



## Differences in the Reading Performance of Texas Grade 4 Students as a Function of Their Economic Status: A Multiyear, Statewide Analysis

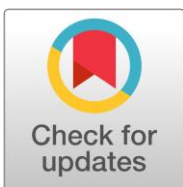
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**Abstract:** In this study, the degree to which differences were present in the reading performance of Grade 4 Texas students as a function of their economic status (i.e., Not Poor, Moderately Poor, and Very Poor) was analyzed. Data obtained from the Texas Education Agency Public Education Information Management System for all Grade 4 students in Texas who took the State of Texas Assessment of Academic Readiness Reading exam, were analyzed for the 2012-2013, 2013-2014, and 2014-2015 school years. In all three years examined, statistically significant differences were established in not only overall reading performance, but also in all three Reading Reporting categories. A clear stair-step effect was present. The higher the degree of poverty, the lower student STAAR Reading test scores were. Finally, the higher the degree of poverty, the lower the percentages of students who met the passing standard on the STAAR Reading exam. Future research and implications for policy and practice are suggested.

**Keywords:** Not Poor, Moderately Poor, Very Poor, STAAR Reading test, Texas, Grade 4, Level II Final Satisfactory Standard and Literacy.

### Introduction

Poverty is a serious issue affecting the United States as it reduces educational opportunities available for students (Olszewski-Kubilius & Corwith, 2018). In 2015, 14.7 million children under the age of 18 were living below the poverty line in the United States (National Center for Education Statistics, 2017). An estimated 21% of all children in the United States live in families where the earned income is below the federal poverty line of \$23,550 for a family of four (Olszewski-Kubilius & Corwith, 2018).

According to the National Center for Children in Poverty (2017), in Texas, there are

3,489,798 families with 6,927,328 children. Of these children, 25% (i.e., 1,697,981) live in poverty and in poor living conditions (National Center for Children in Poverty, 2017). Childhood hunger is one of the side effects of poverty (Texas Classroom Teacher Association, 2014). In fact Texas has the third highest rate of food insecure households in the United States at 18.4% (Texas Classroom Teacher Association, 2014). Children who struggle with getting enough food are more likely to experience headaches, fatigue, colds, stomachaches, and ear infections (Texas Classroom Teacher Association, 2014). These

aliments often prevent students from having good attendance in school; therefore, making students vulnerable to falling further behind. Children living in high poverty concentrated neighborhoods are susceptible to the most challenges such as higher dropout rates and teen births (Center for Public Policy Priorities, 2016). In Texas, 19% of children (more than 1.3 million) live in high poverty neighborhoods (Center for Public Policy Priorities, 2016). The lack of proper nutrition can negatively influence the ability of children to focus and function in school. When basic nutritional needs are not met, students tend to have increasingly higher levels of behavioral, emotional, and academic problems (Texas Classroom Teacher Association, 2014). It is evident that poverty is connected to many challenges, including academic challenges for students in the United States, as well as for students in Texas.

Family income poverty is the strongest predictor of academic performance in school (Garrett-Peters, Mokrova, Vernon-Feagans, Willoughby, & Pan, 2016). More specifically, children living in poverty exhibit poor cognitive and language development skills that hinder their acquisition of vital basic reading skills (Garrett-Peters et al., 2016). It is due to this lack of basic reading skill acquisition that children below the poverty line do not achieve at adequate levels (Stinnett, 2011). Many researchers (e.g., Conradi, Amendum, & Liebfreund, 2016; Dearing et al., 2016; McGown, 2016; Tran et al., 2017) have examined the relationship between poverty and academic performance in reading. Amid the multitude of empirical research articles in the extant literature, the influence that poverty has on a student's ability to read fluently and proficiently as measured by standardized assessments has been detailed in several studies.

For years, educators have recognized the importance of mastering reading by the end of third grade (Hernandez & Casey, 2011).

Third grade is an important grade-level because students in Texas are required to take the state assessment for the first time in this grade. To measure reading proficiency in the state of Texas, students take the State of Texas Assessment of Academic Readiness test (STAAR). The results from the STAAR assessment are not only used to determine the proficiency level for students but to assign yearly ratings to schools and districts. Historically, school districts with high numbers of students in poverty struggle to meet standards. Therefore, researchers (e.g., McGown, 2016) have determined it essential to analyze the effects of poverty on academic performance in reading. Examined in her study were archival data from Grade 3 students in Texas who were administered the STAAR Reading assessment in the 2012-2013, 2013-2014, and 2014-2015 school years. Each of the three Reading Reporting Categories as well as the percentage of students meeting the Level II Final Satisfactory Performance Standard were analyzed to determine if differences existed in reading performance by student economic status.

Regarding the STAAR Reading Reporting Categories, the Texas Education Agency provides the following definitions (a) Reading Reporting Category 1: Understanding across genres; (b) Reading Reporting Category 2: Understanding and analysis of literary texts; (c) Reading Reporting Category 3: Understanding and analysis of informational texts (2011). As documented by McGown (2016), statistically significant differences were present by degree of economic disadvantage for all three school years for Reading Reporting Categories 1, 2, and 3. Students who were Extremely Poor (i.e., qualified for the federal free price lunch program) scored statistically significantly lower on the Reading Reporting Categories 1, 2, and 3 than did students who were Moderately Poor (i.e., qualified for the reduced-price lunch program). Moreover, students who were Moderately Poor scored

statistically significantly lower than did students who were Not Poor (i.e., did not qualify for either the federal free or reduced-price lunch program) on the Grade 3 STAAR Reading assessment. Therefore, both groups of students in poverty had statistically significantly lower average reading scores in Reporting Categories 1, 2, and 3 than students who were Not Poor. Regarding the Level II Final Satisfactory Performance Standard, students who were Extremely Poor had the lowest performance, followed by students who were in the Moderately Poor group, and then by students who were in the Not Poor group. As such, a stair-step effect (Carpenter, Ramirez, & Severn, 2006) was present in the Reading Reporting Category 1, 2, and 3 and in the Level II Final Satisfactory Performance Standard. As student degree of poverty increased, their reading performance became poorer (McGown, 2016). Based on the findings of this study, it is evident that students in poverty perform at a disproportionately lower rate than their more advantaged peers.

