School Climate and High School Size: A Multi-Year
Analysis of Hispanic Students
[View PDF]

Abstract

In this investigation, we examined the attendance rates, dropout rates, and completion rates of Hispanic students in Texas high schools for the 2003-2004 through the 2008-2009 school years as a function of school size. With student-connectedness as the theoretical framework for this study, no difference was present for Hispanic student attendance rates or for Hispanic student dropout rates among small, medium, and large high schools. For two of the five years, Hispanic students in small high schools had better completion rates, albeit small effect sizes, than did Hispanic students enrolled in larger size high schools. As such, our findings were not supportive of the student-connectedness framework as an explanation for secondary school size. Implications of our results are provided.

From 1985 to 2008, enrollment in public schools increased from 39.4 million to 49.8 million students, representing a 26% increase in enrollment (National Center for Education Statistics [NCES], 2008a). During this time, a 20% increase in the number of secondary schools occurred due to increases in student enrollment. Between 1998 and 2008, secondary schools have experienced an increase of 13% in student enrollment (NCES, 2008a). To deal with the increasing student enrollment, the majority of school districts built larger schools (Abramson, 2008).

In 1930, over 23,930 secondary schools existed; in 1990 the number decreased slightly to 23,460 secondary schools (NCES, 2008b). By the 2006-2007 school year the number of secondary schools increased to 29,420. School construction during 2007 totaled $20.8 billion dollars, an increase of $800 million dollars from the previous year. However, despite increasing spending, districts built fewer schools in 2007 than in the previous years, with new buildings consisting of 63% of the construction (Abramson, 2008).

The state of Texas in the 2007-2008 school year had 9,082 public school buildings, second to only California, which had 10,198 public school buildings (NCES, 2008d). Texas educated over 2 million students compared to the national average of 461,475 students (NCES, 2008d). In Texas, Grades 9-12 had an enrollment of over 1 million students compared to the national average of 294,025 (NCES, 2008d). The average size high school campus Grade 9-12 in Texas was 1,146 students, second only to California, which averaged 1,576 students (NCES, 2008d). Because of the continued growth in enrollment, the rising cost of construction, and the building of fewer schools, researchers called for policy makers to examine the relationship between building organization, strategic planning, and achievement (Abramson, 2008; Bickel, Howley, Williams, & Glascock, 2000; Black, 2006; Darling-Hammond, Peter, & Milliken, 2006; Haycock, 2006; Howley & Bickel, 2000).

Until the last decade, district consolidation, which resulted in the creating of larger schools, became the historical trend in relation to school size across the country (Cotton, 1996;

Howley, 1997). Recently researchers raised questions about whether larger schools were better for students than smaller schools when taking into consideration student outcomes (Cotton, 2001; Howley, 1996; Raywid, 1999; Slate & Jones, 2008a, 2008b). However, even though researchers favored small schools, the issue of school size from a research aspect was not complete (Stevenson, 2006).

Although many researchers have analyzed the relationship between secondary school size and student outcomes (e.g., Chavez, 2002; Howley, Strange, & Bickel, 2000; Lee & Smith, 1993; Slate & Jones, 2008a, 2008b; Stiefel, Berne, Iatarola, & Fruchter, 2000), recently researchers have raised questions about whether larger schools are better than smaller schools for students when considering student outcomes (Cotton, 2001; Howley, 1996; Raywid, 1999; Slate & Jones, 2008a, 2008b). Furthermore, researchers have questioned the extent to which a one-size-fits-all model is appropriate and have expressed the need for more detailed research on the relationship between school size and student outcomes (Rumberger & Palardy, 2005). Information provided in this study may be useful in providing direction for legislators, superintendents, community members, and board members related to funding and design of capital projects. Information provided from this study may also guide administrators in decisions based around organizational structure of school buildings.

Statement of the Problem

The focus of this study was on the relationship that secondary school size has either indirectly or directly on school climate. Cohen, McCabe, Michelli, and Pickeral (2009) documented that a positive school climate was connected to student performance, school success, and to relationships among teachers and students. School size became an issue as a result of increased population, consolidation of rural districts, increased spending, and the increased size of schools built. Construction of new schools in 2007-2008 in Texas cost over $5 billion; of that total, 37% of the new buildings were at the secondary level with a median capacity of 1,800 students (Abramson, 2008). The NCES estimated that through 2017, Texas will experience the third highest increase in student enrollment behind Arizona and Nevada (NCES, 2008c). From 1998-1999 and 2008-2009, the state of Texas public school enrollment increased by 20.1% (Texas Education Agency, 2009). During this time, the Hispanic population increased by 49% and now accounts for 47.9% of the student population (TEA, 2009).

Theoretical Framework

School Connectedness

According to Blum (2005), a student's connectedness to school increases academic performance, attendance, and completion rates while lowering absenteeism. School connectedness is defined as the attachment a student experiences towards his or her school as a result of a positive interaction with a faculty member (Wilson, 2004). When students felt cared for by staff members and felt connected to their school, they were less likely to engage in sexual activity, drug use, and violent behavior (McNeely, Nonnemaker, & Blum, 2002). School connectedness was maximized when students perceived that they had meaningful roles within the school, were academically and creatively engaged, and had a sense of safety (Whitlock,

2006). Furthermore, students who felt more connected to their schools were more likely to participate in extra-curricular activities and make better grades (McNeely et al., 2002).

In several studies, advocates for smaller schools have noted negative effects of school size on graduation rates and attendance rates (Howley & Bickel, 2000; Stiefel et al., 2000; Welsh, Stokes, & Greene, 2000). McNeely et al. (2002) analyzed a national data set in which 71,515 students were surveyed regarding school connectedness. Students enrolled in small high schools reported feeling more connected to their school than did students who were enrolled in larger high schools. Students who participated in extracurricular activities reported more attachment to their school and had better attendance rates than did students who were enrolled in larger high schools (McNeely et al., 2002).

