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Differences in Dropout Rates as a Function of High School Size for Students in Poverty: A Texas Multiyear, Statewide Study

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Child poverty in the United States, with regard to student achievement, has grave challenges for the children who face poverty (Scott & Pressman, 2013). Not only is living in poverty associated with lower academic achievement, but student poverty is also associated with lower rates of school completion (Borg, Borg, & Stranahan, 2012; Cooper & Crosnoe, 2007; Kena et al., 2015). Consequentially, students who do not complete high school are more likely to (a) serve time in prison, (b) need government assistance, and/or (c) die at an earlier age (Messacar & Oreopoulos, 2013). With the increasing number of children who are living in poverty, child poverty is an issue that needs to be at the forefront of the educational agenda (Tienken, 2012).

In 2014, approximately 10.9 million children, age 5 to 17, lived in poverty (National Center for Education Statistics, 2016). Despite educational reforms such as the No Child Left Behind Act of 2002, students in poverty are still dropping out at a higher rate than are their more affluent peers (Howard & Madison-Harris, 2011). Messacar and Oreopoulos (2013) documented that students in poverty as well as Black and Hispanic students were disproportionately leaving school before completion.

Even before children from low-income families enter school, the achievement gap is apparent (Duncan & Sojourner, 2013; Reardon 2011). With increasing income inequality and a lack of financial resources invested into the development of children, students in poverty are facing a huge disadvantage even before entering school (Altintas, 2016; Kornrich & Furstenburg, 2013; Western, Bloome, & Percheski, 2008). Compared to their more affluent peers, students who are economically disadvantaged experience limited learning opportunities (Miller, Pavlakis, Lac, & Hoffman, 2014). As a result, students in poverty are entering schools with weaker academic skills than their more affluent peers (Duncan & Magnuson, 2011; Duncan & Murnane, 2011; Hughes, 2010; Miller et al., 2014).

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Moreover, the achievement gap between income classes also can be attributed to social and cultural factors affecting student performance: (a) number of moves, (b) number of parents, (c) food insecurity, (d) violence rate, and (e) average income (Berliner, 2009; 2013). Fiorni and Keane (2014) and Willingham (2012) identified the amount of time invested in developmental cognitive skills as another important explanation for the achievement gap between students of affluence and students of poverty. Students in poverty are entering school doors with less financial and social resources than their more affluent peers, which could affect their long term successes.

Several researchers (e.g., Merten & Flowers, 2003; Rendon, 2013; Suh, Suh, & Houston, 2007; Turner, 2000) have established that poverty and achievement rates are negatively associated. In a study conducted in Minnesota for the 1998-2010 years, Nitardy, Duke, Pettindell, and Borowsky (2014) documented that students in poverty had poorer academic achievement than students who were not economically disadvantaged. White students had approximately a 0.17-point advantage on Black students' GPA and a 0.37-point advantage on Hispanic students' GPA. Furthermore, when asked about intentions of completing high school, approximately 2.3% of Black students and 3% of Hispanic students who were economically disadvantaged had the intention of dropping out, compared to only 2% of White students who were economically disadvantaged.

With regard to academic achievement and poverty, Lee and Auhtor (2014) examined advanced performance on the 2012 Texas Assessment of Knowledge and Skills (TAKS) Higher Education Readiness Component for English Language Arts and Mathematics as a function of student poverty. Statistically significant differences in performance were present. Students who were economically disadvantaged had statistically significantly lower performance than their more affluent peers on all exam subjects and advanced indicators. On the TAKS English Language Arts test, students who were economically disadvantaged were 6.19% less likely to earn Commended Performance and 27.61% less likely to be college-ready than students who were not economically disadvantaged. Small effect sizes (Cramer's V) of .23 were present. On the TAKS Mathematics test, students who were economically disadvantaged were 56.32% less likely to earn Commended Performance and 24.39% less likely to be college-ready than their more affluent peers.

