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A Pre- and Post-Pandemic Analysis of the Mathematics Performance: A Multiyear Analysis of Texas Grade 8 Emergent Bilingual Students by their Economic Status

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ABSTRACT

In this Texas multiyear investigation, the Grade 8 STAAR Mathematics performance of Emergent Bilingual students was examined by their economic status. Five years of data, two prior to the pandemic (i.e., 2017-2018 and 2018-2019) and three post-pandemic (i.e., 2020-2021, 2021-2022, and 2022-2023), were analyzed to ascertain the effects of the COVID-19 pandemic. In four of the five years of data analyzed, statistically significantly lower percentages of Emergent Bilingual students in poverty met the Grade 8 STAAR Mathematics Approaches Grade Level Standard than Emergent Bilingual students not in poverty. An interesting finding is that in the three years following the pandemic, the gap in the percentages of Emergent Bilingual students in poverty who met all three Grade Level Standards compared to those Emergent Bilingual students not in poverty widened. Additionally, in the 2022-2023 school year, a higher percentage of both groups met all Grade Level Standards before the pandemic except in the Meets Grade Level Standard for those Emergent Bilingual students who were in poverty.

Keywords: Economic Status, Emergent Bilingual, Grade Level Standards, Texas

INTRODUCTION

The United States has historically been a nation of immigrants. Ever since its founding, people seeking refuge, or a better life have been welcomed. This influx of diverse immigrants has resulted in an increase of people with a wide range of linguistic repertoires. Students in the United States whose native language is not English are referred to by various terms such as English Learners, English Language Learners, and most recently Emergent Bilinguals. In this proposed article, the term Emergent Bilingual will replace previously used terms. Moreover, the intersection of language and poverty will be examined in this investigation because poverty is a contributing factor that affects student academic outcomes (Nation's Report Card, 2023a) and when combined with language acquisition, these students have more to overcome. Of importance to this study, more than 38 million people in the United States live in poverty as of 2022 (Shrider & Creamer, 2023).

LITERATURE REVIEW

As of 2020, Emergent Bilingual students were the most rapidly expanding subgroup in the United States, accounting for almost 10% of the entire student population (National Center for Education Statistics, 2023a), and are projected to reach 40% of the student population by 2030 (Huang, 2022). The percentage of the Emergent Bilingual student population in the United States increased by 35% between 2000 and 2020 (Office of English Language Acquisition, 2021). Of note, the distribution of where Emergent Bilingual students live has also shifted over the past 20 years. In 2000, California had the highest percentage of Emergent Bilingual students in the nation and Texas was fifth on the list at 14.1% (Office of English Language Acquisition, 2021).

As previously mentioned, poverty has detrimental effects on students' academic outcomes. Students living in poverty are eligible for free meals if their family income is between 130 and 185% of the federal poverty level, and students are eligible for reduced lunch if their family income is at or below 130 of the poverty line (National Center for Education Statistics, 2023b). For 2022, the Nation's Report Card (2023a) established that Grade 4 and Grade 8 students eligible for the National School Lunch Program performed much lower than similar students who did not qualify for the program. According to the National Center for Education Statistics, only 13% of Grade 8 students who were eligible for the National School Lunch Program scored at the proficient level, whereas 38% of Grade 8 students who were not eligible for the program met proficiency standards (Nation's Report Card, 2023a). This statistic reflects a 5% and 10% decrease in scores, respectively, from 2019 (Nation's Report Card, 2023a).

Students from families in poverty have academic needs long before they start schooling (Kiss et al., 2019; Morgan et al., 2023). Furthermore, Kiss et al. (2019) and Morgan et al. (2023) have established that academic difficulties for students living in poverty start at an early age. Morgan et al. (2023) determined that racial and ethnic disparities in advanced mathematics and science were evident before first grade in children from families in poverty. Specifically, White and Asian students were 10% to 13% more likely to have higher advanced mathematics or science achievement than Black or Hispanic students. Carnoy and Garcia (2017) have established that language and poverty status matter for Black, Hispanic, and Asian students. They concluded that Black, Hispanic, and Asian students who attend a high-poverty school are more likely to have lower mathematics and reading achievement than are White students. In addition to lower mathematics achievement on standardized assessments, the Office of English Language Acquisition (2023) noted that Emergent Bilingual students were 15% less likely to graduate from high school than were non-Emergent Bilingual students.

Regarding academics, students in the United States are underperforming in mathematics compared to students in other developed nations (Peterson et al., 2011). Students in numerous countries take the Program for International Student Assessment every three years. This assessment measures a 15-year-old's abilities in mathematics, reading, and science literacy (National Center for Education Statistics, 2023c). Over the past two decades, the average Program for International Student Assessment score for students in the United States declined from 483 in 2003 to 465 in 2022 (National Center for Education Statistics, 2023d). In addition to the Program for International Student Assessment, student achievement is measured every two years in Grades 4, 8, and 12, through a national assessment designed to measure academics in the United States called The National Assessment of Educational Progress. According to the 2022 administration of The National Assessment of Educational Progress, The Nation's Report Card (2023a) determined that only 26% of United States Grade 8 students scored proficient on the mathematics assessment. Although this statistic represents an 11-point increase from 1990, it is a decrease of 7 points compared to 2019 (Nation's Report Card, 2023a).