In another recent investigation, Harris and Slate (2017) examined the achievement of Grade 3 Black students in Texas as a function of their economic status (i.e., Not Poor, Moderately Poor, and Extremely Poor) at the Phase-In I, Phase-In II, and Phase-In III level on the STAAR Reading exam for the 2015-2016 school year. The STAAR exam is measured by three categories of performance. The Phase-In I level indicates students meeting unsatisfactory academic performance who did not meet the minimum standard set for that subject area. According to the Texas Education Agency, students scoring in this category are not adequately prepared for the next grade level and are not likely to be successful without significant and ongoing instructional support (Texas Education Agency STAAR Performance Level Descriptors, 2016a). The Phase-In II level includes the students who reached satisfactory academic performance. Students at this level demonstrate performance that is at or above passing (Texas

Education Agency STAAR Performance Level Descriptors, 2016a). Additionally, students in this category are sufficiently prepared for the next grade level and are highly likely to be successful (Texas Education Agency STAAR Performance Level Descriptors, 2016a). Students achieving at the Phase-In III level demonstrate performance that is considered above passing standards. As indicated in this category, students are well prepared for the next grade level and considered highly likely to be successful in that grade (Texas Education Agency STAAR Performance Level Descriptors, 2016a).

All three reading indicators (i.e., Phase-In I, Phase-In II, and Phase-In III) from the 2015-2016 STAAR exam were analyzed separately for Grade 3 Black students in the Harris and Slate (2017) study. Results were that the percentage of Grade 3 Black students who passed the three reading indicators decreased as their poverty level increased. In all three STAAR Reading performance standards, a clear stair-step effect (Carpenter et al., 2006) was present. As the degree of poverty increased, the percentage of Grade 3 Black students demonstrating proficient academic performance on the STAAR Reading assessment decreased. In the Harris and Slate (2017) investigation, poverty was clearly related to the reading performance of Grade 3 Black students.

Educators have not only seen Grade 3 students underperform as a result of poverty, the impact has also been seen in early childhood. Crosnoe and Cooper (2010) conducted an investigation on the Early Childhood Longitudinal Study-Kindergarten Cohort to determine factors that mediated the connection between children in poverty and early childhood learning. As noted by Crosnoe and Cooper (2010), children who are economically disadvantaged enter preschool with fewer developed cognitive skills than their peers. Ultimately, these children make lower grades and fall grade levels behind

(Barker & Coley, 2017), as they move through the educational system (Crosnoe & Cooper, 2010). The economic disadvantages experienced by these students accumulated over time and they continued to lag behind their peers. As supported by the findings, the startling reality is that students who were economically disadvantaged scored on average seven points lower on reading tests than students who were not economically disadvantaged (Crosnoe & Cooper, 2010). The associations of poverty were at least two times the magnitude of other factors identified as barriers to student success. Interpreting the results of the study, Crosnoe and Cooper (2010) contended, "Income poverty plays a greater role in early learning than other elements" (p. 283).

Further examining the effects of poverty on reading achievement, Herbers et al. (2012) investigated the importance of early academic achievement for later achievement trajectories among 18,011 students grouped by their economic status. The economic groups consisted of three groups: (a) students eligible for free meals, (b) students eligible for reduced price meals, and (c) students who were not low income. Standardized achievement tests were administered to all Grade 3 through Grade 7 students. Among the students in the study, 55% qualified for free meals, 4% qualifying for reduced price meals, and 31% did not qualify for either program (Herbers et al., 2012). Reading fluency measured in Grade 1 predicted both initial levels and growth of reading achievement from Grade 3 to Grade 8. According to Herbers et al. (2012), the lowest levels of performance on Grade 1 reading assessments were associated with students in poverty. Moreover, students in poverty were at-risk for differences in reading achievement and growth across Grade 3 through Grade 8. Gaps in reading achievement observed at age 18 were already present as early as age 5 (Duncan et al., 2007). According to Herbers et al. (2012), poverty has a lasting influence on

reading proficiency and early deficits in literacy establishes long-term effects on academic trajectories in Grades 3 through Grade 8.

## Statement of the Problem

For many years, connections between poverty and low reading achievement have been well documented (Conradi et al., 2016; Dearing et al., 2016; Harris & Slate, 2017; Hernandez & Casey, 2011; Reardon, Valentino, & Shores, 2012; Tran et al., 2017). Research has been conducted on Grade 3 students, first year performance on the STAAR assessment, and on students' performance in high school; however, research on Grade 4 student performance in Texas on the STAAR Reading assessment has not been conducted. Educators are charged with the task of ensuring that all students are successful and able to read on grade level. However, as documented by numerous researchers, students in poverty fail to achieve in reading, especially in state-tested grades. Therefore, the focus of this study was on Grade 4 students and the degree to which their economic status was related to their reading performance on the state-mandated reading assessment in Texas.

## Purpose of the Study

The purpose of this study was to examine the degree to which differences were present in the reading achievement of Texas Grade 4 students as a function of their economic status. Specifically addressed was the extent to which differences were present in reading performance on the Texas state-mandated assessment by the economic status of Grade 4 students. In contrast to previous investigations in which student economic status was examined by poverty or non-poverty, in this study student economic status

was analyzed by three groupings: Not Poor, Moderately Poor, and Very Poor.

## Significance of the Study

A substantial body of research (e.g., Conradi et al., 2016; Crosnoe & Cooper, 2010; Dearing et al., 2016) has been generated illustrating the presence of a statistically significant relationship between poverty and low student achievement in reading. Compared in numerous empirical studies are the relationship between poverty and reading performance as a function of economic status. However, few researchers have examined the relationship between degrees of economic disadvantage (i.e., Not Poor, Moderately Poor, and Very Poor) and the three reporting categories (i.e., Reporting Category 1, Reporting Category 2, and Reporting Category 3) as measured by the State of Texas Assessment of Academic Readiness exam. The STAAR Reading assessment is administered in Grades 3-8. Therefore, in Grade 4, students have a second opportunity to demonstrate their reading proficiency on a standardized assessment. Results from this investigation may be used to add to the existing research, as limited studies have been conducted in this area. In addition, administrators, teachers, and legislators might utilize the findings of this study when making policy decisions with regarding educating students in poverty.

## Research Questions

In this study, the following overarching research question was addressed: What is the difference in the reading performance of Texas Grade 4 students as a function of the degree of their economic status (i.e., Not Poor, Moderately Poor, and Very Poor)? Specific subquestions under this overarching research question were: (a) What is the difference in understanding across genres by the economic status of Texas Grade 4 students?; (b) What is

the difference in comprehension and analysis of literary texts by the economic status of Texas Grade 4 students?; (c) What is the difference in comprehension and analysis of informative texts by the economic status of Texas Grade 4 students?; (d) What is the difference in performance on the Level II Final Satisfactory standard by the economic status of Texas Grade 4 students?; and (e) What is the degree to which trends are present in reading by the economic status of Texas Grade 4 students. The first four research subquestions were addressed for three school years, whereas the last research question involved a comparison of results across all three school years.