In a meta-analysis of 14 studies related to school size and attendance rates, Leithwood and Jantzi (2009) contended that the preponderance of evidence showed that student attendance was better in smaller high schools than in larger high schools. Pittman and Haughwout (1987), in an analysis of a national data set, examined the relationship between school size, school climate, and the dropout rate in 744 high schools. A statistically significant negative relationship was present between the dropout rate and an increase in school size. Pittman and Haughwout (1987) estimated that for every 400 students enrolled in a high school, an 1% increase in the dropout rate would occur. In a much more recent article, Werblow and Duesbery (2009) established that dropout rates were statistically significantly lower in smaller high schools than in larger high schools. Rumberger and Palardy (2005) determined that small high schools did have lower dropout rates than did high schools with student enrollments over 1,200.

With respect to students enrolled in Texas schools, Slate and Jones (2008b) analyzed the effect of school size on minority graduation rates. Hispanic students who were enrolled in smaller high schools were more likely to graduate than were Hispanic students from larger schools. Interestingly, this relationship was not present between school size and graduation rates for Black students. Slate and Jones (2008b) contended that this result reflected that the smallest high schools in their study had over 400 students and were, therefore, not small by definition. Accordingly, any advantages related to school connectedness were not present.

The personal attention provided by administrators and teachers and the opportunities for student participation in extra-curricular activities in smaller schools creates a sense of attachment in small high schools (Raywid, 1999). The positive relationships developed between students and faculty has been shown to decrease school violence (Cotton, 2001). Students who reported a connection to their school and staff were less likely to drop out of school (Lee & Burkam, 2003). Furthermore, school connectedness can help students overcome the debilitating effect of poverty in relation to their achievement outcomes (Brookmeyer, Fanti, & Henrich, 2006).

Purpose of the Study

The purpose of this study was to determine the effect of school size on school climate in secondary public schools in the state of Texas. Specifically, student climate was examined in Texas high schools for Hispanic students. School climate was assessed by measuring attendance rates, dropout rates, and completion rates for Hispanic students for the 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. These data were selected because they were the most current data available at the time of the study.

Significance of the Study

This study provides important information about the relationship of secondary school size to student climate. The increase in school size and construction costs made this study timely as the information provided might provide direction for legislators, superintendents, community members, and board members related to funding and design of capital projects. Furthermore, information from this study might guide administrators in decisions regarding organizational structures of school buildings.

Research Questions

In this study, the following questions were addressed:
1. What is the difference in attendance rates as a function of school size among Texas high schools for Hispanic students?
2. What is the difference in dropout rates as a function of school size among Texas high schools for Hispanic students?
3. What is the difference in completion rates as a function of school size among Texas high schools for Hispanic students?
Each of these research questions was repeated for each of the six years of data analyzed. Thus, a total of 18 research questions were present in this study.

Definition of Terms

Academic Excellence Indicator System (AEIS). The AEIS report is a public report compiled by the TEA on an annual basis to evaluate the performance of all schools and districts in the state of Texas. School and district performance were measured by student performance on the TAKS examination. Student data were reported by subject area, by grade level, and by ethnicity (TEA, 2008a).

Annual Dropout Rate. This measure shows the dropout rates for the high schools Grades 9-12. It is a report-only measure and is not used to determine accountability ratings. The annual dropout rate is calculated as the number of dropouts in Grades 9-12 divided by the number of Grades 9-12 students who were in attendance at any time during the previous year. A dropout is defined as a student enrolled in Grades 7-12 who did not return to public school the following fall, was not expelled, and did not graduate, receive a GED, continue school outside the public school system, begin college, or die (TEA, 2008a).

Attendance Rate. Attendance rates reported in AEIS were based on student attendance for the entire school year. These calculations included only students in Grades 9-12. Attendance is calculated by the total number of days students were present divided by the total number of days students were enrolled (TEA, 2008a).

Completion Rate. This indicator showed the status of a group (cohort) of students after four years in high school. The cohort consisted of students who first entered ninth grade and were followed through their expected graduation four years later. Any student who transferred in the cohort was added, and any student who transferred out was subtracted. Students were considered a part of the same cohort no matter whether they graduated early or in more than four years (TEA, 2008a).

Hispanic. For this study, Hispanic was used to represent students who were of Hispanic origin. School districts assign students an ethnic designation from one of the following categories: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, Hispanic, or White not of Hispanic origin (TEA, 2008b). The PEIMS uses the term Hispanic to code the data received from school districts (TEA, 2008b).

Large School. A large school was defined in this study as a school with a student enrollment of 1,500 or more students (Slate & Jones, 2008a, 2008b).

Medium School. A medium school was defined in this study as a school with a student enrollment of 401 through 1,499.

Small School. A small school was defined in this study as a school with a student enrollment of 400 or fewer students.

School Climate. According to Koth, Bradshaw, and Leaf (2008), "School climate is a product of social interactions among students and with teachers is influenced by educational and social values, and has been shown to relate to social situations within classrooms and to the school as a whole" (p. 96). In this investigation, we used dropout rates, attendance rates, and completion rates for Hispanic students as our indicators of school climate. Our rationale for using these variables as proxies for school climate is based, partly, on their use as measures of school climate by other researchers in investigations of school size (Chavez, 2002; Slate & Jones, 2006, 2008a, 2008b).