Disparities between students of affluent neighborhoods and students in poor neighborhoods not only affect student achievement, but also influence whether or not students receive a high school diploma. Students from more affluent backgrounds are more likely to achieve a diploma than their peers who live in poor neighborhoods (Anderson & Leventhal, 2014; Boyle, Georgiades, Racine, & Mustard, 2007; Sastry & Pebley, 2010). In states that have higher unequal income distribution, higher dropout rates occur (Berliner, 2013; Wilkinson & Pickett, 2010).

Lower academic achievement can lead to high dropout rates, especially for students in poverty. Leventhal-Weiner and Wallace (2011) investigated the dropout rates of Black, Hispanic, and White students who were economically disadvantaged. Leventhal-Weiner and Wallace established the presence of statistically significant higher dropout rates for White, Black, and Hispanic students living in poverty than their peers who were not living in poverty. Black and Hispanic students in poverty had higher dropout rates than White students.

In a recent investigation, Ambrose, Slate, and Moore (2016) examined two school years (i.e., 2011-2012 and 2012-2013) of Texas statewide data to determine the extent to which dropout rates differed as a function of high school size for students in poverty. Congruent to this investigation and previous research, they categorized high school size into three sizes based on student enrollment numbers: (small-size school = 50 to 400 students; medium size school = 401 to 1,500 students; large-size school > 1,500 students). Ambrose et al. documented the presence of statistically significant differences in dropout rates by high school size for their sample of students in poverty. For both school years, small-size high schools had higher dropout rates for students in poverty compared with medium or large-size high schools.

With respect to the topic of school size, whether large-size or small-size schools are better with respect to student achievement, is an ongoing argument. Several researchers (Conant, 1959, Duke, DeReberto, & Trauvetter, 2009; Supovitz & Christian, 2005) contended smaller schools were better for supporting student achievement and offered better educational opportunity. However, in more recent research investigations, researchers (e.g., Greeney & Slate, 2012; Rios, Slate, Moore, Martinez-Garcia, 2016a, 2016b) have emphasized larger high schools best support student achievement and high school completion rates.

In a recent investigation of dropout rates, Rios et al. (2016a) investigated the dropout rate of Hispanic students as a function of high school size. Texas statewide data of school years, 2009-2010 to 2013-2014, were used to examine high school sizes, small [50 to 400 students], medium [401-1499], and large-size high schools [1500 or more students] and their relationship to dropout rates of Hispanic students. Statistically significant differences were yielded with small effect sizes in this study. For all five years, Hispanic students dropped out at a higher rate in small-size schools rather than large-size schools. Using the same parameters for school years and high school size, in a second study, Rios et al. (2016b) documented the presence of statistically significant differences in attendance rates for Hispanic students as a function of high school size. Attendance rates for Hispanic students were lower in small-size high schools than medium or large-size high schools. Percentage points ranged from 0.36 to 1.59 lower in small-size high schools than medium or large-size high schools.

Kahne, Spote, de la Torre, and Easton (2008) conducted an investigation of large-size high schools in Chicago. One strategy implemented by Chicago's school reform was leaders converted some large-size high schools into smaller high schools. Kahne et al. documented dropout rates for the initial cohort were decreased, but no difference was present for the second cohort compared to the original dropout rates in the large-size schools.

Scott, Ingels, Shera, Taylor, and Jergovic (1996) examined data from the High School Effectiveness Supplement from the National Educational Longitudinal study of 1988. In their investigation, they established that schools with more academic courses were less likely to have students drop out than did schools with fewer academic offerings? Greater graduation rates were also documented for schools that had a student enrollment of 1,500 students or less than schools that had fewer students enrolled.

Werblow and Duesbery (2009) analyzed the relationship of school size to mathematics achievement and to dropout rates of sophomores and seniors ($n = 16,081$) from the Educational Longitudinal Study of 2002. They determined that students who attended very large schools (2,592 or more students) or very small schools (674 or fewer students) had higher student performance in mathematics. Moreover, students enrolled in larger schools were more likely to drop out than students in small schools. Werblow and Duesbery (2009) further contended building smaller schools was best practice due to their findings on mathematics achievement and dropout rates. Similarly, in an investigation of the relationship of school size and dropout rates in the consideration of socioeconomic status, Gardener, Riblatt, and Beaty (2000) discovered statistically significant differences for dropout rates for larger schools versus smaller schools. Larger schools had higher dropout rates for students who were economically disadvantaged than did smaller schools.