In 2010, in the state of focus of this investigation, 17.9% of Texans were living in poverty, but as of 2020, 14.2% were living in poverty. Out of the four million people living in poverty in Texas, almost one in five are people under the age of 18 (United States Census, 2023). Over 5 million students are enrolled in public schools, with over 62% of those students living in poverty. This statistic represents an increase of 4% from the 2021-2022 school year to the 2022-2023 school year (Texas Education Agency, 2023a; United States Census Bureau, 2023). As recently as 2023, more than one million students, or 23% of students were considered Emergent Bilingual in Texas (National Assessment of Educational Progress, 2022; Texas Education Agency, 2023a). Of importance for

readers is that in 2022, the Texas Education Agency documented that more than 84% of Emergent Bilingual students were also economically disadvantaged (Texas Education Agency, 2023a).

Of all Texas Grade 8 students, only 24% were proficient on the National Assessment of Educational Progress Mathematics assessment in 2022, which represents a 6% decrease compared to 2019, before the COVID-19 pandemic (Nation's Report Card, 2023b). Fewer Texas students scored proficiently on the mathematics assessment than the average student in the United States. In a recent Texas study, Argueta (2022) examined the mathematics performance of Grade 3 Emergent Bilingual students by their economic status. Archival data were analyzed for the 2016-2017 through the 2018-2019 school years. In all three school years, Emergent Bilingual students who were economically disadvantaged had lower achievement test scores across all mathematics reporting categories and performance standards than their peers who were not in poverty.

In another Texas study, Davenport and Slate (2019) analyzed the relationship between economic status and mathematics achievement of Grade 3 students on the Texas state-mandated assessment for three school years (i.e., 2016-2017, 2017-2018, 2018-2019). They established the presence of statistically significantly lower mathematics test scores as student poverty levels increased. They also documented that Black and Hispanic students who were in poverty had lower mathematics test scores than Black and Hispanic students who were not in poverty (Davenport & Slate, 2019).

In a similar study, Davenport (2021) addressed the mathematics performance of boys by their economic status. Through his three-year analysis (i.e., 2016-2017, 2017-2018, 2018-2019), he established that Grade 3 Hispanic and Black boys who were in poverty performed poorer than Hispanic and Black boys who were not in poverty on the Texas state-mandated assessment. This statistic is further substantiated by a recent study conducted by Resilla (2017) in which she investigated the mathematics college-readiness of Texas students as a function of their language status. Resilla (2017) concluded that Emergent Bilingual students were less likely to be college-ready than non-Emergent Bilingual students and therefore "limited proficiency in the English language negatively influenced the academic achievement of all English Language Learners" (Resilla, 2017, p. 94).

In a study about college preparedness, Alford-Stephens (2016) analyzed the mathematics performance of Texas boys as a function of their ethnicity/race. In her multiyear analysis from the 2004-2005 through 2011-2012 school years, she established the presence of statistically significant differences in mathematics performance by student ethnicity/race. She established that Asian boys had the highest performance followed by White, Hispanic, and Black boys. These findings were consistent with Resilla (2017).

Reilly et al. (2015) examined the performance on mathematics and science assessments as a function of gender. Data were obtained from the National

Assessment of Educational Progress for the 1990-2011 school years for students in Grades 4, 8, and 12. Statistically significant differences were identified in that boys outperformed girls in mathematics and science across the three grade levels. Of particular interest, Reilly et al. (2015) noted that the magnitude of gender differences increased from elementary to the final year of high school.

Researchers (e.g., Davenport & Slate, 2019; Lee & Slate, 2014; Resilla & Slate, 2023) have documented the presence of disparities between family income and student achievement. The income of families living in urban areas had a stronger link to Grade 8 achievement than in suburban and rural areas (Miller & Votruba-Drzal, 2015). Concerning academic achievement, students who were economically disadvantaged were more likely to underperform academically than their peers who were not in poverty (Davenport & Slate, 2019; Miller et al., 2019). The National Center for Education Statistics (2023b) reported that students in high-poverty schools where more than 75% of students qualify for free or reduced lunch scored, on average, score 50 points lower than schools whose population of students eligible for free or reduced lunch was 10% or lower. These studies exhibit a need for additional research investigations into these areas.

In the State of Texas, students are assessed in Grades 3 through 8 in mathematics through the State of Texas Assessment of Academic Readiness, otherwise referred to as the STAAR test. For this investigation, the focus will be on three performance measures (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) that are present on the Grade 8 STAAR Mathematics test. Of all the students who participated in the Grade 8 STAAR Mathematics test in the Spring of 2022, 69% achieved the Approaches Grade Level standard, 38% achieved the Meets Grade Level standard, and 13% achieved the Masters Grade Level standard (State of Texas Assessments of Academic Readiness, 2023). Grade 8 students who were economically disadvantaged had lower percentage rates in each of the three performance measures compared to students who were not economically disadvantaged. Grade 8 boys, in particular, achieved Met Grade Level standard at 37%, which is 1% higher than the overall score. For the 2022 STAAR Mathematics test administration, 57% of Grade 8 Emergent Bilingual students obtained Approaches Grade Level standard, 24% achieved the Meets Grade Level standard, and 6% achieved the Masters Grade Level standard (STAAR, 2023). Conversely, non-Emergent Bilingual students outperformed Emergent Bilingual students in each of the performance measures by 15%, 16%, and 8%, respectively. Recent results from international, national, and statewide assessments add to the literature that achievement gaps still exist not only by student economic status but also by student language status in Texas. Addressed in this investigation was the extent to which the existing gap in the literature is still present, as this article will be the first study on the mathematics performance of Grade 8 students after the pandemic. For this article, connections between

language and poverty status were examined, specifically the effect of the Covid-19 pandemic on student performance.

