia, R. R., & Black, M. S. (2019). "Mexican Americans Don't Value Education!": On the Basis of the Myth, Mythmaking, and Debunking. In *Critical Readings on Latinos and Education* (pp. 3-25). Routledge.
- Vasantharaju, N., & Harinarayana, N. S. (2016, January). Online survey tools: A case study of Google Forms. In *National Conference on Scientific, Computational & Information Research Trends in Engineering, GSSS-IETW, Mysore*.
- Vaughn, M. (2020). What is student agency and why is it needed now more than ever?. *Theory Into Practice*, 59(2), 109-118.
- Vázquez-Nava, F., Vázquez-Rodríguez, E. M., Vázquez-Rodríguez, C. F., & Betancourt, N. V. O. (2019). High school dropout: Association with family structure, maternal employment, and health-risk habits among female Mexican adolescents. *Journal of Child and Family Studies*, 28(12), 3307-3314.
- Vickers, M., McCarthy, F., & Zammit, K. (2017). Peer mentoring and intercultural understanding: Support for refugee-background and immigrant students beginning university study. *International Journal of Intercultural Relations*, 60, 198-209.
- Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcomes. *Review of Higher Education*, 27(1), 45-73. doi:10.1353/rhe.2003.0044
- Warren, C. J. E. (1954). Brown v. board of education. *United States Reports*, 347(1954), 483.

- Webb-Williams, J. (2018). Science self-efficacy in the primary classroom: Using mixed methods to investigate sources of self-efficacy. *Research in Science Education*, 48(5), 939-961.
- Weber, S., Kronberger, N., & Appel, M. (2018). Immigrant students' educational trajectories: The influence of cultural identity and stereotype threat. *Self and Identity*, 17(2), 211-235.
- Whitesell, N. R., Mitchell, C. M., & Spicer, P. (2009). A longitudinal study of self-esteem, cultural identity, and academic success among American Indian adolescents. *Cultural Diversity and Ethnic Minority Psychology*, 15(1), 38.
- Wiese, A. M., & Garcia, E. E. (1998). The Bilingual Education Act: Language minority students and equal educational opportunity. *Bilingual Research Journal*, 22(1), 1-18.
- Wilde, N., & Hsu, A. (2019). The influence of general self-efficacy on the interpretation of vicarious experience information within online learning. *International Journal of Educational Technology in Higher Education*, 16(1), 1-20.
- Willingham, W. W., Pollack, J. M., & Lewis, C. (2002). Grades and test scores: Accounting for observed differences. *Journal of Educational Measurement*, 39(1), 1-37.
- Winterer, E. R., Froyd, J. E., Borrego, M., Martin, J. P., & Foster, M. (2020). Factors influencing the academic success of Latinx students matriculating at 2-year and transferring to 4-year US institutions—implications for STEM majors: a systematic review of the literature. *International Journal of STEM Education*, 7, 1-23.
- Wooley, E. O. (1944). Five decades of German instruction in America. *Monatshefte für deutschen Unterricht*, 36(7), 359-370.
- Wößmann, L., Ursprung, H. W., & Schuetz, G. (2005). *Education policy and equality of opportunity* (No. 1518). CESifo Working Paper.

- Yu, Q., Foroudi, P., & Gupta, S. (2019). Far apart yet close by: Social media and acculturation among international students in the UK. *Technological Forecasting and Social Change*, 145, 493-502.
- Yukselturk, E., & Bulut, S. (2009). Gender differences in self-regulated online learning environment. *Journal of Educational Technology & Society*, 12(3), 12-22.
- Zadeh, Z. Y., Geva, E., & Rogers, M. A. (2008). The impact of acculturation on the perception of academic achievement by immigrant mothers and their children. *School Psychology International*, 29(1), 39-70.
- Zaker, A. (2016). The acculturation model of second language acquisition: Inspecting weaknesses and strengths. *Indonesian EFL Journal*, 2(2), 80-87.
- Zaki, K. A., Rafiq, S., & Afzal, A. (2023). IMPACT OF TEACHER-STUDENT FAVORITISM ON STUDENTS' LEARNING OUTCOMES AT UNIVERSITY LEVEL. *Journal of Social Research Development*, 4(1), 01-14.
- Zea, M. C., Asner-Self, K. K. I., Birman, D., & Buki, L. P. (2011). Abbreviated Multidimensional Acculturation Scale (AMAS-ZABB) 2003.
- Zea, M. C., Asner-Self, K. K., Birman, D., & Buki, L. P. (2003). The Abbreviated Multidimensional Acculturation Scale: Empirical validation with two Latino/Latina samples. *Cultural Diversity and Ethnic Minority Psychology*, 9(2), 107.
- Zhang, D., & Wang, C. (2020). The relationship between mathematics interest and mathematics achievement: Mediating roles of self-efficacy and mathematics anxiety. *International Journal of Educational Research*, 104, 101648.