The most recent studies reviewed in this investigation were interpreted to support the idea that large-size schools were better for higher graduation rates. Also of note is that these investigations were conducted on data from the students in Texas, the same state of interest in this study. The studies that were interpreted to support the idea small-size schools are better were conducted outside of Texas and reflect older research.

Purpose of the Study

The purpose of this investigation was to examine the degree to which differences might be present in high school dropout rates as a function of high school size for students in poverty. Specifically, high school size and dropout rates were analyzed for two school years: 2012-2013 and 2013-2014. These school years were selected because they constituted the most recent data available for Texas high schools.

Significance of the Study

Students living in poverty may encounter barriers that may prevent them from having success through education (McKinney, 2014). Addressing poverty is not a simple task, nor does a simple fix exist. However, due to dropout rates being a part of the accountability system in the state of Texas, educational leaders need insights in how to help all students achieve, regardless of economic status. By allowing for the equitable access to opportunities for educational achievement, schools can enhance the lives for children in poverty (McKinney, 2014).

Policymakers and school leader may use the results and recommendations from this study to determine a school size that best supports student achievement and the attainment of a high school diploma. In the consideration of students who are economically disadvantaged, policymakers and school leaders may take into account how the formation of schools affects this particular population. Moreover, educators may use the results from this study as a valuable lens through which they may determine the relationship of school size to dropout rates for all students as well as those students who are economically disadvantaged.

Research Questions

The following research questions were addressed in this study: (a) What is the difference in dropout rates as a function of high school size for students in poverty using the Greeney and Slate (2012) school size definition?; (b) What is the difference in dropout rates as a function of high school size for students in poverty using the Perez and Slate (2015) school size groupings?; (c) What is the difference in dropout rates as a function of high school size for student in poverty using the Texas University Interscholastic League groupings?, and (d) What consistency, if any, is present in dropout rates by high school size for students in poverty using the Greeney and Slate (2012) definition?; (e) What consistency, if any, is present in dropout rates by high school size for students in poverty using the Perez and Slate (2015) definition; and (f) What consistency, if any, is present in dropout rates by high school size for students in poverty using the Texas University Interscholastic League groupings? The first three research question were analyzed for two school years (i.e., 2012-2013, 2013-2014) whereas the fourth, fifth, and sixth research questions were a comparison of results across both school years. Therefore, a total of nine research questions was addressed in this study.

Method

Research Design

The research design for this empirical investigation was a non-experimental, causal comparative (Johnson & Christensen, 2014). In this causal comparative study, archival data were analyzed. In this investigation, the independent variable of high school size and the dependent variable of high school dropout rates for students who were economically disadvantaged had already occurred. Accordingly, neither variable could be manipulated—a typical occurrence in causal comparative research studies (Johnson & Christensen, 2014).

Participants and Instrumentation

Participants in this study were students who were determined to be economically disadvantaged and who are enrolled in traditional Grade 9 through Grade 12 Texas high schools. In this investigation, students who were economically disadvantaged were students who lived in a household that met the guidelines for free or reduced lunch (Texas Academic Performance Report Glossary, p. 14). Students who were considered to have completed high school typically refer to students from a class of first-time ninth graders who completed their high school education within the traditional 4-year period (Texas Education Agency, 2015). Students were assigned a final status of graduate, once they had completed all graduation requirements (Texas Education Agency, 2015).

For the purpose of this study, high school size in the Greeney and Slate (2012) definition consisted of three groupings: small, moderate, and large. A Small-size high school was defined as a school with an enrollment of 400 or fewer students, with a minimum of 50 students. A Moderate-size high school defined as a school with an enrollment of 401 to 1,499 students. A Large-size high school was a school with an enrollment of 1,500 or more students (Greeney & Author, 2012).

In the Perez and Slate (2015) definition, high school size consisted of four categories: small, moderate, large, and very large. A Small-size high school was defined as a high school with a student enrollment of 50 to 500 students. A Moderate-size high school was a high school with a student enrollment of 501 to 1,499 students. A Large-size high school was defined as a high school with a student enrollment of 1,500 to 2,499 students. A Very Large-size high school had a student enrollment of 2,500 or more students (Perez & Slate, 2015).