Selection of Participants

The unit of analysis in this study was all Texas public high schools with Grades 9-12 listed in the Texas Education Agency database. Data obtained were from the six most recent years of the Texas Assessment of Knowledge and Skills examinations. Data collected from secondary schools were student dropout rates, attendance rates, and completion rates for Hispanic students. Excluded from consideration in this study were any schools that were alternative schools, private schools, charter schools, or schools that were not organized in Grades 9-12. According to the TEA (2008b) accountability manual,

> Any student group with fewer than 30 students tested is not evaluated. If there are 30 to 49 students within the student group and the student group comprises at least 10% of All Students, it is evaluated. If there are at least 50 students within the student group, it is evaluated. Student group size is calculated subject by subject. For this reason the number of student groups evaluated will sometimes vary. For example, an elementary school with grades 3, 4, & 5 tested may have enough Hispanic students to be evaluated on reading and mathematics, but not enough to be evaluated on writing. (p. 12)

Limiting the schools to a selection criterion allowed similar school structures to be statistically compared. The limits used to identify school size were small, medium, and large. Prior to conducting statistical analyses, a frequency distribution was conducted for each of the years examined to determine the set points for each of the school-size categories. Based upon the frequency distributions for all six years, small high schools were determined to have student enrollments of 400 or fewer students; medium high schools had student enrollments of 401 to 1,500 students; and large high schools had student enrollments of over 1,500 students.

Given recent increases in secondary school enrollment, large high school size was established in this study as at least 1,500 students (Slate & Jones, 2008a, 2008b). Further analysis of the frequency distribution revealed that a majority of schools with enrollments of less

than 100 students had their passing rates masked due to small numbers within the ethnic groups whose data were analyzed in this study. As a result, high schools with student enrollments of less than 100 students were eliminated from any statistical analysis.

Instrumentation

Examined in this study was the relationship of school size to student climate. Archival data were obtained for secondary schools in Texas that meet the selection criteria for six academic years (i.e., 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, and 2008-2009). The data in this study were quantitative and reported by TEA annually in the Academic Excellence Indicator System (TEA, 2008a). Data collected from secondary schools were student enrollments, dropout rates, attendance rates, and completion rates for Hispanic students. Data were analyzed for statistically significant differences in student climate indicators related to secondary school size.

Variables

Student Climate

Performance indicators of student climate were examined in the areas of attendance rates, completion rates, and dropout rates. According to Rumberger and Palardy (2005), the inclusion of other measures beyond test scores for student achievement such as graduation rates and dropout rates is important. Furthermore, attendance rates, completion rates, and dropout rates have been used as measures for school climate by other researchers in studies of school size (Chavez, 2002; Slate & Jones, 2006, 2008a, 2008b).

According to Welsh et al. (2000), attendance rates have also been used effectively to measure both school climate and school attachment. Attendance rates are self-reported by each individual school and school district. Attendance rates are calculated by dividing the total number of students present in a given year by the total number of students in membership in a given year (TEA, 2008a). Dropout rates are also self-reported by each individual school and school district. The dropout rate is calculated by dividing the number of students in Grades 9-12 who drop out in a given year by the number of students in Grades 9-12 who are in attendance at any time during the school year (TEA, 2008a). The completion rate represents the status of a cohort after four years of high school considering four outcomes: graduated, received GED, continued high school, and dropped out (TEA, 2008a). A cohort consists of students who first attended ninth grade during the same school year (TEA, 2008a).

School Enrollment

School enrollment is the total number of students who are reported in membership at a school on a specific date set by TEA in October in a given year (TEA, 2008a). Enrollment groups were subdivided into small, medium, and large schools. Based upon the frequency distributions for all six years, small high schools were determined to have student enrollments of 400 or fewer students; medium high schools had student enrollments of 401 to 1,500 students; and large high schools had student enrollments of over 1,500 students.

Results

Attendance Rate Analyses

Summarized in Table 1 are the descriptive statistics for the attendance rate measure for Hispanic students enrolled in small high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Similar to four other investigations (Bone, Slate, & Martinez-Garcia, 2011; Greeney, 2010; Riha, 2012; Zoda, Slate, & Combs, 2011) in which AEIS data were examined, the 2004-2005 school year data were not analyzed because of a data anomaly. Results for the 2004-2005 are markedly atypical compared to any other year of AEIS data. Reasons for this data anomaly are not known. Summary statistics are detailed by school size. Also depicted in Table 1 are the descriptive statistics for the attendance rates measure for Hispanic students enrolled in medium high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Summary statistics are detailed by school size. Also depicted in Table 1 are the descriptive statistics for the attendance rates measure for Hispanic students enrolled in large high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Summary statistics are detailed by school size.

Table 1

Descriptive Statistics for Attendance Rates by Year and by School Size for Hispanic Students Enrolled

School Size	*n of schools*	*M*	*SD*
Small Schools			
2003-2004	303	93.97	5.22
2005-2006	303	94.03	2.24
2006-2007	314	93.59	5.86
2007-2008	311	93.51	5.79
2008-2009	318	93.55	5.35
Medium Schools			
2003-2004	328	93.90	2.40
2005-2006	324	94.06	2.24
2006-2007	330	93.82	2.30
2007-2008	324	93.73	2.63
2008-2009	336	93.83	2.30
Large Schools			
2003-2004	305	93.21	1.89
2005-2006	324	93.47	1.76
2006-2007	324	93.33	1.63
2007-2008	338	93.15	1.77
2008-2009	334	93.27	1.75

The ANOVA, conducted for the 2003-2004 school year on Hispanic students attendance rates, did not yield a statistically significant difference, $F(2, 936) = 3.54$, $p = .03$ at the Bonferroni-adjusted alpha level. No difference was present in the attendance rates of Hispanic students as a function of high school size. Readers are referred to Table 1 for the descriptive statistics for attendance rates for Hispanic students for the 2003-2004 school year. An ANOVA, conducted for the 2005-2006 school year on Hispanic students attendance rates, failed to yield a statistically significant difference, $F(2, 951) = 3.27$, $p = .04$, at the Bonferroni-adjusted alpha level. No difference was present in the attendance rates of Hispanic students as a function of high school size. The ANOVA for the 2006-2007 school year did not result in a statistically significant difference, $F(2, 968) = 1.40$, $p = .25$. No difference was present in the attendance rates of Hispanic students as a function of high school size. The ANOVA, conducted for the 2007-2008 school year on Hispanic students attendance rates, did not yield a statistically significant difference, $F(2, 973) = 1.99$, $p = .14$. An ANOVA, conducted for the 2008-2009 school year on Hispanic students attendance rates, failed to yield a statistically significant difference, $F(2, 988) = 2.13$, $p = .12$. No difference was present in the attendance rates of Hispanic students as a function of high school size.