- Zientek, L. R., Fong, C. J., & Phelps, J. M. (2019). Sources of self-efficacy of community college students enrolled in developmental mathematics. *Journal of Further and Higher Education*, 43(2), 183-200.
- Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American educational research journal*, 29(3), 663-676.
- Zimmerman, B. J., Schunk, D. H., & DiBenedetto, M. K. (2017). The role of self-efficacy and related beliefs in self-regulation of learning and performance. *Handbook of competence and motivation: Theory and application*, 313.
- Ziol-Guest, Kathleen M., and Kenneth T. H. Lee. 2016. “Parent Income-based Gaps in Schooling: Cross-cohort Trends in the NLSYs and the PSID.” *AERA Open* 2(2):1–10.
- Zysberg, L., & Schwabsky, N. (2021). School climate, academic self-efficacy and student achievement. *Educational Psychology*, 41(4), 467-482.

Appendix A Principal Approval



Institutional Review Board
Kansas State University
Manhattan, Kansas

April 27, 2022

Dear IRB Members,

After reviewing the proposed study, *The Impact of Four Sources of Self-Efficacy and Mathematics Performance of Immigrant Students or Students with an Immigration Background in an Urban High School*, presented by Ms. Evangeline Li, a doctoral student at Kansas State University, I have granted permission for the study to be conducted within the Reading High School.

The purpose of the study is to determine whether student self-efficacy in learning mathematics is associated with their mathematics performance and the differences in gender, grade level, immigration generation, acculturation, etc. The activity will collect data through electronic surveys of participants who attend Reading High School. Only students enrolled in the high school will be eligible to participate, and participation in this study will be entirely voluntary, and students may refuse to participate or withdraw from the study at any time.

I understand that Ms. Li will *launch a survey and collect data* within the high school. All collected data and information will remain confidential. Any data collected by Ms. Li will be kept confidential and will be stored and password protected by Ms. Li. Participants will be assigned a random numerical code, and at no time will any student's actual identity be revealed. Ms. Li has agreed to provide us with a copy of the aggregate results and reports from her study. The participants or our school will incur no costs. The data will be destroyed after the study is completed.

Ms. Li has also agreed to provide my office with a copy of Kansas State University IRB-approved document before she launches the electronic survey on campus.

If the IRB has any concerns about the permission being granted by this letter, please contact me at alvaradw@readingsd.org.

Sincerely,

A handwritten signature in dark ink, appearing to read "Waldo Alvarado", is written over a light gray rectangular background.

Waldo Alvarado
Principal of Reading High School
Phone: 484-258-7420 extension 81900

Appendix B IRB Approval



TO: J. Spencer Clark
Curriculum and Instruction
Manhattan, KS 66506

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 04/29/2022

RE: Approval of Proposal Entitled, "The Impact of Four Sources of Self-Efficacy and Mathematics Performance of Immigrant Students or Students with an Immigration Background in an Urban High School."

Proposal Number IRB-11180

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval. This proposal is **approved for three years from the date of this correspondence.**

APPROVAL DATE: 04/29/2022

EXPIRATION DATE: 04/28/2025

In giving its approval, the Committee has determined that:

No more than minimal risk to subjects

This approval applies only to the proposal currently on file as written. Any change or modification affecting human subjects must be approved by the IRB prior to implementation. All approved proposals are subject to continuing review, which may include the examination of records connected with the project. Announced post-approval monitoring may be performed during the course of this approval period by URCO staff. Injuries, unanticipated problems or adverse events involving risk to subjects or to others must be reported immediately to the Chair of the IRB and / or the URCO.