## Method

### Research Design

The research design that was used in this study was a quantitative, causal comparative, non-experimental research design (Johnson & Christensen, 2012). Researchers use causal comparative designs to find relationships between independent and dependent variables after the action has already taken place (Johnson & Christensen, 2012). In this investigation, the action that has already taken place was the STAAR Reading test that was administered to Grade 4 students in the 2012-2013, 2013-2014, and 2014-2015 school years. The independent variable in this research study was the degree of economic disadvantage (i.e., Not Poor, Moderately Poor, and Very Poor) and the dependent variables were the three reporting categories (i.e., Reporting Category 1, Reporting Category 2, Reporting Category 3, and the Level II Final Satisfactory Performance Standard) from the 2012-2013, 2013-2014, and 2014-2015 STAAR Reading exams that were analyzed separately for Grade 4 students in Texas.

## Participants

Participants in this study were Grade 4 students in Texas who took the STAAR Reading test in the 2012-2013, 2013-2014, and 2014-2015 school years. Archival data that was analyzed herein were previously requested through a Public Information Request form submitted to the Texas Education Agency Public Education Information Management System, which is a database of demographic student data used to report and monitor student performance. For the purpose of this study, *economically disadvantaged* is defined by The Texas Education Agency (2013) as “a student who is eligible for free or reduced-price meals under the national School Lunch and Child Nutrition Program” (para. 5). The description of economic status was defined by the following, (a) Extremely Poor (i.e., those students who qualified for the federal free-lunch program), (b) Moderately Poor (i.e., those students who qualified for federal reduced-lunch program), and (c) Not Poor (i.e., those students who did not qualify for the federal free- nor reduced-lunch program).

## Instrumentation and Procedures

Data analyzed herein were previously obtained from the Texas Education Agency Public Education Information Management System database for the 2012-2013, 2013-2014, and 2014-2015 school years. To obtain the data, a Public Information Request was submitted to and fulfilled by the Texas Education Agency. Datasets were requested for (a) Texas Grade 4 students, (b) students who were classified as Not Poor, Moderately Poor, and Very Poor, (c) STAAR Reporting Categories, and (d) STAAR Phase-In levels.

Assessed by the STAAR Reading test are three categories for performance. In Reporting Category 1: The student will demonstrate an ability to understand a variety of written texts across reading genres (Texas

Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 2). Outlined in this category is the focus on the reading and vocabulary development of the student. Students are expected to understand new vocabulary and use it when reading and writing (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 2). In addition, students are expected to identify the meaning of common prefixes and suffixes and know how they change the meaning of roots words (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 2).

In Reporting Category 2: The student will demonstrate an ability to understand and analyze literary texts (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 3). Reporting Category 2 is centered around comprehension of a variety of texts drawing on reading strategies (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 3). Students are expected to ask applicable questions, seek clarification, discover facts and details about stories, and support answers with textual evidence (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 4). In addition, students are expected to make inferences and draw conclusions about theme and genre in different cultural, historical, and contemporary contexts (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 4). Reporting Category 2 also measures students' skills on drawing conclusions about the structure and elements of poetry (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 4).

According to The Texas Education Agency, in Reporting Category 3: The student will demonstrate an ability to understand and analyze informational texts (Texas Education

Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 5). Students are expected to analyze, draw conclusions, and make inferences about the author's purpose in cultural, contemporary, and historical contexts (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 5). Similar to Reporting Categories 1 and 2, students are expected to provide evidence from the text to support their understanding.

Each reporting category encompasses Readiness and Supporting Standards (Texas Education Agency The New STAAR Report Card Presentation, 2017, p. 1-2). The general characteristics of Readiness Standards includes skills that are essential for success in the current grade (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 4). These standards are designed to measure student preparedness for the next grade level. In addition, these standards support college and career readiness benchmarks and measures specific content and concepts. Unlike Readiness Standards, Supporting Standards are introduced in the current grade level but emphasizes subject matter in a subsequent year. Addressed in this standard are more narrowly defined content and concepts. Reporting Category 1 includes five multiple choice questions from both the Readiness and Supporting Standards; Reporting Category 2 contains 15 multiple choice questions from both the Readiness and Supporting Standards; and Reporting Category 3 includes 14 multiple choice questions also from both the Readiness and Supporting Standards (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b, p. 4). Also, students are expected to exhibit “a flexible range of metacognitive reading skills in both assigned and independent reading to understand an author’s message... as they become self-directed, critical readers” by being evaluated in their mastery of Figure 19, a TEKS process standard, across the three Reporting

Categories (Texas Education Agency Student Assessment Division Frequently Asked Questions, 2016b). Readers are directed to <http://tea.texas.gov/> for more reliability and validity information regarding the STAAR test.

The STAAR exam is measured by three categories of performance. The Phase-In I level indicates students meeting unsatisfactory academic performance who did not meet the minimum standard set for that subject area. According to the Texas Education Agency, students scoring in this category are not adequately prepared for the next grade level and are not likely to be successful without significant and ongoing instructional support (Texas Education Agency STAAR Performance Level Descriptors, 2016a). The Phase-In II level includes the students who reached satisfactory academic performance. Students at this level demonstrate performance that is at or above passing (Texas Education Agency STAAR Performance Level Descriptors, 2016a). Additionally, students in this category are sufficiently prepared for the next grade level and are highly likely to be successful (Texas Education Agency STAAR Performance Level Descriptors, 2016a). Students achieving at the Phase-In III level demonstrate performance that is considered above passing standards. As indicated in this category, students are well prepared for the next grade level and considered highly likely to be successful in that grade (Texas Education Agency STAAR Performance Level Descriptors, 2016a).

## Results

Prior to conducting a multivariate analysis of variance (MANOVA), its underlying assumptions were checked. Specifically examined were data normality, Box’s Test of Equality of Covariance and the Levene’s Test of Equality of Error Variances. The majority of these assumptions were not met, however, the robustness of a MANOVA procedure made it

appropriate to use in this study (Field, 2009). Results of statistical analyses for Grade 4 students in Texas who took the STAAR Reading test in the 2012-2013, 2013-2014, and 2014-2015 school years who were Extremely Poor, Moderately Poor, and Not Poor will be described by Reading Reporting Category. The results in this study will be discussed in chronological order from 2012-2013, 2013-2014, and 2014-2015.