Theoretical Framework

Within this article, cultural-ecological theory (Ogbu & Simons, 1998) wase applied as the framework to investigate and to interpret any disparities in the academic performance of Grade 8 students, focusing on their economic and language backgrounds. Researchers (e.g., Davenport & Slate, 2019; Lee & Slate, 2014; Resilla & Slate, 2023) have established the presence of disparities in student achievement associated with family income. These disparities are exacerbated for students who come from impoverished backgrounds and speak a different language (Argueta, 2022; Martin, 2022; Resilla, 2017). Of importance to this article, as of 2022 more than 38 million people in the United States live in poverty, with a substantial proportion of them identified as Emergent Bilingual (Shrider & Creamer, 2023). Emergent Bilingual students not only score lower in mathematics on standardized tests but also have a lower high school graduation rate, with 15% fewer obtaining a diploma compared to their non-Emergent Bilingual peers (Office of English Language Acquisition, 2023). Addressed in this article will be how Emergent Bilingual students, classified as involuntary minorities, encounter discriminatory school policies that negatively affect their academic performance. Despite Ogbu's framework primarily about the achievement gap of Black students, findings from this article will expand the focus to consider how the negative societal power dynamics affecting this minority group influence their academic success (Worrel, 2014).

Statement of the Problem

Extensive achievement gaps on standardized tests have been documented to be associated with poverty and language status of students in the United States (e.g., Argueta, 2022; Davenport, 2021; Davenport & Slate, 2019; Lee & Slate, 2014). Children born into poverty are at a disadvantage as soon as Kindergarten compared to students who are not born into poverty (Kiss et al., 2019; Morgan et al., 2023). Students from poverty are also likely to attend low-performing schools, which further exacerbates the gap between poverty levels (National Center for Education Statistics, 2023b). Additionally, gaps in high school graduation rates exist among Emergent Bilingual students based on economic status Office of English Language Acquisition, 2023). The Covid-19 pandemic affected education in 2020 as a substantial number of students received either intermittent online education from home or no schooling at all. To date, no published studies could be located about the effects that Covid-19 had on Texas Emergent Bilingual students in mathematics since schools have fully returned to in-person instruction.

Purpose of the Study

The purpose of this study was to determine the degree to which differences were present in the Grade 8 STAAR Mathematics assessment by the economic status of Emergent Bilingual students. The first objective was to examine the effects of economic status on the mathematics performance of Emergent Bilingual students by performance standard (i.e., Approaches Grade Level Standard, Meets Grade Level Standard, and Masters Grade Level Standard). The second purpose was to investigate the degree to which trends were present across five school years of Grade 8 STAAR Mathematics data (i.e., 2017-2018, 2018-2019, 2020-2021, 2021-2022, and 2022-2023) which includes two years before and three years after the pandemic. No STAAR data are available for the 2019-2020 school year due to the educational interruption caused by the COVID-19 pandemic.

Significance of the Study

Multiple researchers (e.g., Davenport & Slate, 2019; Lee & Slate, 2014; Resilla & Slate, 2023) have documented a link between economic status and academic achievement. The significance of this article was to ascertain the degree to which differences were present in the mathematics performance of Emergent Bilingual students by their economic status. Few researchers have focused on the relationship between economic an status on the mathematics performance of Grade 8 students.

According to the Texas Education Agency (2023a), alignment between the STAAR Mathematics test and classroom instruction was necessary, therefore the STAAR test was redesigned in the 2022-2023 school year through House Bill 3906. The redesign included the following components: new question types, online testing and accommodations, evidence-based writing, and cross-curricular passages. Addressed in this multiyear investigation will be three years of data before the COVID-19 pandemic and two years after the pandemic. No data are available for the 2019-2020 school year due to the COVID-19 schooling interruption.

Research Questions

The overarching research question that was addressed in this study was: What is the difference in the mathematics performance of Texas Grade 8 students by their economic status (i.e., Not Poor and Poor). Specific sub questions were: (a) What is the difference in the Approaches Grade Level standard by student economic status?; (b) What is the difference in the Meets Grade Level standard by student economic status?; (c) What is the difference in the Masters Grade Level standard by student economic status?; and (d) What trend is present in grade level mathematics standard performance by student economic status across five school years?

RESEARCH METHOD

Research Design

A non-experimental causal-comparative research design was present in this article (Johnson & Christensen, 2020). Archival data from the Texas Education Agency Public Education Information Management System for the 2017-2018, 2018-2019, 2020-2021, 2021-2022, and 2022-2023 school years were analyzed. Data for the 2019-2020 school year do not exist due to the COVID-19 pandemic. Achievement data were analyzed across the three performance standards to determine the extent of differences that existed by student economic and language status. The independent variable was student language status (i.e., Emergent Bilingual and non-Emergent Bilingual) of Grade 8 students in Texas. Dependent variables were the three student performance levels on the STAAR Mathematics exam (i.e., Approaches Grade Level, Meets Grade Level, and Masters Grade Level) for the previously mentioned school years.

Participants and Instrumentation

Participants in this study were Texas Grade 8 students who were assessed on the STAAR Mathematics exam in the 2017-2018, 2018-2019, 2020-2021, 2021-2022, and 2022-2023 school years. In this article, Emergent Bilingual refers to students who are "in the process of acquiring English and have another language as the primary or home language" (Texas Education Agency, 2023a, p. 2). This term was used to refer to all the previous labels. Data were acquired from the Texas Education Public Information Management System. A Public Information Request was submitted to the Texas Education Agency requesting: (a) grade level, (b) STAAR Mathematics performance levels, (c) Emergent Bilingual indicator, and (d) economic status. Data were then uploaded into the Statistical Package for Social Sciences software program.