Electronically signed by Rick Scheidt on 05/02/2022 10:45 AM ET

Appendix C Parent Consent Form

Project Title and Purpose:

Your child is invited to participate in a research study entitled The Impact of Four Sources of Self-Efficacy and Mathematics Performance of Immigrant Students or Students with an Immigration Background in an Urban High School. This study determines whether student self-efficacy in learning mathematics is associated with their mathematics performance and the differences in gender, grade level, immigration generation, acculturation, etc.

Investigator(s):

This study is being conducted by the principal investigator J. Spencer Clark and the doctoral student Evangeline Li.

What is the study about?

This research project examines whether and how your child's internal emotions, beliefs, perceptions, experiences, and other related variables are associated with their mathematics performance. In this study, your child will be asked to provide their honest, personal opinion on the survey questions about their perceived self-efficacy in learning mathematics, acculturation levels, and some demographic information.

Why are you asking my child?

Your child is invited to participate in this research study because they are a Reading High School student who has taken or is taking mathematics classes.

What will you ask my child to do if I agree to let him or her be in the study?

The survey will be sent out via email. Participating students will be asked to complete the survey at their convenience. The questions on the survey will collect information about students' perceived self-efficacy in learning mathematics, their acculturation levels, and some demographic data.

What is the length of the study?

The research study will last no longer than three years.

What are the risks to my child?

There is no known risk to participants.

Whole genome sequencing will not be included as part of the research

No clinically relevant research results will be disclosed to you as part of the research.

If you have questions, want more information or have suggestions, please contact Evangeline Li who may be reached at 609-516-7271 or evangelineli@ksu.edu.

If you have any concerns about your rights, how you are being treated, concerns or complaints about this project, or benefits or risks associated with being in this study, please contact the principal investigator J. Spencer Clark at jspencerclark@ksu.edu or the IRB chair of Office of Research Compliance Dr. Rick Scheidt at KSU at comply@ksu.edu.

Are there any benefits to *my child* as a result of participation in this research study?

There are no direct benefits to participants in this study.

Are there any benefits to society as a result of my child taking part in this research?

The results will be helpful to educators and schools in similar urban settings in the U.S. or worldwide to copiously address issues related to the prominent sources. The findings may be used to advocate and enhance the more protuberant role that the specific source of self-efficacy is acting in the mathematical performance of first- and second-generation immigrant students. Likewise, they can potentially be used to create and implement improvement plans and manage or control the root causes of immigrant student underperformance. Additionally, the outcomes of the study may also be used to project and potentially change immigrant student mathematics learning trajectories in urban high schools. It is anticipated that mathematics or relevant teacher education programs also consider, design, and integrate different ways and strategies to promote and reinforce the leading sources of self-efficacy in the teaching and training.

Will my child get paid for being in the study? Will it cost me anything for my kid to be in this study?

There are no costs to you or payments to you or your child as a result of participation in this study.

How will my child's information be kept confidential?

All collected data and information will remain confidential. Any data collected by the investigators will be kept confidential and will be stored and password protected by investigators. Participants will be assigned a random numerical code, and at no time will any student's actual identity be revealed. All information obtained in this study is strictly confidential unless disclosure is required by law. Absolute confidentiality of data provided through the Internet cannot be guaranteed. Please be sure to close the browser when finished so no one will be able to see what you have been doing.

The information or biospecimens that will be collected as part of this research will not be shared with any other investigators. Participant data will not be shared with other researcher in the future without returning for informed consent.

What if my child wants to leave the study or I want him/her to leave the study?

You have the right to refuse to allow your child to participate or to withdraw him or her at any time, without penalty. If your child does withdraw, it will not affect you or your child in any way. If you or your child chooses to withdraw, any data which has been collected from your child will be destroyed. The investigators also have the right to stop your child's participation at any time.

This could be because your child has had an unexpected reaction, has failed to follow instructions, or because the entire study has been stopped.

What about new information/changes in the study?

If significant new information relating to the study becomes available, which may relate to your willingness allow your child to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

I have read the information in this consent form. I have had the chance to ask questions about this study, and those questions have been answered to my satisfaction. I am at least 18 years of age, and I agree for my child to participate in this research project. I understand that I will receive a copy of this form after it has been signed by me and the Principal Investigator.