### Overall Results for the Three School Years

Regarding the 2012-2013 school year, the MANOVA revealed a statistically significant difference, Wilks'  $\Lambda = .88$ ,  $p < .001$ , partial  $\eta^2 = .06$ , in overall reading performance as a function of economic status. The effect size for this statistically significant difference was moderate (Cohen, 1998). With respect to the 2013-2014 school year, the MANOVA revealed a statistically significant difference, Wilks'  $\Lambda = .89$ ,  $p < .001$ , partial  $\eta^2 = .06$ , in overall reading performance as a function of economic status. Using Cohen's (1988) criteria, the effect size was moderate. Concerning the 2014-2015 school year, the MANOVA revealed a statistically significant difference, Wilks'  $\Lambda = .88$ ,  $p < .001$ , partial  $\eta^2 = .06$ , in overall reading performance as a function of economic status. Based on Cohen's (1988) criteria, this effect size was moderate. In all three school years, the effect sizes for the statistically significant difference in student overall reading performance as a function of their economic status were moderate.

### Reading Reporting Category 1 Results (Understanding Across Genres) Across All Three School Years

Following the overall results of the MANOVA, univariate follow-up Analysis of Variance (ANOVA) procedures were

conducted for each of the three STAAR Reading Reporting Categories. For the 2012-2013 school year, a statistically significant difference in Reading Reporting Category 1 by student economic status was yielded,  $F(2, 338014) = 72916.81$ ,  $p < .001$ , partial  $\eta^2 = .09$ , moderate effect size. With respect to the 2013-2014 school year, a statistically significant difference was revealed on the STAAR Reading Reporting Category 1 by student economic status,  $F(2, 341365) = 16417.23$ ,  $p < .001$ , partial  $\eta^2 = .09$ , moderate effect size. Concerning the 2014-2015 school year, a statistically significant difference was again yielded on the STAAR Reading Reporting Category 1 by student economic status,  $F(2, 353135) = 19773.84$ ,  $p < .001$ , partial  $\eta^2 = .10$ , moderate effect size. On the STAAR Reading Reporting Category 1, the effect sizes for the statistically significant differences on the STAAR Reading Reporting Category 1 by student economic status were moderate for all three school years.

Following the three follow-up ANOVA procedures, Scheffe' post hoc procedures were conducted to ascertain which economic status pairings were statistically significantly different. The Not Poor, Moderately Poor, and Very Poor groups were all determined to have statistically significant STAAR Reading Reporting Category 1 scores from each other in all school years. Regarding the 2012-2013 school year, students who were Not Poor had a statistically significantly higher average raw score, 0.76 points higher, than students who were Moderately Poor and 1.38 points higher than the average raw score of students who were Very Poor. Students who were Moderately Poor had a higher average raw score that was 0.62 points higher than the Very Poor group. Concerning the 2013-2014 school year, students who were Not Poor had a statistically significantly higher average raw score, 0.85 points higher, than students who were Moderately Poor and 1.41 points higher than students who were Very Poor. Students who were Moderately Poor had a statistically



significantly higher average raw score, 0.56 points higher, than students who were Very Poor. With respect to the 2014-2015 school year, students who were Not Poor had a statistically significantly higher average raw score, 0.98 points higher, than students who were Moderately Poor and 1.64 points higher than students who were Very Poor. Students who were Moderately Poor had a statistically significantly higher average raw score, 0.86 points higher, than students who were Very Poor.

In all three school years, a clear stair-step effect (Carpenter, Ramirez, & Severn, 2006) was present on the STAAR Reading Reporting Category 1. The greater the degree of poverty, the lower the reading performance was on the Reading Reporting Category 1. In all three school years, students who were in the Not Poor group had the best performance, followed by students who were Moderately Poor, and then by students in the Very Poor group. Revealed in Table 1 are the descriptive statistics for this analysis.

**Table 1** Descriptive Statistics for the STAAR Grade 4 Reporting Category 1 Scores by Student Economic Status for the 2012-2013, 2013-2014, and 2014-2015 School Years

School Year and Economic Status	<i>n</i>	<i>M</i>	<i>SD</i>
2012-2013			
Not Poor	140,077	7.82	1.94
Moderately Poor	25,172	7.06	2.17
Very Poor	172,768	6.44	2.30
2013-2014			
Not Poor	142,845	7.44	2.09
Moderately Poor	25,177	6.59	2.20
Very Poor	173,346	6.03	2.27
2014-2015			
Not Poor	151,053	7.07	2.31
Moderately Poor	24,392	6.09	2.37

**Reading Reporting Category 2 (Understanding Literary Texts) Results Across All Three School Years**

Regarding the 2012-2013 school year, a statistically significant difference was yielded on the STAAR Reading Reporting Category 2 by student economic status,  $F(2, 338014) =$

$255626.96, p < .001$ , partial  $\eta^2 = .10$ , moderate effect size. Concerning the 2013-2014 school year, a statistically significant difference was revealed on the STAAR Reading Reporting Category 2 by economic status,  $F(2, 341365) = 19056.58, p < .001$ , partial  $\eta^2 = .10$ , moderate effect size. With respect to the 2014-2015 school year, a statistically significant

difference was again yielded on the STAAR Reading Reporting Category 2 by economic status,  $F(2, 353135) = 17973.50, p < .001$ , partial  $\eta^2 = .09$ , moderate effect size. On the STAAR Reading Reporting Category 2, the effect sizes for the statistically significant differences by student economic status were in the moderate range for all three school years.

Next, Scheffe' post hoc procedures were conducted to determine which economic status pairings were statistically significantly different. The Not Poor, Moderately Poor, and Very Poor student groups were all determined to have statistically significant STAAR Reading Reporting Category 2 scores from each other in all three school years. Concerning the 2012-2013 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.53 points higher, than students who were Moderately Poor and 2.58 points higher than students who were Very Poor. Similarly, students who were Moderately Poor had a statistically significantly higher average raw score, 1.05 points higher, than students who were Very Poor. Regarding the 2013-2014 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.54 points higher, than students

who were Moderately Poor and 2.57 points higher than students who were Very Poor. Students who were Moderately Poor had a statistically significantly higher average raw score, 1.03 points higher, than students who were Very Poor. With respect to the 2014-2015 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.43 points higher, than students who were Moderately Poor and 2.57 points higher than students who were Very Poor. Students who were Moderately Poor had a statistically significantly higher average raw score, 1.14 points higher, than students who were Very Poor.

Statistically significant differences, as revealed by the post hoc procedures, were present by degree of economic disadvantage for all three school years on the STAAR Reading Reporting Category 2. A stair-step effect (Carpenter et al., 2006) was clearly evident. Students who were in the Not Poor group had the highest performance, followed by students who were in the Moderately Poor group, and then by students in the Very Poor group. Readers are referred to Table 2 for the descriptive statistics of this analysis.