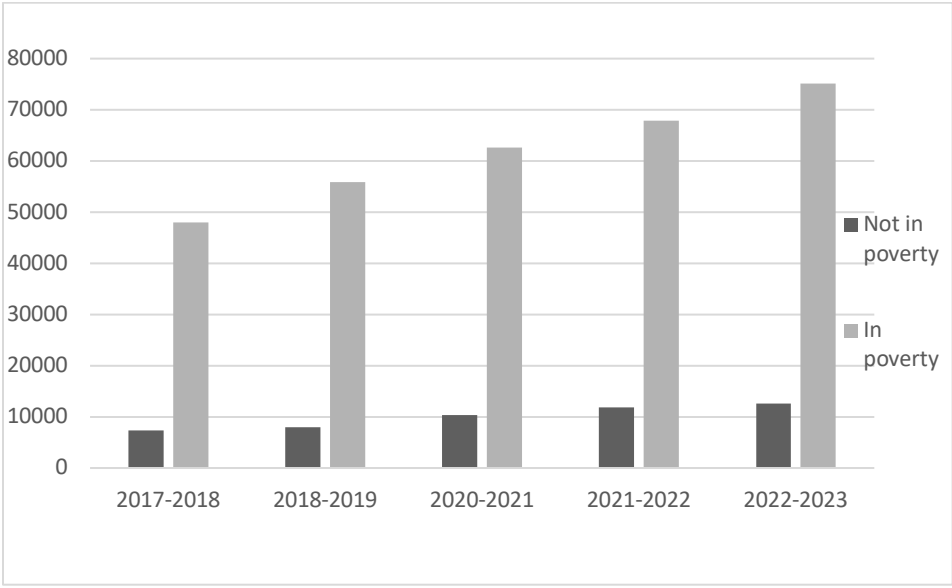
As indicated in Table 1, the total number of Emergent Bilingual students who participated in the Grade 8 STAAR Mathematics test increased from 55,321 in 2017-2018 to 87,767 in 2022-2023, representing a 59% increase. Of note, the number of Emergent Bilingual students who were in poverty increased each year from 48,037 during the 2017-2018 school year to 75,143, a 56% increase, in the 2022-2023 school year. Represented in Figure 1 are these percentages across the five school years.

Three performance measures are assessed on the STAAR mathematics assessment. Students who attain the Approaches Grade Level performance standard are expected to advance successfully to the next grade or course with focused academic intervention. Generally, these students can demonstrate skills in familiar contexts (Texas Education Agency, 2017).

Table 1: Percentages and Frequencies of Texas Emergent Bilingual Students and Their Economic Status for All Five School Years

School Year	Economically Disadvantaged *n* (%age)	Not Economically Disadvantaged *n* (%age)
2017-2018	*n* = 48,037 (86.8%)	*n* = 7,284 (13.2%)
2018-2019	*n* = 55,898 (87.6%)	*n* = 7,924 (12.4%)
2020-2021	*n* = 62,650 (85.9%)	*n* = 10,320 (14.1%)
2021-2022	*n* = 67,860 (85.1%)	*n* = 11,897 (14.9%)
2022-2023	*n* = 75,143 (85.6%)	*n* = 12,624 (14.4%)

Figure 1: Average Percentages of Emergent Bilingual Students by Their Economic Status for All Five School Years



Achievement in the Meets Grade Level standard indicates students who are likely to be successful in the next grade level or course but may still require short-term, targeted academic intervention. Students in this category generally demonstrate the ability to think critically and apply the assessed knowledge and skills in familiar contexts (Texas Education Agency, 2017). Students who achieve the Masters Grade Level performance are expected to succeed in the next grade or course with little or no academic intervention. Students in this category demonstrate the ability to think critically and apply the assessed knowledge and skills in varied contexts, both familiar and unfamiliar (Texas Education Agency, 2017).

Moreover, student performance on the STAAR Mathematics exam will also be investigated based on their economic status, as determined by their eligibility for the Free and Reduced Lunch Program. Students are eligible for free meals if their family income is between 130 and 185% of the Federal poverty level, and students are eligible for reduced lunch if their family income is at or below 130 of the poverty line (National Center for Education Statistics, 2023b). Students who are eligible for either the free lunch program or the reduced lunch program will be classified as Poor. Students who are not eligible for the program will be referred to as Not Poor.

Regarding the validity and reliability of the STAAR assessment, the Texas Education Agency enlisted the Human Resources Research Organization to conduct an independent evaluation of the STAAR test (Texas Education Agency, 2016). The alignment of the mathematics assessment to intended expectations was determined to be 97.7% and 96.3%, respectively (Texas Education Agency, 2016). For additional information about the reliability and validity of the STAAR reading assessment, consult the Technical Manuals on the Texas Education Agency website.

RESULTS

Data Analysis

To ascertain whether differences were present in the mathematics performance of Texas Grade 8 Emergent Bilingual students by their economic status (i.e., Not Poor and Poor) at Approaches Grade Level standard, Meets Grade Level standard, and Masters Grade Level standard, Pearson chi-square analyses were conducted. Pearson chi-square procedures are the most appropriate statistical procedure to use when the independent variable and dependent variables are dichotomous. Thus, chi-squares are the statistical procedure of choice when both variables are categorical (Slate, 2023). Prior to calculating Pearson chi-square procedures, its underlying assumptions were checked, and they were met.

Approaches Grade Level Analyses Across All Three School Years

For the first research question on the Approaches Grade Level standard for the 2017-2018 school year, the result was not statistically significant, $\chi^2(1) = 0.85$, $p = .36$. Emergent Bilingual students, regardless of their economic status, had similar percentages who met the Approaches Grade Level standard in this school year. Descriptive statistics for this analysis are contained in Table 2.