Summary of Attendance Rate Analyses

For the five years analyzed, no difference was present in the attendance rates of Hispanic students as a function of high school size. Readers are referred to Table 2 for a summary of the statistical outcomes regarding the attendance rates of Hispanic students by year. However, for the five years analyzed Hispanic students in medium schools had the highest attendance rates, albeit the rates were not statistically significantly. Readers are reminded that the 2004-2005 school year data were not analyzed because of a data anomaly.

Table 2

Results by Year for Hispanic Students' Attendance Rates

School Year	Outcome	Effect Size	Highest Attendance Rates
2003-2004	Not significant	No effect	Medium high schools
2005-2006	Not significant	No effect	Medium high schools
2006-2007	Not significant	No effect	Medium high schools
2007-2008	Not significant	No effect	Medium high schools
2008-2009	Not significant	No effect	Medium high schools

Dropout Rate Analyses

Table 3 summarizes the descriptive statistics for dropout rates for Hispanic students enrolled in small high schools for the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Furthermore, the 2003-2004 school year dropout rates data were not available and therefore were not analyzed. Summary statistics are detailed by school size. Also depicted in Table 3 are the descriptive statistics for dropout rates for Hispanic students enrolled in medium

high schools for the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Summarized in Table 3 are the descriptive statistics for dropout rates for Hispanic students enrolled in large high schools for the 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years.

Table 3

Descriptive Statistics for Dropout Rates by Year and School Size for Hispanic Students

School Size	*n of schools*	*M*	*SD*
Small Schools			
2005-2006	309	1.11	2.35
2006-2007	323	3.58	6.62
2007-2008	317	3.06	6.04
2008-2009	321	2.99	5.49
Medium Schools			
2005-2006	324	1.26	1.81
2006-2007	330	3.23	2.91
2007-2008	324	3.57	3.73
2008-2009	336	2.74	2.53
Large Schools			
2005-2006	324	1.52	1.20
2006-2007	324	3.65	2.35
2007-2008	338	3.91	2.57
2008-2009	334	2.91	1.95

An ANOVA, conducted for the 2005-2006 school year on Hispanic students dropout rates, failed to yield a statistically significant difference, $F(2, 957) = 3.99$, $p = .02$, at the Bonferroni-adjusted alpha level. Hispanic students in medium high schools had the lowest dropout rates measure. An ANOVA was conducted to determine the extent to which the dropout rates measure for Hispanic students for the 2006-2007 school year differed as a function of high school size. A statistically significant difference was not yielded for the dropout rates measure as a function of high school size, $F(2, 977) = 0.88$, $p = .42$. Hispanic students in medium high schools had the lowest dropout rates, albeit not statistically significantly lower. The ANOVA, conducted for the 2007-2008 school year on Hispanic students dropout rates, failed to yield a statistically significant result, $F(2, 979) = 3.18$, $p = .04$, at the Bonferroni-adjusted alpha level. Hispanic students in small high schools had the lowest dropout rates, albeit not statistically significantly lower. An ANOVA, conducted for the 2008-2009 school year on Hispanic students dropout rates, failed to yield a statistically significant difference, $F(2, 991) = 0.40$, $p = .67$. Hispanic students in medium high schools had the lowest dropout rates measure.

Summary of Dropout Rate Analyses

For the four years analyzed, no difference was present in the dropout rates of Hispanic students as a function of high school size. For two of the four years analyzed Hispanic students in small size schools had the lowest dropout rates. Readers are referred to Table 4 for a summary of the statistical outcomes regarding the dropout rates of Hispanic students by year. Furthermore, the 2003-2004 school year dropout rates data were not available and therefore were not analyzed.

Table 4

Results by Year for Hispanic Students' Dropout Rates

School Year	Outcome	Effect Size	Lowest Dropout rates
2005-2006	Not significant	No effect	Small high schools
2006-2007	Not significant	No effect	Medium high schools
2007-2008	Not significant	No effect	Small high schools
2008-2009	Not significant	No effect	Medium high schools

Completion Rates Analyses

Depicted in Table 5 are the descriptive statistics for completion rates for Hispanic students enrolled in small high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Also depicted in Table 5 are the descriptive statistics for completion rates for Hispanic students enrolled in medium high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. Finally summarized in Table 5 are the descriptive statistics for completion rates for Hispanic students enrolled in large high schools for the 2003-2004, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years.

An ANOVA was conducted to determine the extent to which completion rates for Hispanic students for the 2003-2004 school year differed as a function of high school size. A statistically significant difference was not yielded for completion rates as a function of high school size, $F(2, 832) = 2.29$, $p = .10$. Hispanic students in small high schools had the highest completion rates measure, albeit not statistically significantly higher. The ANOVA, conducted to determine the extent to which completion rates differed for Hispanic students for 2005-2006 as a function of high school size, did not reveal a statistically significant difference, $F(2, 856) = 3.26$, $p = .04$. Hispanic students in small high schools had the highest completion rates, albeit not statistically significantly higher at the Bonferroni-adjusted alpha level. An ANOVA was conducted to determine the extent to which completion rates for Hispanic students for the 2006-2007 school year differed as a function of high school size. A statistically significant difference was not yielded for completion rates as a function of high school size, $F(2, 865) = 3.17$, $p = .04$. Hispanic students in small high schools had the highest completion rates, albeit not statistically significantly higher at the Bonferroni-adjusted alpha level.