**Table 2** Descriptive Statistics for the STAAR Grade 4 Reporting Category 2 Scores by Student Economic Status for the 2012-2013, 2013-2014, and 2014-2015 School Years

School Year and Economic Status	n	M	SD
2012-2013			
Not Poor	138,884	12.71	3.37
Moderately Poor	24,729	11.39	3.59
Very Poor	177,686	10.41	3.75
2013-2014			
Not Poor	142,845	13.06	3.56
Moderately Poor	25,177	11.52	3.73

Very Poor	173,346	10.49	3.78
2014-2015			
Not Poor	151,053	13.58	3.67
Moderately Poor	24,392	12.15	3.90
Very Poor	177,693	11.01	4.05

### Reading Reporting Category 3 (Understanding Informational Texts) Results Across All Three School Years

With respect to the 2012-2013 school year, a statistically significant difference on the STAAR Reading Reporting Category 3 by student economic status was yielded,  $F(2, 338014) = 275727.73$ ,  $p < .001$ , partial  $\eta^2 = .11$ , moderate effect size. Regarding the 2013-2014 school year, a statistically significant difference was revealed in the Reading Reporting Category 3 by student economic status,  $F(2, 341365) = 16187.38$ ,  $p < .001$ , partial  $\eta^2 = .09$ , moderate effect size. Concerning the 2014-2015 school year, a statistically significant difference was again yielded in the Reading Reporting Category 3 by student economic status,  $F(2, 353135) = 19099.04$ ,  $p < .001$ , partial  $\eta^2 = .10$ , moderate effect size. On the STAAR Reading Reporting Category 3, the effect size for these statistically significant differences by student economic status was moderate for all three school years.

Scheffe' post hoc procedures were conducted to determine which economic status pairings were statistically significantly different. The Not Poor, Moderately Poor, and Very Poor student groups were all determined to have statistically significant STAAR Reading Reporting Category 3 scores from each other in all three school years. Regarding the 2012-2013 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.57 points higher, than students who were Moderately Poor and 2.67 points higher than students who were Very Poor.

Moreover, students who were Moderately Poor had a statistically significantly higher average raw score, 1.10 points higher, than students who were Very Poor. Concerning the 2013-2014 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.32 points higher, than students who were Moderately Poor and 2.21 points higher than students who were Very Poor. Similarly, students who were Moderately Poor had a statistically significantly higher average raw score, 0.89 points higher, than students who were Very Poor. With respect to the 2014-2015 school year, students who were Not Poor had a statistically significantly higher average raw score, 1.42 points higher, than students who were Moderately Poor and 2.50 points higher than students who were Very Poor. Students who were Moderately Poor had a statistically significantly higher average raw score, 1.08 points higher, than students who were Very Poor.

A stair-step effect (Carpenter et al., 2006) was present for student performance on the STAAR Reading Reporting Category 3. The greater the degree of poverty, the lower the reading performance was on the Reading Reporting Category 3. Students who were Very Poor had statistically significantly lower average STAAR Reading Reporting Category 3 scores than students who were Moderately Poor, and students who were Moderately Poor had statistically significantly lower average reading scores than students who were Not

Poor. Table 3 contains the descriptive statistics of this analysis.

**Results for the Level II Final Satisfactory Performance Analyses Over Time**

Student performance on the STAAR Reading Level II Final Satisfactory standard was examined next through the use of Pearson chi-square procedures. This statistical procedure was the most appropriate statistical procedure to use because dichotomous data were present for the Level II Final Satisfactory Performance Standard (i.e., met or did not meet this standard) and categorical data were present for student economic status. As such, the chi-square is the preferred statistical procedure when both variables are categorical (Field, 2009). Because a large sample size was present, the assumptions for utilizing a chi-square were met.

Concerning the Level II Final Satisfactory Performance Standard by economic status, the result for the 2012-2013 school year was statistically significant,  $\chi^2(2) = 28,391.06, p < .001$ . The effect size revealed for this finding, Cramer’s V, was small, .28 (Cohen, 1988). Statistically significantly higher percentages of students who were Not Poor met this Level II Final Satisfactory Performance Standard than students in the Moderately Poor group. The Not Poor group had 19.3% more students who met this standard than the Moderately Poor group of students and 29.4% more students who met this standard than the Very Poor group of students. The Moderately Poor group had 10.1% more students who met this standard than the Very Poor group of students. Table 4 contains the frequencies and percentages for the 2012-2013 school year.

**Table 3** Descriptive Statistics for the STAAR Grade 4 Reporting Category 3 Scores by Student Economic Status for the 2012-2013, 2013-2014, and 2014-2015 School Years

School Year and Economic Status	<i>n</i>	<i>M</i>	<i>SD</i>
2012-2013			
Not Poor	140,077	11.65	3.44
Moderately Poor	25,172	10.08	3.62
Very Poor	172,768	8.98	3.64
2013-2014			
Not Poor	142,845	11.34	3.33
Moderately Poor	25,177	10.02	3.49
Very Poor	173,346	9.13	3.54
2014-2015			
Not Poor	151,053	11.37	3.54
Moderately Poor	24,392	9.95	3.68
Very Poor	177,693	8.87	3.74

**Table 4** Frequencies and Percentages for the Grade 4 STAAR Reading Level II Satisfactory Performance Standard by Degree of Economic Disadvantage for the 2012-2013, 2013-2014, and 2014-2015 School Years

School Year and Economic Status	Met Standard		Did Not Meet Standard	
	<i>n</i>	%	<i>n</i>	%
2012-2013				
Not Poor	78,214	55.4	63,088	44.6
Moderately Poor	9,184	36.1	16,276	63.9
Very Poor	45,511	26.0	129,410	74.0
2013-2014				
Not Poor	75,329	52.3	68,743	47.7
Moderately Poor	8,556	33.6	16,898	66.4
Very Poor	42,811	24.4	132,853	75.6
2014-2015				
Not Poor	87,049	58.2	62,572	41.8
Moderately Poor	9,279	38.5	14,823	61.5
Very Poor	46,101	26.3	129,205	73.7

With regard to the 2013-2014 school year, the result was statistically significant,  $\chi^2(2) = 26,662.08$ ,  $p < .001$ . The effect size yielded for this finding, Cramer's *V*, was small, .28 (Cohen, 1988). Statistically significantly higher percentages of students who were Not Poor met this Level II Final Satisfactory Performance Standard than students in the Moderately Poor group. The Not Poor group had 18.7% more students who met this standard than the Moderately Poor group of students and 27.9.2% more students who met this standard than the Very Poor group of students. The Moderately Poor group had 9.2% more who met this standard than the Very Poor group of students. Table 4 contains