With respect to 2018-2019 school year, the Pearson chi-square revealed the presence of a statistically significant difference, $\chi^2(1) = 9.67$, $p = .002$, Cramer's V was below small, .01 (Cohen, 1988).

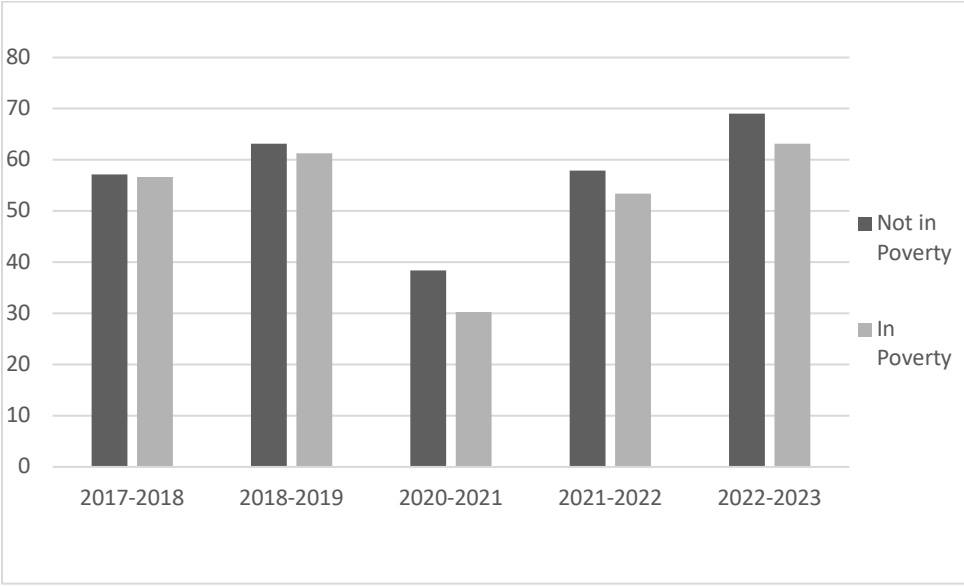
Table 2: Percentages and Frequencies of Emergent Bilingual Students Who Met the Approaches Grade Level Standard by Student Economic Status for All Five School Years

School Year and Economic Status	Did Not Meet *n* and %age of Total	Met *n* and %age of Total
2017-2018		
Not Economically Disadvantaged	(*n* = 3,116) 42.8%	(*n* = 4,168) 57.2%
Economically Disadvantaged	(*n* = 20,826) 43.4%	(*n* = 27,211) 56.6%
2018-2019		
Not Economically Disadvantaged	(*n* = 2,924) 36.9%	(*n* = 5,000) 63.1%
Economically Disadvantaged	(*n* = 21,642) 38.7%	(*n* = 34,256) 61.3%
2020-2021		
Not Economically Disadvantaged	(*n* = 56,358) 61.6%	(*n* = 3,962) 38.4%
Economically Disadvantaged	(*n* = 43,667) 69.7%	(*n* = 18,983) 30.3%
2021-2022		
Not Economically Disadvantaged	(*n* = 5,003) 42.1%	(*n* = 6,894) 57.9%
Economically Disadvantaged	(*n* = 31,600) 46.6%	(*n* = 36,260) 53.4%
2022-2023		
Not Economically Disadvantaged	(*n* = 3,9151) 31%	(*n* = 8,709) 69%
Economically Disadvantaged	(*n* = 27,680) 36.8%	(*n* = 47,463) 63.2%

As delineated in Table 2, a statistically significantly lower percentage of Emergent Bilingual students in poverty, nearly 2 percentage points more, met the Approaches Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Concerning the 2020-2021 school year, the Pearson chi-square revealed the presence of a statistically significant difference, $\chi^2(1) = 269.1$, $p < .001$, Cramer's V was below small, .06 (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, 8 percentage points higher, met the Approaches Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Descriptive statistics for this analysis are contained in Table 2.

Regarding the 2021-2022 school year, a statistically significant difference was yielded, $\chi^2(1) = 83.06$, $p < .001$, Cramer's V was below small, .03 (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, almost 5 percentage points more, met the Approaches Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Descriptive statistics for this analysis are contained in Table 2. With respect to the 2022-2023 school year, a statistically significant difference was revealed, $\chi^2(1) = 159.12$, $p < .001$, Cramer's V was below small, .04 (Cohen, 1988). As presented in Table 2, a statistically significantly lower percentage of Emergent Bilingual students in poverty, almost 6 percentage points lower, met the Approaches Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. The results across all five school years are depicted in Figure 2.

Figure 2: Average Percentages of Emergent Bilingual Students by Their Economic Status Who Met Grade 8 STAAR Mathematics Approaches Grade Level Standard for All Five School Years



Meets Grade Level Analyses Across All Five School Years

For the first research question on the Meets Grade Level standard for the 2017-2018 school year, the result was statistically significant, $\chi^2(1) = 27.87$, $p < .001$. The effect size for this finding, Cramer's V, was below small, .02 (Cohen, 1988). As revealed in Table 3, a statistically significantly lower percentage of Emergent Bilingual students in poverty, 3 percentage points, met the Meets Grade Level standard than did Emergent Bilingual students who were not in poverty.