Table 5

Descriptive Statistics for Completion Rates by Year and School Size for Hispanic Students

School Size	*n of schools*	*M*	*SD*
Small Schools			
2003-2004	216	92.79	9.51
2005-2006	227	92.43	10.78
2006-2007	225	89.37	12.84
2007-2008	225	89.43	12.56
2008-2009	223	90.37	11.19
Medium Size			
2003-2004	311	91.90	7.55
2005-2006	305	91.95	7.49
2006-2007	312	88.37	10.20
2007-2008	304	85.44	12.22
2008-2009	322	87.85	10.78
Large Schools			
2003-2004	305	91.41	4.87
2005-2006	324	90.80	5.30
2006-2007	328	87.15	8.30
2007-2008	314	84.84	10.06
2008-2009	309	87.09	7.27

The ANOVA, conducted for the 2007-2008 school year on Hispanic students completion rates, yielded a statistically significant difference, $F(2, 843) = 11.60$, $p = .001$, eta squared (n^2) = .03. Using Cohen's (1988) categories, this effect size was small. Scheffé's post hoc tests (Field, 2000) revealed that Hispanic students enrolled in small high schools had higher completion rates than Hispanic students enrolled in medium and large high schools. Hispanic students enrolled in medium high schools did not differ in their completion rates from Hispanic students enrolled in large high schools. An ANOVA, conducted for the 2008-2009 school year on Hispanic students completion rates, yielded a statistically significant difference, $F(2, 854) = 7.67$, $p = .001$, n^2 = .02. This effect size was small (Cohen, 1988). Scheffé's post hoc tests revealed that Hispanic students enrolled in small high schools had higher completion rates than Hispanic students enrolled in medium and large high schools. Hispanic students enrolled in medium high schools did not differ in their completion rates from Hispanic students enrolled in large high schools.

Summary of Completion Rate Analyses

For the five years analyzed, statistically significant differences were present in two out of five years for Hispanic students' completion rates as a function of high school sizes. In each of the five years, Hispanic students enrolled in small high schools demonstrated a higher

completion rate than did Hispanic students enrolled in large high schools. However, in 2003-2004, 2005-2006, and 2006-2007, no statistically significant differences were yielded. The effect sizes for the two statistically significant results were small (Cohen, 1988). Readers are referred to Table 6 for a summary of the statistical outcomes regarding the completion rates of Hispanic students by year.

Table 6

Results by Year for Hispanic Students' Completion Rates

School Year	Outcome	Effect Size	Highest Completion Rates
2003-2004	Not significant	No effect	Small high schools
2005-2006	Not significant	No effect	Small high schools
2006-2007	Not significant	No effect	Small high schools
2007-2008	Significant	.03 (Small)	Small high schools
2008-2009	Significant	.02 (Small)	Small high schools

Discussion

In 1930, over 23,930 secondary schools existed; in 1990 the number had decreased slightly to 23,460 secondary schools (NCES, 2008b). By the 2006-2007 school year, the number of secondary schools had increased to 29,420. School construction during 2007 totaled $20.8 billion dollars, an increase of $800 million dollars from the previous year. However, despite increasing spending, districts built fewer schools in 2007 than in the previous years, with new buildings consisting of 63% of the construction (Abramson, 2008). To deal with increasing student enrollment, the majority of school districts have built larger schools (Abramson, 2008).

Because of the continued growth in enrollment, the rising cost of construction, and the building of fewer schools, researchers have called for policy makers to examine the relationship between building organization, strategic planning, and achievement (Abramson, 2008; Darling-Hammond et al., 2006; Haycock, 2006; Howley & Bickel, 2000). Recently researchers have raised questions about whether larger schools are better for students than smaller schools when taking into consideration student outcomes (Cotton, 2001; Howley, 1996; Raywid, 1999; Slate & Jones, 2008a, 2008b). However, even though researchers have obtained findings that favored small schools, the issue of school size from a research aspect is not complete (Stevenson, 2006).

The purpose of this study was to determine the effect of school size on school climate in secondary public schools in the state of Texas. Specifically, variables that were indicative of student climate were examined for Texas high schools for Hispanic students. The variable of school climate was assessed by measuring attendance rates, dropout rates, and completion rates for the 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-2008, and 2008-2009 school years. These data were selected because they were the most current data available at the time of the study.

No difference was present in the attendance rates of Hispanic students as a function of high school size for any of the years of data analyzed. Similar results were yielded for dropout rates for Hispanic students. High school size was not related to either Hispanic attendance rates

or to Hispanic student dropout rate. Regarding completion rates, Hispanic students in small schools had the highest completion rates, compared to Hispanic students in larger high schools for two out of the five years of data analyzed. In summary, the effect of school size on student climate yielded few statistically significant results. Hispanic students who were enrolled in small high schools were more likely to complete high school than were Hispanic students who were enrolled in large size high schools. However, little evidence was present that school climate was affected by school size for Hispanic students.

Links to Literature

When the federal government mandated that all children must demonstrate Adequate Yearly Progress (Erpenbach, Forte-Fast, & Potts, 2003), more responsibility was placed upon administrators and policy makers to provide the necessary resources for student success (Linn, 2003). Many researchers have analyzed the relationship between secondary school size and student outcomes (e.g., Chavez, 2002; Howley et al., 2000; Lee & Smith, 1993; Slate & Jones, 2008a, 2008b; Stiefel et al., 2000). However, little research exists on school size in relation to student outcomes as a function of ethnicity (Slate & Jones, 2008b). Therefore, given the increase in minority student enrollment (NCES, 2008a) research studies are needed on the effect of school size on ethnicity over several years (Slate & Jones, 2006; 2008a; 2008b; Zoda, 2009; Zoda et al., 2011).

Leithwood and Jantzi (2009) reviewed 59 studies related to school size. Of these studies, 19 researchers analyzed the effect of school size on student achievement in secondary schools. Out of those 19 studies, researchers in 15 of the studies either reported a U-shaped or a negative relationship between school size and student achievement. Current research has tended to favor small schools over large schools in relation to school climate. In a review of 103 school size studies, Cotton (1996) reported that students enrolled in small schools had better attendance, lower dropout rates, and higher graduation rates than students in large schools. However, out of the statistical analyses performed herein, only two statistically significant findings were calculated. Though these findings favored small schools with regard to completion rates, the effect sizes were small. No evidence was observed that small schools had higher attendance or lower dropout rates for Hispanic students. Therefore, only limited empirical evidence was present in this study that school size affected student climate, as measured by the three variables analyzed herein, in Texas high schools.