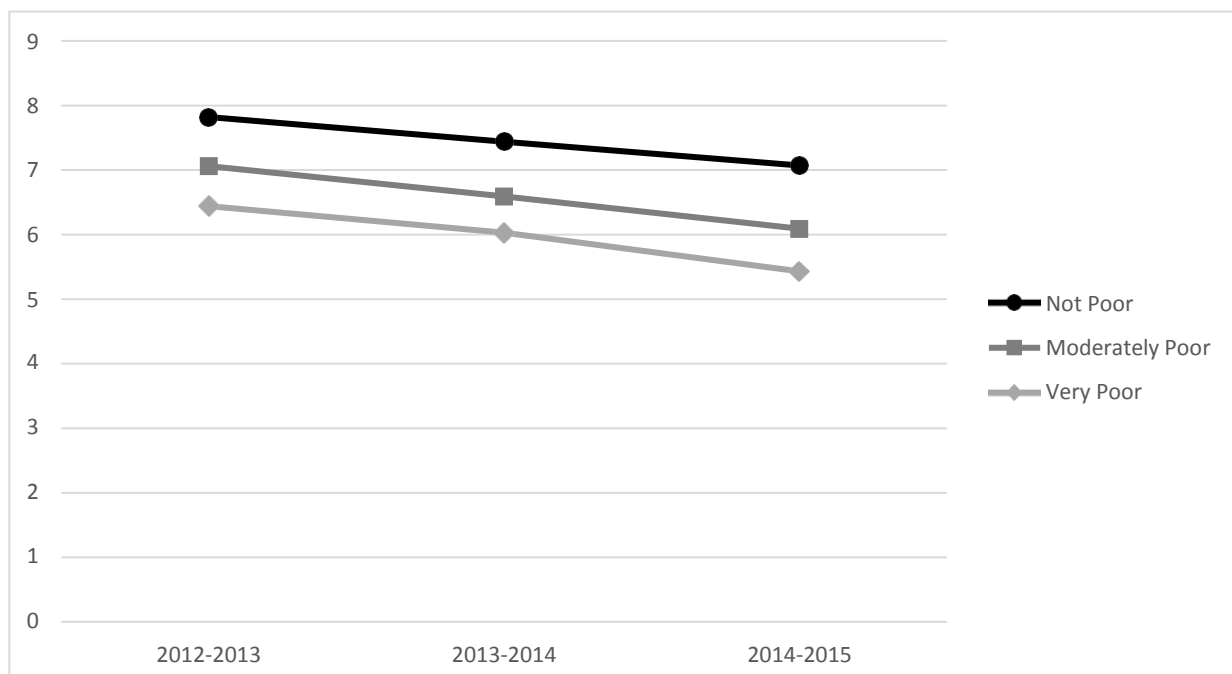
the frequencies and percentages for the 2013-2014 school year.

Concerning the 2014-2015 school year, a statistically significant difference was present,  $\chi^2(2) = 34,027.07$ ,  $p < .001$ . The effect size yielded for this finding, Cramer's *V*, was moderate, .31 (Cohen, 1988). Statistically significantly higher percentages of students who were Not Poor met this Level II Final Satisfactory Performance Standard than students in the Moderately Poor group. The Not Poor group had 19.7% more students who met this standard than the Moderately Poor group of students and 31.9% more students who met this standard than the Very Poor group of students. The Moderately Poor group had 12.2% more who met this standard than

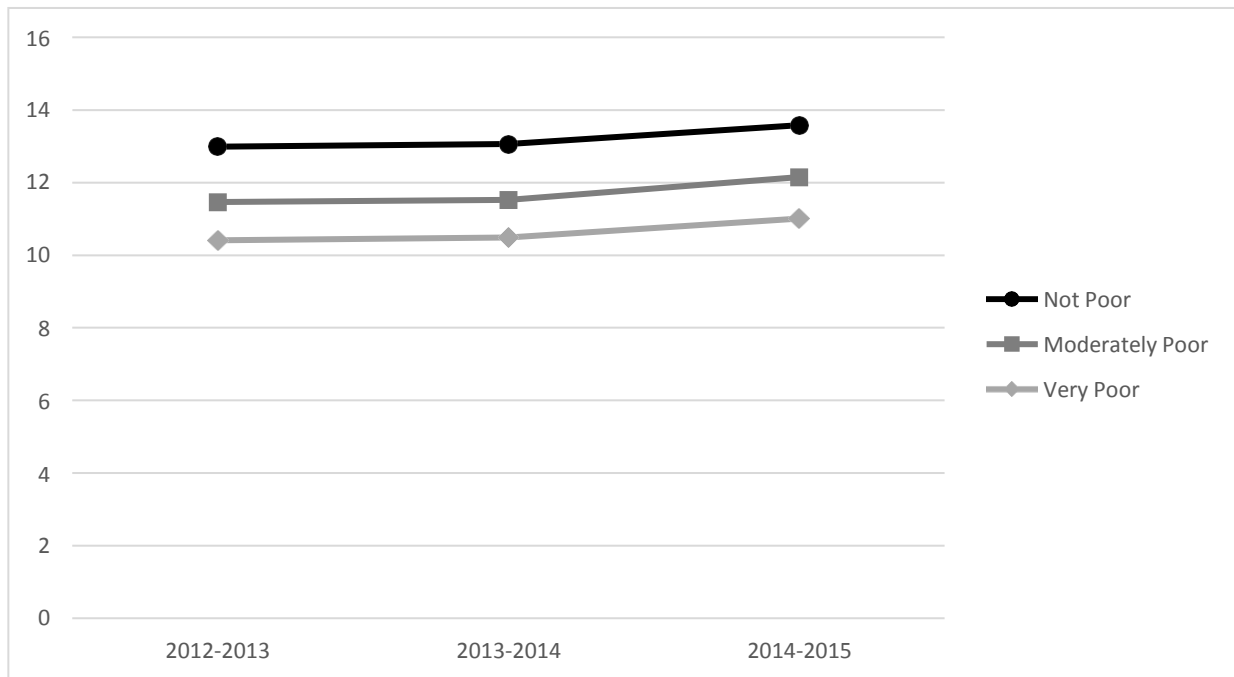
the Very Poor group of students. Table 4 contains the frequencies and percentages for the 2014-2015 school year.