The third grouping of high school size was the University Interscholastic League (2014) guidelines: Very small, Small, Moderate, Medium, Large, and Very large. A Very Small-size high school was defined as a high school with a student enrollment of 25 to 104 students. A Small-size high school was a high school with a student enrollment of 105 to 219 students. A Moderate-size high school was defined as a high school with a student enrollment of 220 to 464 students. A Medium-size high school was a high school with a student enrollment of 465 to 1,059 students. A Large-size high school was defined as a high school with a student enrollment of 1,060 to 2,099 students. Finally, a Very Large-size high school was a high school with an enrollment of 2,100 or more students (University Interscholastic League, 2014).

For the 2012-2013 and 2013-2014 school years, archival data were obtained from the Texas Academic Performance Reports as published annually by the Texas Education Agency. Available at the Texas Academic Performance report website are data for both of the school years. With specific reference to this investigation, Texas Academic Performance Report data were downloaded for the 2012-2013 and 2013-2014 school years. Specific variables that were downloaded were: (a) configuration of each high school; (b) total student enrollment; and (c) dropout rates of students in poverty.

Results

To determine whether a difference existed in dropout rates as a function of high school size as defined by Greeney and Slate (2012), Perez and Slate (2015), and the Texas University Interscholastic League (2014) groupings for students who were economically disadvantaged, an Analysis of Variance (ANOVA) procedure was conducted to address each research question. Before calculating an ANOVA, the standardized skewness coefficients and the standardized kurtosis coefficients were calculated to determine the degree to which the dropout rate data were normally distributed, ± 3 (Onwuegbuzie & Daniel, 2002). The Levene's Test of Error Variance was also calculated to determine the degree of homogeneity of the data, in which a violation was discovered. Despite not all of the underlying assumptions being met, Field (2009) contends the ANOVA procedure is sufficiently robust to use as the statistical procedure.

Research Question 1

For the first research question, student enrollment was grouped into three high school sizes (Greeney & Author, 2012): Small-size high schools (50 to 400 students); Moderate-size high schools (401 to 1,499 students); and Large-size high schools (1,500 or more students). For the 2012-2013 school year, a statistically significant difference was revealed in the dropout rates of students in poverty as a function of school size, $F(2, 1114) = 15.71, p < .001, \eta^2 = .027$, a small effect size (Cohen 1988). Scheffe' post hoc procedures were used next to determine which school size pairwise comparisons were statistically significantly different with respect to dropout

rates for students in poverty. Two of the three post hoc comparisons yielded a statistically significant difference. Students in poverty who were enrolled in Small-size schools had statistically significantly higher dropout rates than did students in poverty who were enrolled in either Moderate-size or in Large-size high schools. The dropout rates of students in poverty did not differ between Moderate-size and Large-size high schools.

With regard to the 2013-2014 school year, a statistically significant difference was yielded in the dropout rates of students in poverty as a function of school size as defined by Greeney and Slate (2012), $F(2, 1119) = 15.15, p < .001, \eta^2 = .026$, a small effect size (Cohen 1988). Scheffe' post hoc procedures were again used to determine which pairwise groupings of high school size differed with respect to the dropout rates of their students in poverty. These post hoc procedures revealed that two of the three pairwise comparisons had statistically significant differences in the dropout rates of their students in poverty. Similar to the previous school year, students in poverty who were enrolled in Small-size high schools had statistically significantly higher dropout rates than for students in poverty who were enrolled in either Moderate-size or in Large-size high schools. The dropout rates of students in poverty did not differ between Moderate-size and Large-size high schools