Schools and School Climate

Jones, Toma, and Zimmer (2008) investigated the effect of school and district size on attendance rates using nine years of data obtained from the Academic Excellence Indicator System in all public high schools in Texas. Jones et al. (2008) reported that when a district added just one school, a 0.0036% decline in average daily attendance occurred, and when a school added one more student, a 0.02% decline occurred in the average daily attendance rate. Jones et al. (2008) concluded that the negative relationship between school and district size and attendance is important because irregular attendance is related to the dropout rate. Cotton (1996) reviewed 16 documents concerning school size and its effect on attendance and retention rates. Cotton (1996) commented that students attending smaller high schools had statistically significantly better attendance than students attending larger high schools. Similarly, Leithwood

and Jantzi (2009) examined 14 studies related to school size and attendance rates and reported that the abundance of evidence reflects better attendance in smaller high schools than in larger high schools.

Researchers on the effect of school size on minority attendance rates have documented that African American students in small schools had better overall attendance than their large school counterparts (Slate & Jones, 2006). In a similar study, Slate and Jones (2008b) demonstrated that Hispanic students in smaller schools had better attendance than Hispanic students in large schools. Jones et al. (2008), Cotton (1996), Leithwood and Jantzi (2009), and Slate and Jones (2006) reported that African American students enrolled in small high schools had higher attendance compared to African American students enrolled in large high schools. However, Slate and Jones (2006) contradicted the results in this study; in the five years examined no differences were present in attendance rates. Therefore, school size was not related to student attendance rates.

Werblow and Duesbery (2009) documented that dropout rates were statistically significantly lower in smaller high schools than in larger high schools. Rumberger and Palardy (2005) investigated other performance indicators in relation to student achievement and determined that small high schools did not lower dropout rates in comparison to medium high schools but did have lower dropout rates than high schools with student enrollments over 1,200. Lee and Burkam (2003), using a national data set, analyzed data on 3,840 students in the 10th and 12th grades in 190 Catholic and independent urban and suburban schools. Lee and Burkam (2003) documented that 5% of the cohort had dropped out of school, and those students in schools with student enrollments fewer than 1,500 were less likely to drop out than were students enrolled in larger schools. Chavez (2002), in a study of Texas public high schools, noted that as the school grew in size, the dropout rate substantially increased. In a review of 101 articles related to school size, Cotton (1996) reported that 90% of the studies reviewed related to the dropout rate provided evidence that smaller schools had lower dropout rates. However, the results of the present study failed to confirm that students who were enrolled in small or medium high schools had lower dropout rates than student who were enrolled in large high schools. The results, however, were similar to Slate and Jones (2006) who reported no relationship between school size and the dropout rates for African American students.

Darling-Hammond et al. (2006) conducted a study in which they examined data from six schools of approximately 200 mostly at-risk students. The schools were a part of the Coalition Campus Schools Project in New York City, which were opened to replace a large high school with six smaller high schools. Darling-Hammond et al. (2006) documented that graduation rates were higher at the six small campuses than at the larger campus. Cotton (1996), in a review of 10 studies, documented in nine of the studies that graduation rates were better in smaller schools than in larger schools.

Slate and Jones (2008b) analyzed the effect of school size on minority graduation rates in a Texas statewide study. They demonstrated that Hispanic students enrolled in smaller high schools were more likely to graduate than were Hispanic students from larger schools. The results of the current study are similar to the findings of Darling-Hammond (2006), Cotton (1991), and Slate and Jones (2008b). Hispanic students who were enrolled in small high schools were more likely to complete high schools than were Hispanic students who were enrolled in large size high schools.

Links to Theoretical Framework

The results from the present study do not support the theory that as a result of school connectedness, small high schools have a better school climate than do large high schools. School connectedness, the attachment students experience toward their school as a result of positive interactions with faculty members (Wilson, 2004), is maximized when students perceive that they have meaningful roles within the school, are academically and creatively engaged, and have a sense of safety (Whitlock, 2006). In addition, students who feel more connected to their schools are more likely to participate in extra-curricular activities and make better grades (Cotton, 2001; McNeely et al., 2002) than students who do not feel connected to their schools. Furthermore, students who have more positive student-teacher relationships are less likely to drop out of school than are students who report less positive relationships with their teachers (Lee & Burkam, 2003). However, these positive effects were negated as the size of the schools increased (Lee & Burkam, 2003).

Recommendations for Future Research

Researchers have touted the positive effects of school connectedness on student performance and school climate. Although findings that support the school connectedness theory were not present in this study, further research is necessary. The current trend in education is to create schools-within-a-school models to help foster school connectedness within large school environments. Schools-within-a-school models increase social interaction between students and faculty; create a safer, more orderly environment within the school; and increase student attendance, extracurricular participation, and academic performance (Oxley, 1990; Ready, Lee, & Welner, 2004). Mixed method or qualitative research aimed at examining the effects of school achievement and school connectedness of schools-within-schools models could provide valuable information to superintendents, school board members, and administrators related to school organization.

Finally, with federal and state legislatures increasingly examining the progress of students who are labeled special education, at-risk, economically disadvantaged, or designated as English Language Learner students, research is needed to examine the effects of school size on student achievement of special populations. Researchers have documented the negative effect of large schools on low SES and at-risk students' academic achievement (Howley & Bickel, 2000). The current study provides a framework that could be utilized to examine the effects of school size on students who are labeled special education, at-risk, economically disadvantaged, or English Language Learner students. Furthermore, researchers could examine PEIMS data which might produce different results from aggregated school level data. This information would be valuable to decision makers serving these special populations.