A star-step effect (Carpenter et al., 2006) was clearly evident in the percentages of students who met this standard in all three school years. Statistically significantly greater percentages of students who were Not Poor met the Level II Final Satisfactory Performance Standard than students who were in the Moderately Poor group or in the Very Poor group. Differences in percentages between the Not Poor and the Moderately Poor groups of students not meeting the Level II Performance Standard were 19.3%, 18.7%, and 19.7%, respectively for the three school years. Similarly, differences in percentages between the Moderately Poor and Very Poor groups of students not meeting the Level II Performance Standard were 10.1%, 9.2%, and 12.2% respectively for the three school years. Readers are referred to Table 4 for the descriptive statistics for this analysis.

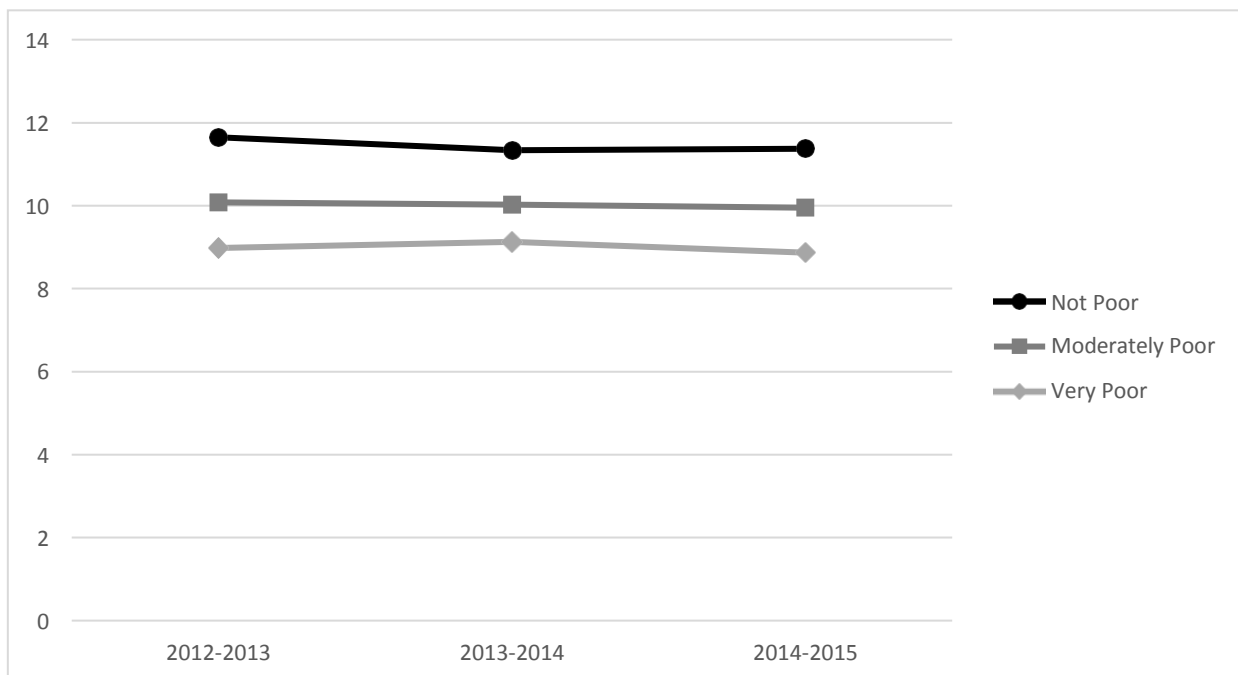
In examining the reading performance of Grade 4 students in Texas across the three years of data that were analyzed herein, consistent trends in scores by economic status were identified. In each Reporting Category and in all three years investigated, the Not Poor group had statistically significantly higher reading scores than students in either the Moderately Poor group or in the Very Poor group. In addition, the same trends were present in all three years regarding the Level II Satisfactory Performance Standard by student economic status in that higher percentages of students in the Not Poor group met this standard than students in either the Moderately Poor group or in the Very Poor group. Similarly, a higher percentage of students in the Moderately Poor group met this reading standard than students in the Very Poor group. These trends are depicted in Figures 1 through 4.



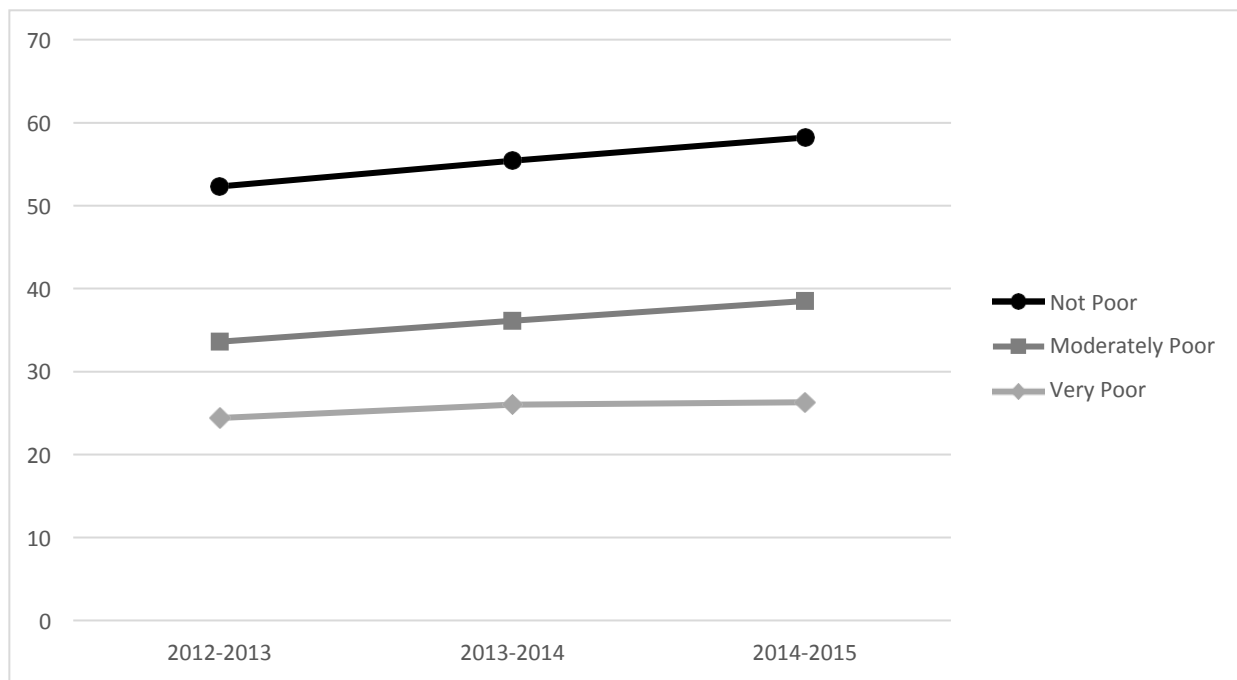
**Figure 1** Average scores by student economic status for the STAAR Grade 4 Reporting Category 1 for the 2012-2013, 2013-2014, and 2014-2015 school years.