Student Name (print)

Parent Name (print)

Parent Signature

DATE

Appendix D Student Assent Form

Terms of participation: I understand this project is research and that my participation is voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time and stop participating at any time without explanation, penalty, loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form and willingly agree to participate in this study under the terms described and that my signature acknowledges that I have received a signed and dated copy of this consent form.

Participant Name (print)

Participant Signature

DATE

Witness Signature

DATE

Appendix E Survey Instrument

The purpose of this research study is to get a better understanding of your internal emotions, beliefs, perspectives, and experiences in learning mathematics. You are invited to participate in this research study because you are a Reading High School student who has taken or is taking mathematics classes. Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized.

The procedure involves filling out an online survey that consists of sixty-six (66) questions that will take approximately twenty (20) minutes. Your answer will be kept confidential and will not be identified by name. All data is stored in a password-protected electronic format and will be destroyed after the research study is completed.

Electronic Consent: Please select your choice below.

Click on the "agree" button below indicates that you have read the above information and voluntarily agree to participate. If you do not wish to participate in the research study, please decline participation by closing the page or clicking the "disagree" button.

- ☐ Agree
- ☐ Disagree

1.1.1.1.1.1 Section I

The first section is constructed to assist us in getting a better understanding of your internal emotions, beliefs, and perceptions about learning mathematics. Please indicate how strongly you agree or disagree with the following statements.

1. I make excellent grades on math tests. (ME)
 - a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
2. I have always been successful with math. (ME)
 - a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
3. Even when I study very hard, I do poorly in math. (ME)
 - a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
4. I got good grades in math on my last report card. (ME)
 - a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
5. I do well on math assignments. (ME)
 - a. Strongly Disagree
 - b. Disagree

- c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
6. I do well on even the most difficult math assignments. (ME)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
7. Seeing adults (i.e., parents, teacher, boss, etc.) do well in math pushes me to do better. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
8. When I see how my math teacher solves a problem, I can picture myself solving the problem in the same way. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
9. Seeing kids do better than me in math pushes me to do better. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree

- e. Agree
 - f. Strongly Agree
10. When I see how another student solves a math problem, I can see myself solving the problem in the same way. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
11. I imagine myself working through challenging math problems successfully. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
12. I compete with myself in math. (VE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
13. My math teachers have told that I am good at learning math. (VP)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree

14. People have told me that I have a talent for math. (VP)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
15. Adults in my family have told me what a good math student I am. (VP)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
16. I have been praised for my ability in math. (VP)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
17. Other students have told me that I'm good at learning math. (VP)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
18. My classmates like to work with me in math because they think I'm good at it. (VP)
- a. Strongly Disagree
 - b. Disagree

- c. Somewhat Disagree
- d. Somewhat Agree
- e. Agree
- f. Strongly Agree

19. Just being in math class makes feel stressed and nervous. (PE)

- a. Strongly Disagree
- b. Disagree
- c. Somewhat Disagree
- d. Somewhat Agree
- e. Agree
- f. Strongly Agree

20. Doing math work takes all of my energy. (PE)

- a. Strongly Disagree
- b. Disagree
- c. Somewhat Disagree
- d. Somewhat Agree
- e. Agree
- f. Strongly Agree

21. I start to feel stressed-out as soon as I begin my math work. (PE)

- a. Strongly Disagree
- b. Disagree
- c. Somewhat Disagree
- d. Somewhat Agree
- e. Agree
- f. Strongly Agree

22. My mind goes blank and I am unable to think clearly when doing math work. (PE)

- a. Strongly Disagree
- b. Disagree
- c. Somewhat Disagree
- d. Somewhat Agree
- e. Agree

- f. Strongly Agree
23. I get depressed when I think about learning math. (PE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree
24. My whole body becomes tense when I have to do math. (PE)
- a. Strongly Disagree
 - b. Disagree
 - c. Somewhat Disagree
 - d. Somewhat Agree
 - e. Agree
 - f. Strongly Agree

1.1.1.1.1.2 Section II

This section contains questions about your *culture of origin* and your *native language*.