Implications for Policy

Small school advocates have claimed that smaller schools create an environment that fosters personal relationships between students and staff (Cotton, 2001). Lee and Burkam (2003) reported that students who had more positive student-to-teacher relationships were less likely to drop out of school than were students who reported less positive relationships with their teachers. Researchers have also documented that students are more likely to participate in extracurricular

activities in small schools (Feldman & Matjasko, 2007; McNeely et al., 2002) than in large schools. Moreover, students who participated in extracurricular activities reported more attachment to their school, made better grades, and had better attendance rates than students who were enrolled in larger high schools (McNeely et al., 2002). Researchers' findings supporting small sized schools have led to a movement dividing larger schools into smaller schooling units (Darling-Hammond et al., 2006).

However the results from this study call into question the small school movement. In the present study, only minimal evidence, at best, was present that small high schools provided a better school environment than large high schools for Hispanic students. Therefore, Texas legislators should review data related to school size in high schools. To the extent that findings in this study can be generalized to other grade levels, Texas legislators may need to evaluate these findings at the elementary and middle school levels. Researchers have continued to promote consolidation of schools and school districts as a method to control costs and increase efficiency (Duncombe & Yinger, 2007; Lewis & Chakroborty, 1996). This information could guide legislators in decisions related to school size and school consolidation, which would create opportunities for students to benefit from the positive effects of large schools.

References

Abramson, P. (2008). The 2008 annual school construction report. *School Planning and Management.* Retrieved from http://www.peterli.com/spm/resources/rptsspm.shtm

Bickel, R. (1999). *School size: Socioeconomic status, and achievement: A Georgia replication of inequity in education.* Retrieved from ERIC database. (ED433985)

Bickel, R., Howley, C., Williams, T., & Glascock, C. (2000). *High school size, achievement equity, and cost: Robust interaction effects and tentative results.* Retrieved from ERIC database. (ED450991)

Black, S. (2006). The right size school. *American School Board Journal*, *193*(4), 63-65.

Blum, R. (2005). A case for school connectedness. *Educational Leadership, 62*(7), 16-20.

Bone, J. A., Slate, J. R., & Martinez-Garcia, C. (2011). Middle school teachers and students in Texas: Ethnic diversity over 11 school years. *International Journal of Educational Leadership Preparation, 6*(2). Retrieved from http://cnx.org/content/m41643/latest/

Brookmeyer, K. A., Fanti, K. A., & Henrich, C. C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology, 35,* 504-524. doi:10.1207/s15374424jccp3504_2

Chavez, J. J. (2002). *School size and academic performance of Texas secondary public school students.* (Doctoral dissertation, University of Texas at El Paso). Available from ProQuest Dissertations and Theses database. (3049697)

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.)*.* Hillsdale, NJ: Lawrence Erlbaum.

Cohen, J., McCabe, L., Michelli, N. M., & Pickeral, T. (2009). School climate: Research, policy, and teacher education. *Teachers College Record, 11*(1), 180-213.

Cotton, K. (1996). *School size, school climate, and student performance*. School Improvement Research Series. Portland, OR: Northwest Regional Educational Laboratory. Retrieved from http://www.nwrel.org/scpd/sirs/10/c020.html

Cotton, K. (2001). *New small learning communities: Findings from recent literature.* Portland, OR: Northwest Regional Educational Laboratory. Retrieved from http://www3.scasd.org/small_schools/nlsc.pdf

Darling-Hammond, L., Peter, R., & Milliken, M. (2006). High school size, organization, and content: What matters for student success. *Brooking Papers on Education Policy, 9*, 163-203. doi:10.1353/pep.2007.0001

Duncombe, W., & Yinger, J. (2007). Does school district consolidation cut costs. *Education Finance and Policy, 2*, 341-375. doi:10.1162/edfp.2007.2.4.341

Erpenbach, W. J., Forte-Fast, E., & Potts, A. (2003). *Statewide accountability under NCLB: Central issues arising from an examination of state accountability workbooks and U.S. Department of Education reviews under the No Child Left Behind Act of 2001.* Retrieved from ERIC database. (ED481838)

Feldman, A. F., & Matjasko, J. L. (2007). Profiles and portfolios of adolescent schoolbased extracurricular activity participation. *Journal of Adolescence*, *30*, 313-332. doi:10.1016/j.adolescence.2006.03.004

Field, A. P. (2000). *Discovering statistics using SPSS for Windows: Advanced techniques for the beginner.* London, England: Sage.

Greeney, B. (2010). *Secondary school size and student performance in Texas: A multiyear statewide investigation.* (Doctoral dissertation, Sam Houston State University).

Haycock, K. (2006). No more indivisible kids. *Educational Leadership*, *64*(3), 38-42.

Howley, C. (1996). *Ongoing dilemmas of schools size: A short story.* Retrieved from ERIC database. (ED401089)

Howley, C. (1997). Dumbing down by sizing up. *The School Administrator, 54,* 24-30.

Howley, C. B., & Bickel, R. (2000). *When it comes to schooling small works: School size, poverty, and student achievement.* Retrieved from ERIC database. (ED447973)

Howley, C., Strange, M., & Bickel, R. (2000). *Research about school size and school performance in impoverished communities.* Retrieved from ERIC database. (ED448968)

Jones, T. J., Toma, E. F., & Zimmer, R. W. (2008). School attendance and district school size. *Economics of Education Review, 27,* 140-148. doi:10.1016/j.econedurev.2006.09.005

Koth, C. W., Bradshaw, C. P., & Leaf, P. J. (2008). A multilevel study of predictors of student perceptions of school climate: The effect of classroom-level factors. *Journal of Educational Psychology, 100*, 96-104. doi:10.1037/0022-0663.100.1.96

Lee, V. E., & Burkam, D. T. (2003). Dropping out of high school: The role of school organization and structure. *American Educational Research Association, 40*, 353-393. doi:10.3102/00028312040002353

Lee, V. E., & Smith, J. B. (1993). Effects of school restructuring on the achievement and engagement of middle-grade students. *Sociology of Education, 66*(3), 164-187.