**Figure 2** Average scores by student economic status for the STAAR Grade 4 Reporting Category 2 for the 2012-2013, 2013-2014, and 2014-2015 school years.



**Figure 3** Average scores by student economic status for the STAAR Grade 4 Reporting Category 3 for the 2012-2013, 2013-2014, and 2014-2015 school years.



**Figure 4** Grade 4 STAAR Reading Level II Satisfactory Performance Standard by student economic status for the 2012-2013, 2013-2014, and 2014-2015 school years.

**Table 5** Summary of Reading Performance Results for the Grade 4 STAAR Reading Exam as a Function of Economic Disadvantage for the 2012-2013, 2013-2014, and 2014-2015 School Years

STAAR Reading Category	Statistically Significant	Effect Size	Lowest Performing Group
<b>2012-2013</b>			
Reporting Category 1	Yes	Moderate	Very Poor
Reporting Category 2	Yes	Moderate	Very Poor
Reporting Category 3	Yes	Moderate	Very Poor
<b>2013-2014</b>			
Reporting Category 1	Yes	Moderate	Very Poor
Reporting Category 2	Yes	Moderate	Very Poor
Reporting Category 3	Yes	Moderate	Very Poor
<b>2014-2015</b>			
Reporting Category 1	Yes	Moderate	Very Poor
Reporting Category 2	Yes	Moderate	Very Poor
Reporting Category 3	Yes	Moderate	Very Poor



## Discussion

Analyzed in this investigation was the extent to which differences were present in the reading performance of Texas Grade 4 students by their economic status. Three years of statewide data on the three Grade 4 STAAR Reading Reporting Categories were examined for the Not Poor, Moderately Poor, and Very Poor groups. Statistically significant results were present in all three school years. A summary of these results is presented in Table 5. Following these statistical analyses, the Level II Final Satisfactory Performance Standard by economic status was examined and determined to yield statistically significant results in all three school years.

## Connections to Existing Literature

As indicated by the review of literature, inequities in the income achievement gap have widen over the last several decades (McGown, 2016). Vast disparities exist between students from impoverished backgrounds and students from affluent backgrounds (McGown, 2016). In a recent Texas statewide investigation, McGown (2016) examined the reading performance of Grade 3 students on the STAAR Reading exam. In her multiyear analysis, she documented the presence of statistically significant differences in all three STAAR Reading Reporting categories, as well as on the percentages of students who met the passing standard on this exam, as a function of student economic status. In her investigation, as well as in this article, a clear stair-step effect (Carpenter et al., 2006) was established in student reading performance. The greater the degree of poverty, the greater the achievement gaps were in student reading performance.

The connection between poverty and poor basic reading skills has also been examined (Garrett-Peters et al., 2016). According to Tran, Luchters, and Fisher (2017), children living in poverty are at in the

most disadvantaged position in society, therefore, they fail to reach their developmental potential. In this multiyear analysis, students who were in the Very Poor group consistently had the poorest reading performance. Results from this research investigation are consistent with the literature regarding poverty and academic performance in reading. As established by Conradi, Amendum, and Liebfreund (2016) children from high-poverty backgrounds read at a lower proficiency level than their peers. In addition, Jones, Ostojic, Menard, Picard, and Miller (2017) documented that poverty is the strongest predictor of learning challenges and poor academic outcomes for children. When children live in poverty, they simply fail to make parallel gains when compared to their peers in a more affluent background (Jones et al., 2017). Garrett-Peters et al. (2016) determined that children living in poverty exhibit poor cognitive and language development skills that hinder their acquisition of vital basic reading skills. Due to their lack of basic reading skill acquisition, children below the poverty line do not achieve at adequate levels (Stinnett, 2011).

## Implications for Policy and Practice

Based on the analysis of three years of Texas statewide data, several implications for policy and for practice can be recommended. First, additional funding needs to be made available to school districts and school campuses that have students who are economically disadvantaged. The additional funding can be used to provide educational support and resources for students in poverty. Therefore, if students have not met the passing standard on the Grade 3 STAAR Reading exam, a specific educational plan should be established to prevent them from repeating the same performance in Grade 4. Third, funding should be provided for full-day pre-

kindergarten programs which would assist in providing the early literacy foundation that is essential for students to develop as proficient readers. Fourth, school districts should provide professional development that would assist teachers in educating this population of students. Additional funds and collaborative efforts among the federal, state, and local educational agencies will support these efforts and close the achievement gap between the economic groups analyzed.

### Recommendations for Future Research

Given the results of this empirical multiyear investigation, several recommendations for future research can be made. A first recommendation would be for researchers to examine the connection between economic status and reading performance at other grade levels. In this investigation, only the reading performance of Grade 4 students was addressed. For that reason, researchers are encouraged to examine the reading performance of students in middle school and high school. Second, researchers should also examine reading achievement by gender and ethnicity/race to determine the degree to which these demographic characteristics are related to student reading performance. In this study, only the relationship between student economic status and reading achievement was addressed. Third, researchers should determine if differences are present in other subjects such as mathematics and writing. The focus of this study was solely on reading. Grade 4 students are also required by the state of Texas to complete the STAAR Mathematics and Writing assessments. Fourth, researchers should analyze reading performance by economic status in other states. Only data on the students in Texas were examined in this study. The extent to which the results of this study can be generalized to other states is unknown. Fifth, to analyze trends over several years, researchers are encouraged to conduct

longitudinal studies that span from Kindergarten through Grade 12. A study of this magnitude will allow researchers to connect economic status with student achievement in multiple grade levels. Last, researchers are also encouraged to conduct mixed and qualitative research studies to provide meaningful data that policymakers and educators can use in making informed decisions regarding educating students in poverty.

### Conclusion

The purpose of this research investigation was to determine the degree to which differences were present in the reading performance of Texas Grade 4 students as a function of their economic status. Through the analysis of three years of Texas statewide data, statistically significant differences were revealed in the reading performance of students who were Not Poor, Moderately Poor, and Very Poor. A stair-step effect (Carpenter et al., 2006) was clearly established in all three school years. Students who were Not Poor had better reading skills than students who were Moderately Poor, and students who were Moderately Poor had better reading skills than students who were Very Poor.

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