Research Question 2

For the second research question, student enrollment was grouped into four high school sizes (Perez & Slate, 2015): Small-size high schools (50 to 500 students); Moderate-size high schools (501 to 1,499 students); Large-size high schools (1,500 to 2,499 students); and Very Large-size high schools (2,500 or more students). For the 2012-2013 school year, a statistically significant difference was revealed in the dropout rates of students in poverty as a function of school size, $F(2, 1113) = 4.70, p = .003, \eta^2 = .012$, a small effect size (Cohen 1988). Scheffe' post hoc procedures revealed that two of the six post hoc pairwise comparisons yielded a statistically significant difference. Students in poverty who were enrolled in Small-size schools had statistically significantly higher dropout rates than did students in poverty who were enrolled in Moderate-size high schools. Statistically significant differences were also revealed between Small-size high schools and Large-size high schools and Very Large-size high schools. Small-size high schools had higher dropout rates than Large-size high schools and higher dropout rates than Very Large-size high schools. The dropout rates of students in poverty did not differ between Moderate-size and Large-size high schools or in Large-size and Very large-size high schools.

Concerning the 2013-2014 school year, a statistically significant difference was yielded in the dropout rates of students in poverty as a function of school size based upon the Perez and Slate (2016) definition, $F(3, 1118) = 4.72, p = .003, \eta^2 = .013$, a small effect size (Cohen 1988). Scheffe' post hoc procedures revealed that of the six post hoc comparisons yielded a statistically significant difference. Similar to the previous school year, students in poverty who were enrolled in Small-size schools had statistically significantly higher dropout rates than students in poverty who were enrolled in any of the other high school sizes. The dropout rates of students in poverty did not differ between Moderate-size and Large-size high schools or Large-size and Very large-size high schools.

Research Question 3

For the third research question, student enrollment was grouped into the six Texas University Interscholastic League classifications (2014): Very Small-size high schools (25 to 104 students); Small-size high schools (105 to 219 students); Moderate-size high schools (220 to 446 students); Medium-size high schools (465 to 1,059 students); Large-size high schools (1,060 to 2,099 students); and Very Large-size high schools (2,100 or more students). For the 2012-2013 school year, a statistically significant difference was revealed in the dropout rates of students in poverty as a function of school size, $F(5, 1137) = 29.84, p < .001, \eta^2 = .116$, a medium effect size (Cohen 1988). Scheffe' post hoc procedures revealed that six of the 14 post hoc comparisons yielded statistically significant differences. Students in poverty enrolled in Very Small-size high schools had higher dropout rates than any other school size in the 2012-2013 school year. Statistically significant differences also were apparent between Small-size high schools and Medium-size high schools. Differences were not present between Medium-size high schools and Moderate-size high schools. Differences were also not present between Medium-size high schools and Large-size high schools and Very Large-size high schools

With regard to the 2013-2014 school year, a statistically significant difference was revealed in the dropout rates of students in poverty as a function of school size based upon the Texas University Interscholastic League classifications, $F(5, 1144) = 35.46, p < .001, \eta^2 = .134$, a near-large effect size (Cohen 1988). Scheffe' post hoc procedures revealed that five of the 14 post hoc comparisons yielded statistically significant differences. Students in poverty who were enrolled in Very Small-size high schools had statistically significantly higher dropout rates than students in poverty who were enrolled in any other size high school. No statistically significant differences were revealed in any of the other comparisons between high school sizes.

Research Question 4

To address the consistency of the results across both school years (i.e., 2012-2013 and 2013-2014) using the Greeney and Slate (2012) groupings, Small-size high schools had higher dropout rates for students in poverty than either Moderate-size or Large-size high schools. Dropout rates for students in poverty who were enrolled in Small-size high schools were almost double the dropout rates of students in poverty who were enrolled in Moderate-size high schools in both school years. Though not a research question, the dropout rates of students in poverty revealed a slight increase from the 2012-2013 to the 2013-2014 school year

Research Question 5

Consistent results were yielded when using the Perez and Slate (2015) high school size groupings in both school years (i.e., 2012-2013 and 2013-2014). Small-size high schools had higher dropout rates for students in poverty than any other school size examined in this investigation. A slight increase was noted in the dropout rates of students in poverty from the 2012-2013 to the 2013-2014 school year. One explanation for this change in dropout rates may be due to having data from five additional high schools available for analysis in the 2013-2014 school year.