By *culture of origin*, we refer to the culture of the country either you or your parents came from (e.g., Puerto Rico, Dominican Republic, Cuba, Vietnam, China). By *native language*, we refer to the language of that country spoken by you or your parent in that country (e.g., Spanish, French, Vietnamese, Mandarin). If you come from a multicultural family, choose the culture you relate to the most. Please select a response best describes each statement.

25. I think of myself as being U.S. American.
- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
26. I feel good about being U.S. American.

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

27. Being U.S. American plays an important part in my life.

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

28. I feel that I am part of U.S. American culture.

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

29. I have a strong sense of being U.S. American.

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

30. I am proud of being U.S. American.

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

31. I think of myself as being _____ (a member of my culture of origin).

- a. Strongly Disagree
- b. Disagree
- c. Agree
- d. Strongly Agree

32. I feel good about being _____ (a member of my culture of origin).

- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
33. Being _____ (a member of my culture of origin) plays an important part in my life.
- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
34. I feel that I am part of _____ culture (culture of origin).
- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
35. I have a strong sense of being _____ (culture of origin).
- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
36. I am proud of being _____ (culture of origin).
- a. Strongly Disagree
 - b. Disagree
 - c. Agree
 - d. Strongly Agree
37. How well do you speak English at school?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
38. How well do you speak English with American friends?
- a. Not at all

- b. A little
- c. Pretty well
- d. Extremely well

39. How well do you speak English on the phone?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

40. How well do you speak English with strangers?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

41. How well do you speak English in general?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

42. How well do you understand English on television or in movies?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

43. How well do you understand English in newspapers and magazines?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

44. How well do you understand English words in songs?

- a. Not at all
- b. A little

- c. Pretty well
 - d. Extremely well
45. How well do you understand English in general?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
46. How well do you speak your native language with family?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
47. How well do you speak your native language with friends from the same country as you?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
48. How well do you speak your native language on the phone?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
49. How well do you speak your native language with strangers?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
50. How well do you speak your native language in general?
- a. Not at all
 - b. A little
 - c. Pretty well

- d. Extremely well
51. How well do you understand your native language on television or in movies?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
52. How well do you understand your native language in newspapers and magazines?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
53. How well do you understand your native language words in songs?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
54. How well do you understand your native language in general?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
55. How well do you know American national heroes?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
56. How well do you know popular American television shows?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well

57. How well do you know popular American newspaper and magazines?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
58. How well do you know popular American actors and actresses?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
59. How well do you know American history?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
60. How well do you know American political leaders?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
61. How well do you know national heroes from your native culture?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
62. How well do you know popular television shows in your native language?
- a. Not at all
 - b. A little
 - c. Pretty well
 - d. Extremely well
63. How well do you know popular newspapers and magazines in your native language?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

64. How well do you know popular actors and actress from your native culture?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

65. How well do you know history of your native culture?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

66. How well do you know political leaders from your native culture?

- a. Not at all
- b. A little
- c. Pretty well
- d. Extremely well

1.1.1.1.1.3 Section III

The last section is about your demographic information. Please answer each question as accurately as you can.

- Gender:
 - Male
 - Female
- Grade Level:
 - 9th
 - 10th
 - 11th

- 12th
- Immigration Generation:
 - I was born here, and all people in my family were born here (including grandparents).
 - I was born here, and my parents were also born here.
 - I was born here, but my parents were not.
 - I was not born here, nor did my parents.
- Age at Arrival to the U.S.:
 - I was born here.
 - I arrived in the U.S. between 0 to 5 years old.
 - I arrived in the U.S. between 6 to 11 years old.
 - I arrived in the U.S. between 12 to 14 years old.
 - I arrived in the U.S. between 15 to 16 years old.
 - I arrived in the U.S. after 16 years old.
- Socioeconomic Status:
 - I am eligible for free lunch in school
 - I am eligible for reduced price lunch in school
 - I bring my own lunch or pay full price lunch everyday
- Parent or Guardian Educational Level (highest of either parent):
 - No education or below elementary school
 - Elementary school
 - Middle school
 - High school college
 - College
 - Graduate school (beyond college)
- The Number of Students in Your Math Class (do your best approximation):
 - 10 or below
 - Between 11 to 20
 - Between 21 to 30
 - Between 31 to 40
 - 40 or above

Are you reading all the questions carefully and choosing the most accurate description for each question?

- ☐ Yes
- ☐ No