Table 3: Percentages and Frequencies of Emergent Bilingual Students Who Met the Meets Grade Level Standard by Student Economic Status for All Five School Years

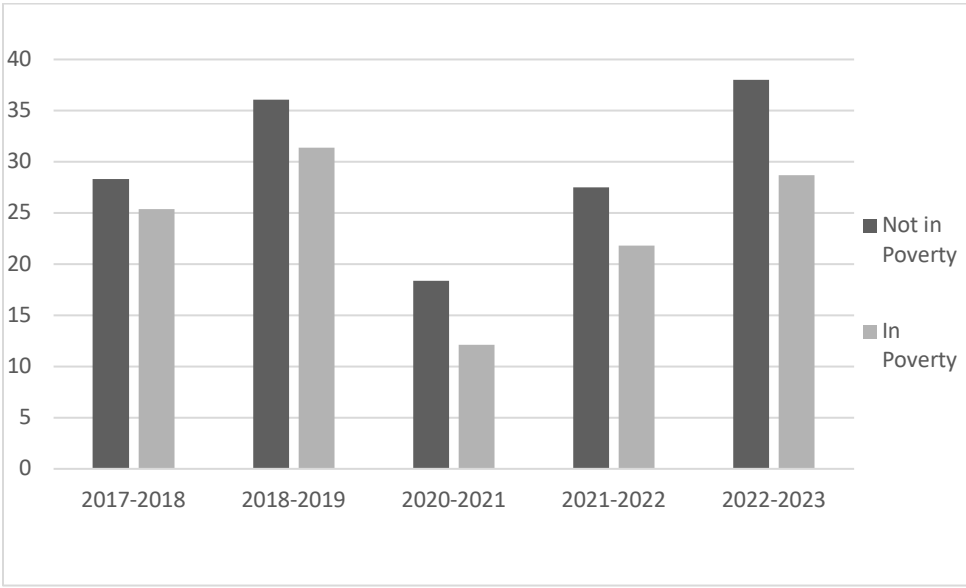
School Year and Economic Status	Did Not Meet *n* and %age of Total	Met *n* and %age of Total
2017-2018		
Not Economically Disadvantaged	(*n* = 5,224) 71.7%	(*n* = 2,060) 28.3%
Economically Disadvantaged	(*n* = 35,846) 74.6%	(*n* = 12,191) 25.4%
2018-2019		
Not Economically Disadvantaged	(*n* = 5,061) 63.9%	(*n* = 2,863) 36.1%
Economically Disadvantaged	(*n* = 38,371) 68.6%	(*n* = 17,527) 31.4%
2020-2021		
Not Economically Disadvantaged	(*n* = 8,419) 81.6%	(*n* = 1,901) 18.4%
Economically Disadvantaged	(*n* = 55,083) 87.9%	(*n* = 7,567) 12.1%
2021-2022		
Not Economically Disadvantaged	(*n* = 8,629) 72.5%	(*n* = 3,268) 27.5%
Economically Disadvantaged	(*n* = 53,074) 78.2%	(*n* = 14,786) 21.8%
2022-2023		
Not Economically Disadvantaged	(*n* = 7,833) 62%	(*n* = 4,791) 38%
Economically Disadvantaged	(*n* = 53,592) 71.3%	(*n* = 21,551) 28.7%

With respect to 2018-2019 school year, the Pearson chi-square revealed the presence of a statistically significant difference, $\chi^2(1) = 72.8$, $p < .001$. The effect size for this finding, Cramer's V, was below small, .03 (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, 5 percentage points higher, met the Meets Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Descriptive statistics for this analysis are contained in Table 3. Regarding the 2020-2021 school year, the Pearson chi-square revealed the presence of a statistically significant result, $\chi^2(1) = 315.64$, $p < .001$. The effect size for this finding, Cramer's V, was below small effect size, .07 (Cohen, 1988). As delineated

in Table 3, a statistically significantly lower percentage of Emergent Bilingual students in poverty, 6 percentage points higher, met the Meets Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty.

Concerning the 2021-2022 school year, a statistically significant difference was yielded, $\chi^2(1) = 186.49$, $p < .001$, Cramer's V of .05, below small effect size (Cohen, 1988). As presented in Table 3, a statistically significantly lower percentage of Emergent Bilingual students in poverty, 6 percentage points higher, met the Meets Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. For the 2022-2023 school year, a statistically significant result was revealed, $\chi^2(1) = 442.31$, $p < .001$, Cramer's V of .07, a below small effect size (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, 9 percentage points higher, met the Meets Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Descriptive statistics for this analysis are contained in Table 3. The results across all five school years are depicted in Figure 3.

Figure 3: Average Percentages of Emergent Bilingual Students by Their Economic Status Who Met Grade 8 STAAR Mathematics Meets Grade Level Standard for All Five School Years



Masters Grade Level Analyses Across All Five School Years

For the first research question on the Masters Grade Level standard for the 2017-2018 school year, the result was statistically significant, $\chi^2(1) = 61.24$, $p <$

.001. The effect size for this finding, Cramer's V, was below small, .03 (Cohen, 1988). As revealed in Table 4, a statistically significantly lower percentage of Emergent Bilingual students in poverty, more than 2 percentage points, met the Masters Grade Level standard than did Emergent Bilingual students who were not in poverty.