Research Question 6

Consistent results were also revealed using the University Interscholastic League (2014) high school size groupings for both school years (i.e., 2012-2013 and 2013-2014). Very Small-size high schools had higher dropout rates for students who were in poverty than any other high school size examined in this investigation (i.e., Small-size, Medium-size, Moderate-size, Large-size, and Very Large-size). Of importance was that the average dropout rate for students in poverty who were enrolled in the Very Small-size high schools was more than twice as large as the average dropout rate for students in poverty at any of the other high school sizes using the University Interscholastic League groupings.

Discussion

In this investigation, the extent to which high school dropout rates differed as a function of high school size for students in poverty was examined. Statewide Texas data were obtained from the Texas Academic Performance Reports for two school years (i.e., 2012-2013 and 2013-2014). Inferential statistical procedures were used to determine whether high school size was a contributing factor to the dropout rates of students in poverty in Texas. By analyzing two school years of data, consistent higher dropout rates in Small-size high schools was determined.

Summary of Results for Dropout Rates for Students in Poverty

Students in poverty who were enrolled in smaller size high schools had statistically significantly higher dropout rates than their peers who were in poverty but were enrolled at high schools with higher levels of student enrollment. For both school years, regardless of the high school size classifications, high schools with smaller student enrollment had higher dropout rates. For students in poverty, in the state of Texas, smaller high schools were not conducive for preventing drop out.

Connections to the Literature

These results are congruent with previous investigations conducted in the State of Texas (Ambrose et al., 2016; Rios et al., 2016a). The smaller the high school enrollment, the higher the dropout rates for students in poverty. Conversely, the larger the high school enrollment, the lower the dropout rates for students in poverty. As such, high school size with respect to student enrollment is clearly connected to dropout rates of students who were economically disadvantaged.

Implications for Policy and Practice

Based upon the results of the three sets of inferential analyses, clearly evident were the presence of statistically significant differences in the dropout rates of students in poverty as a function of the student enrollment at their high schools. The smallest size high schools in each of the three definitions of school size had statistically significantly higher average dropout rates than any of the larger high school size groupings. As such, policymakers and educational leaders are encouraged to examine the possibility of having larger high schools, with respect to student

enrollment. Policymakers and educational leaders should consider the idea of consolidation, where possible, smaller size high schools into larger size high schools. It may be that larger size high schools, with respect to student enrollment, have more resources and can offer their students programs and services that reduce dropout rates. When making decisions about the construction and the consolidation of high schools, educational leaders should consider larger high schools, especially for areas that have a large population of students in poverty. Finally, educational leaders are encouraged to audit each of their high school's dropout rates by student economic status, as well as by other demographic characteristics. Such audits could assist them in determining whether new programs are needed to reduce their dropout rates, as well as in ascertaining the extent to which any current programs in place are effective.

Recommendations for Future Research

In this investigation, the dropout rates of students in poverty were analyzed as a function of high school size, with respect to student enrollment. Moreover, aggregated dropout rate data at the high school level for a 2-year time period were examined. As such, researchers are encouraged to analyze the dropout rates of students by important demographic characteristics. That is, are the dropout rates of Black or Hispanic students influenced by the size of the student enrollment at their high schools? The degree to the results obtained herein on the relationship of dropout rates of students in poverty to their high school size would generalize to other groups of students is not known. Another recommendation for research would be to obtain dropout rate data at the individual student level, rather than at the aggregated high school level. By analyzing individual student level data, a more nuanced examination of the interrelationships of student demographic characteristics (e.g., Black boys in poverty) could be conducted.

Researchers are encouraged to investigate the relationship of high school size with other important academic outcomes such as graduation rates and college readiness. The extent to which the findings obtained in this investigation would generalize to other academic outcomes is not known. This research study was conducted exclusively with regard to Texas students. Accordingly, this research investigation should be replicated in other states to ascertain whether the results in other states are similar to these Texas results.

Conclusion

The results of the two years of data were not consistent with the idea that smaller size high schools are better for students. Rather, the dropout rates for students in poverty were statistically significantly higher in the smaller size high schools. All three high school size groupings yielded similar results, dropout rates were lower in the smallest high school size groupings. The evidence in this investigation provides merit to the discussion of consolidating smaller size high schools into larger ones.

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