Leithwood, K., & Jantzi, D. (2009). A review of empirical evidence about school size effect: A policy perspective. *Review of Educational Research,* 79, 463-490. doi:10.3102/0034654308326158

Lewis, W. C., & Chakraborty, K. (1996). Scale economies in public education. *The Journal of Regional Analysis & Policy, 26*(1), 23-35.

Linn, R. L. (2003). Accountability: Responsibility and reasonable expectations. *Educational Researcher, 32*(7), 3-13.

McNeely, C. A., Nonnemaker, J. M., & Blum, R. (2002). Promoting school connectedness: Evidence from the National Longitudinal Study of Adolescent Health. *Journal of School Health, 72*(4), 138-146.

National Center for Education Statistics. (2008a). *Digest of Education Statistics.* Retrieved from http://nces.ed.gov/programs/digest/d08/

National Center for Education Statistics. (2008b). *Number of public school districts and public and private elementary and secondary schools: Selected years, 1969–70 through 2006–07.* Retrieved from
http://nces.ed.gov/programs/digest/d08/tables/dt08_087.asp?referrer=list

National Center for Education Statistics. (2008c) *Public secondary schools, by grade span, average school size, and state or jurisdiction: 2006–07.* Retrieved from http://nces.ed.gov/programs/digest/d08/tables/dt08_100.asp

National Center for Education Statistics. (2008d). *Projections of education statistics to 2017.* Retrieved from http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2008078

Oxley, D. (1990). *An analysis of house systems in New York City neighborhood high schools.* Retrieved from ERIC database. (ED368845)

Pittman, R. B., & Haughwout, P. (1987). Influence of high school size on dropout rate. *Educational Evaluation and Policy Analysis, 9*(4), 337-343.

Raywid, M. (1999). *Current literature on small schools.* Retrieved from ERIC database. (ED42049)

Ready, D. D., Lee, V. E., & Welner, K. G. (2004). Educational equity and school structure: School size, overcrowding, and schools-within-schools. *Teachers College Record*, *106*, 1989-2014.

Riha, M. (2011). *Middle school size and student performance: A multiyear statewide study.* (Doctoral dissertation, Sam Houston State University).

Rumberger, R. W., & Palardy, G. J. (2005). Test scores, dropout rates, and transfer rates as alternative indicators of high school performance. *American Educational Journal Research, 42,* 3-42. doi:10.3102/00028312042001003

Slate, J. R., & Jones, C. H. (2006). African-American students' performance and secondary school size in the state of Texas. *Essays in Education.* Retrieved from http://www.usca.edu/essays/vol132005/slate.pdf

Slate, J. R., & Jones, C. H. (2008a). School size and gender differences in the state of Texas. *Essays in Education, 23,* 159-176.

Slate, J. R., & Jones, C. H. (2008b). Secondary school size and Hispanic student performance in Texas. *Essays in Education.* Retrieved from http://
www.usca.edu/essays/vol232008/slate2.pdf

Stevenson, K. R. (2006, April). *School size and its relationship to student outcomes and school climate: A review and analysis of eight South Carolina statewide studies*. Washington, DC: National Clearinghouse for Educational Facilities. Retrieved from http://www.edfacilities.org/pubs/size_outcomes.pdf

Stiefel, L., Berne, R., Iatarola, P., & Fruchter, N. (2000). High school size: Effects on budgets and performance in New York City. *Educational Evaluation and Policy Analysis, 22*(1), 27-39. doi:10.3102/01623737022001027

Texas Education Agency. (2008a). *Academic Excellence Indicator System glossary*. Retrieved from http://ritter.tea.state.tx.us/perfreport/aeis/2008/glossary.html

Texas Education Agency. (2008b). *2008 Accountability Manual.* Retrieved from
http://ritter.tea.state.tx.us/perfreport/account/2008/manual/manual.pdf

Texas Education Agency. (2009). *Enrollment in Texas Public Schools 2008-09: Statewide
Enrollment, Texas Public Schools, 1987-88 Through 2008-09.* Retrieved from
http://ritter.tea.state.tx.us/research/pdfs/enrollment_2008-09.pdf

Welsh, W. N., Stokes, R., & Greene, J. R. (2000). A macro-level model of school disorder.
Journal of Research in Crime and Delinquency, 37(3), 243-283.

Werblow, J., & Duesbery, L. (2009). The impact of high school size on math achievement and
dropout rate. *The High School Journal, 92*(3), 14-23. doi:10.1353/hsj.0.0022

Whitlock, J. (2006). Youth perceptions of life at school: Contextual correlates of school
connectedness in adolescence. *Applied Developmental Science, 10*(1), 13-29.
doi:10.1207/s1532480xads1001_2

Wilson, D. (2004). The interface of school climate and school connectedness and relationships
with aggression and victimization. *Journal of School Health, 74*(7), 293-299.

Zoda, P. F. (2009). *Elementary school size and academic performance: A multi-year study*
(Doctoral dissertation, Sam Houston State University). Retrieved from ProQuest.
(3399011)

Zoda, P. F., Slate, J. R., & Combs, J. P. (2011). Public school size and Hispanic student
achievement in Texas: A 5-year analysis. *Educational Research for Policy and Practice,
10*(3), 171-188. doi:10.1007/s10671-011-9103-z

**Brian Greeney, Ed.D., is the Principal of Wunderlich Intermediate which is in located
in the Klein Independent School District, in Klein, TX. His interests lie in
instructional leadership and the use of state, district, and campus level data to
improve the instructional environment of schools.**

**John R. Slate, Ph.D., is a Professor in the Department of Educational Leadership and
Counseling at Sam Houston State University. He teaches academic and professional
writing and statistical analysis.**