Table 4: Percentages and Frequencies of Emergent Bilingual Students Who Met the Masters Grade Level Standard by Student Economic Status for All Five School Years

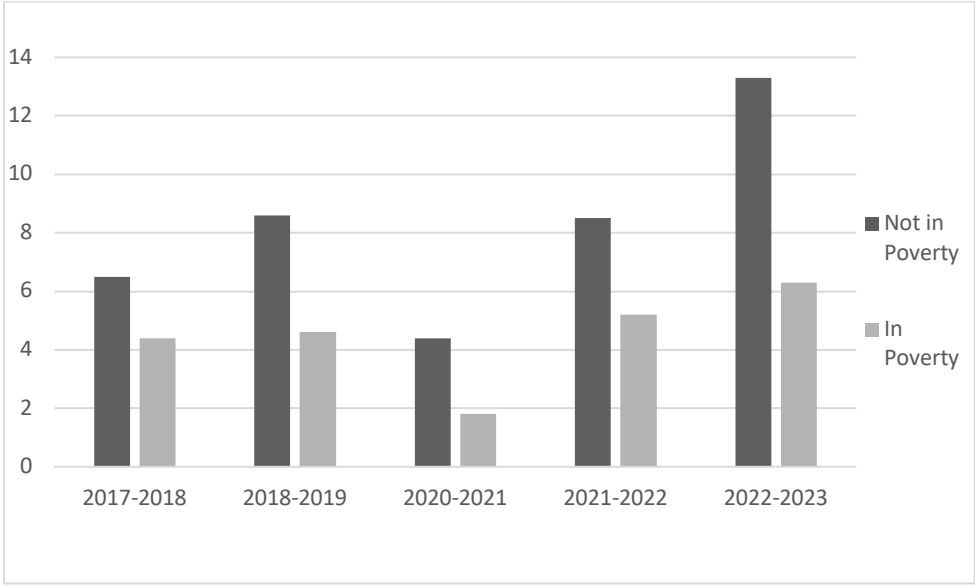
School Year and Economic Status	Did Not Meet *n* and %age of Total	Met *n* and %age of Total
2017-2018		
Not Economically Disadvantaged	(*n* = 6,814) 93.5%	(*n* = 470) 6.5%
Economically Disadvantaged	(*n* = 45,933) 95.6%	(*n* = 2,104) 4.4%
2018-2019		
Not Economically Disadvantaged	(*n* = 7,245) 91.4%	(*n* = 679) 8.6%
Economically Disadvantaged	(*n* = 53,301) 95.4%	(*n* = 2,597) 4.6%
2020-2021		
Not Economically Disadvantaged	(*n* = 9,862) 95.6%	(*n* = 458) 4.4%
Economically Disadvantaged	(*n* = 61,531) 98.2%	(n = 1,119) 1.8%
2021-2022		
Not Economically Disadvantaged	(*n* = 10,884) 91.5%	(*n* = 1,013) 8.5%
Economically Disadvantaged	(*n* = 64,358) 94.8%	(*n* = 3,502) 5.2%
2022-2023		
Not Economically Disadvantaged	(*n* = 10,944) 86.7%	(*n* = 1,680) 13.3%
Economically Disadvantaged	(*n* = 70,409) 93.7%	(*n* = 4,734) 6.3%

With respect to 2018-2019 school year, a statistically significant difference was yielded, $\chi^2(1) = 219.33$, $p < .001$, Cramer's V of .06, below small effect size (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, 4 percentage points higher, met the

Masters Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Descriptive statistics for this analysis are contained in Table 4. Concerning the 2020-2021 school year, a statistically significant result was revealed, $\chi^2(1) = 294.69$, $p < .001$, Cramer's V of .06, below small effect size (Cohen, 1988). As delineated in Table 4, a statistically significantly lower percentage of Emergent Bilingual students in poverty, 2 percentage points higher, met the Masters Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty.

Regarding the 2021-2022 school year, the Pearson chi-square revealed the presence of a statistically significant difference, $\chi^2(1) = 213.24$, $p < .001$. The effect size for this finding, Cramer's V of .05, was below small (Cohen, 1988). As presented in Table 4, a statistically significantly lower percentage of Emergent Bilingual students in poverty, 3 percentage points higher, met the Masters Grade Level standard in this school year compared to Emergent Bilingual students who were not in poverty. Lastly, for the 2022-2023 school year, a statistically significant difference was yielded, $\chi^2(1) = 783.61$, $p < .001$, Cramer's V of .09, below small effect size (Cohen, 1988). A statistically significantly lower percentage of Emergent Bilingual students in poverty, seven percentage points, met the Masters Grade Level standard than did Emergent Bilingual students not in poverty. Descriptive statistics for this analysis are contained in Table 4. Illustrated in Figure 4 are the results across all five school years.

Figure 4: Average Percentages of Emergent Bilingual Students by Their Economic Status Who Met Grade 8 STAAR Mathematics Masters Grade Level Standard for All Five School Years



DISCUSSION AND CONCLUSIONS

In this Texas, multiyear investigation, the mathematics performance of Grade 8 Emergent Bilingual students was examined by their economic status (i.e., Not Poor and Poor) at three grade level standards. Two of the years analyzed were before the pandemic (i.e., 2017-2018 and 2018-2019), while three years analyzed were after the pandemic (i.e., 2020-2021, 2021-2022, and 2022-2023). In the two years before the pandemic, lower percentages of Emergent Bilingual students who were in poverty met grade level performance standards on the state assessment than Emergent Bilingual students who were not in poverty. In the three years after the pandemic, statistically significantly lower percentages of Emergent Bilingual students in poverty met the Grade 8 STAAR Mathematics Approaches Grade Level Standard achievement than Emergent Bilingual students not in poverty. An interesting finding is that in the three years following the pandemic, the gap in the percentages of Emergent Bilingual students in poverty who met all three Grade Level Standards compared to Emergent Bilingual students not in poverty widened. Additionally, data analyzed from the 2022-2023 year reveals that a higher percentage of both groups met all Grade Level Standards before the pandemic except in the Meets Grade Level Standard for Emergent Bilingual students who were in poverty.

Lower percentages of Emergent Bilingual students who were in poverty met grade level performance standards compared to Emergent Bilingual students not in poverty in every single school year. In the 2018-2019 school year, before the pandemic, 31.4% of Emergent Bilingual students in poverty met the Meets Grade Level Standard, whereas 36.1% of Emergent Bilingual not in poverty met the standard. In the year after the pandemic, 2020-2021, only 12.1% of Emergent Bilingual students in poverty met the Meets Grade Level Standard. However, in the most recent year of available data, 2022-2023, 28.7% of Emergent Bilingual students in poverty achieved Meets Grade Level Standard, just short of pre-pandemic achievement.

Connections to Existing Literature

Numerous researchers (e.g., Martin, 2022; McGown, 2016; Reilly et al., 2019) have investigated the effect that poverty has on academic achievement before the pandemic. Concerning academic achievement, students who were economically disadvantaged were more likely to underperform academically than their peers who were not in poverty (Davenport & Slate, 2019; Miller et al., 2019). Before the pandemic, lower percentages of Emergent Bilingual students who were in poverty met grade level performance standards on the STAAR Mathematics test compared to Emergent Bilingual students who were not in poverty. Although results from this multiyear investigation were consistent with previous researchers (Resilla & Slate, 2023; Schleeter et al., 2020) prior to the pandemic, a gap exists

in the literature regarding the performance of Texas Emergent Bilingual students on the Grade 8 STAAR Mathematics test after the pandemic.

Connections to Theoretical Framework

The results of this pre- and post-pandemic multiyear study corroborate Ogbu's cultural-ecological theory, that the achievement of a minority group is influenced by discriminatory societal and educational practices (Worrel, 2014). Researchers (e.g., Davenport & Slate, 2019; Lee & Slate, 2014; Resilla & Slate, 2023) have documented disparities in student achievement associated with family income. These disparities are exacerbated for students who come from impoverished backgrounds and who speak a different language (Argueta, 2022; Martin, 2022; Resilla, 2017). As of 2022, more than 38 million people in the United States live in poverty, with a large proportion of them identified as Emergent Bilingual (Shrider & Creamer, 2023). Emergent Bilingual students and students who were economically disadvantaged experienced substantial roadblocks during the pandemic as public schools were not equipped to support these student groups (Lazarin, 2021).

These challenges included a shortage of technology and resources, intermittent and unreliable internet access, and discontinued language support. With the transition to remote learning, teachers were not properly trained to teach Emergent Bilingual students, particularly in a virtual setting tailored to monolingual English-speaking students. Consequently, the disparities in the academic achievement of Emergent Bilingual students in poverty, compared to Emergent Bilingual students not in poverty, widened in the years following the pandemic (i.e., 2021-2022 and 2022-2023).

Implications for Policy and for Practice

Based on the results of this statewide multi-year investigation, several implications for policy and practice are presented. Starting with policy, due to the continued increase in Emergent Bilingual students across the state, policymakers should continue advocating for Emergent Bilingual students and other at-risk student groups. One way policymakers can advocate for Emergent Bilingual students is to increase funding dedicated to improving outcomes and closing achievement gaps between the different demographic groups. Researchers (Resilla, 2017; Resilla & Slate, 2023; Schleeter et al., 2020) have demonstrated that poverty negatively affects student academic performance, therefore increasing the student allotment in the state of Texas would help address that area of need. Another implication for policy is to ensure that Texas students, specifically Emergent Bilingual students, have access to an effective, certified teacher. The state should require all teachers to hold an English as a Second Language (ESL) certification to ensure they are addressing content and language with every Emergent Bilingual student.

Next, implications for practice can be made. As Texas shifted to a redesigned STAAR test for the 2022-2023 school year, it is essential that educational leaders have access to vetted educational tools and strategies that tear down educational barriers allowing Emergent Bilingual students to thrive. School district-level staff should collaborate with surrounding district personnel to share innovative ideas and effective practices. Another implication for practice is to increase culturally relevant and linguistically responsive professional development for staff working with Emergent Bilingual students as it correlates with an increase in student outcomes (Ortiz et al., 2022). Campus leaders must continue the work in developing a collective understanding of the effects poverty has on students to ensure their teachers provide equitable instruction.

Recommendations for Future Research

Several recommendations for future research can be made based on the results of this investigation. First, because only mathematics performance was addressed, researchers are encouraged to extend this study to reading. Second, because data on only Grade 8 students were analyzed herein, researchers are encouraged to address the performance of Emergent Bilingual students in other grade levels. As this study was conducted only on Texas students, it is recommended that researchers extend a similar study to other states. Another recommendation is to complete a qualitative research study of various stakeholders on their perception of learning loss caused by the pandemic. As a final recommendation, researchers are encouraged to replicate this study of Emergent Bilingual students by other programmatic characteristics such as special education status and Gifted and Talented status.

CONCLUSION

In this Texas, multiyear investigation, the mathematics performance of Texas Grade 8 Emergent Bilingual students was examined by their economic status (i.e., Not Poor and Poor) at three grade level standards in the two school years before the pandemic (i.e., 2017-2018, 2018-2019), and three years after the pandemic (i.e., 2020-2021, 2021-2022, and 2022-2023). Statistically significant differences were documented in the Grade 8 STAAR Mathematics assessment performance of Emergent Bilingual students in poverty and Emergent Bilingual students not in poverty. Lower percentages of Emergent Bilingual students in poverty met all three grade level standards in the five school years that were analyzed than Emergent Bilingual students not in poverty Interestingly, the most recent data show both groups recovering from pandemic learning loss. A higher percentage of both groups met standards in the 2022-2023 school year in the three years after the pandemic.

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