Article

Determinants of Graduation Rate of Public Alternative Schools

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Abstract

In this study we investigated determinants of the graduation rate of public alternative schools by analyzing the most recent, nationally representative data from Schools and Staffing Survey 2007-2008. Based on the literature, we built a series of three regression models via successive block entry, predicting the graduate rate first by (a) student demographics, then by (a) student demographics and (b) staffing characteristics, and finally by (a) student demographics, (b) staffing characteristics, and (c) school processes, with a purpose to compare the models to study the effects of those variables more amenable to policies (i.e., staffing characteristics and school processes). Among others, we found (a) that staffing characteristics and school processes are important blocks of variables to predict the graduation rate, (b) that summer programs and Hispanic teacher ratio are positively associated with the graduation rate, with having same teachers for 2 years or more being a marginally positive predictor, and (c) that having the traditional grade structure and providing day care are negatively correlated with the graduation rate. Implications of our findings for policy and future research are discussed.

Keywords

educational reform, principals, teachers

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The United States has been struggling with the phenomenon of high school dropout much more than many other developed countries (Rumberger, 2011). As one of the strategies to solve the issue, this country has public alternative schools specifically for at-risk high school students. Such schools play an important role in educating students who are expelled or suspended from regular schools due to their at-risk behaviors and placed in such schools to continue their learning.

Most students appear to enter alternative schools due to "referral by home school," "social-emotional/behavioral issues," and "truancy" (Foley & Pang, 2006, p. 15). While special education schools focus on "services to students with varying degrees and forms of disabilities" (Guthrie, 2003, p. 2278), alternative schools aim at serving "students who did not 'fit in' to the traditional programs" (Kellmayer, 1995, p. 4). According to the National Center for Education Statistics (NCES, 2002), there are 6,400 such schools and 74% of them aim at returning the students to their regular schools. However, some students stay in and graduate from such schools. Therefore, the alternative schools are crucial places where at-risk students can have one last chance to be educated. If education in such schools is effective, graduation rates of not only the alternative schools, but also high schools in general will improve.

The effects of the alternative schools have been examined in previous studies. Barr and Parrett (2001) suggested that "alternative public schools may be the most important at-risk programs at the high-school level" (p. 170), focusing on the fact that specific educational support programs helped many at-risk students continue education. Mitchell and Waiwaiole (2003) also indicated, through their evaluation of alternative programs for at-risk high school students in Portland, Oregon public schools, that "without these programs, the district would probably face an even greater dropout rate in the comprehensive high schools" (p. 17). However, each alternative high school has its own school structure and process, which could be important factors for the effects on at-risk students (Beteman & Karr-Kidwell, 1995; Kellmayer, 1995; Ryan, 2009; U.S. Department of Justice, 1980). In other words, different school structures and processes could be associated with various graduation rates. Thus, this study inquired into whether, and if so, how school structures and school processes of public alternative schools specifically for at-risk high school students are related to the graduation rate. The study used Schools and Staffing Survey (SASS) 2007-2008, the most recent, nationally representative data set.

Literature Review

Alternative High Schools' Graduation Rate as an Outcome

The graduation rates of public alternative schools specifically for at-risk students present the extent to which such schools contribute to reducing dropout

rates of students who aim at achieving their last chance to be educated. Because such students need to fulfill certain academic and behavioral criteria to graduate, graduation rates were used to assess the quality of education in previous studies. For example, Stevens, Tullis, Sanchez, and Gonzalez (1991) evaluated seven alternative schools in Houston, Texas, by measuring changes in their graduation rates. Lehr, Tan, and Ysseldyke (2009) also used the graduation rates as one of the outcomes to assess the quality of alternative schools in the analyses of alternative school policies of 48 states in the United States. Moreover, Ryan (2009) investigated predictors for the graduation rates of public alternative schools with at-risk students. These studies indicated the efficacy of the graduation rate to be used as an outcome in studies of alternative schools. The current study also used the graduation rate as an outcome measure.

Alternative High Schools' Student Characteristics and Graduation Rate

One of the factors that can affect graduation rates is the student's background. Previous studies indicated that racial and sexual differences are associated with the graduation rate. In the literature on the graduation rate for alternative high schools, the findings on the relationship between minority status and the graduation rate are mixed. For example, Ryan (2009) used nationally representative data from Schools and Staffing Survey 2003-2004 and did not find that the percentage of minority students had a statistically significant relationship with the graduation rate in public alternative schools specifically for at-risk students. However, Vanderslice (2004) found that "dropout rates [in alternative schools] vary significantly by socioeconomic factors and racial background" (p. 16). Moreover, Henry (1988) indicated that educationally at-risk students, who "are especially concentrated among racial and ethnic minority groups, immigrants, language minorities, and economically disadvantaged populations," (p. 8) appear to have higher dropout rates in secondary schools.

A few studies examine the relationship between gender difference and the graduation rate at alternative schools. In this case, some studies examined differences in at-risk trends, which can be associated with dropping out, caused by gender differences. For example, Mitchell and Waiwaiole (2003) indicated that teachers felt female students had more behavior problems. Furthermore, Shrier and Crosby (2003) indicated that "females were about 60% more likely than males to report sexual experience" (p. 199). These findings suggested that in alternative schools, female students have more difficulty reaching graduation than male students. Thus, the current study examined to what extent the percentage of female students is associated with the graduation rate.

Alternative High Schools' Staffing Characteristics and Graduation Rate

Some studies indicated that alternative high schools' staffing characteristics are associated with the graduation rate. For example, as to teacher quality and staffing, Croninger and Lee (2001) revealed that teachers' characteristics are key factors in reducing the dropout rate of at-risk students. The U.S. Department of Justice (1980) and Nichols and Steffy (1999) indicated the importance of low student–teacher ratios in alternative schools specifically for at-risk students.

A few studies examined the relationship between teachers' race and the graduation rate. One of them is Baez's (1992) study on evaluation of alternative programs for at-risk students in Milwaukee Public Schools. The findings indicated that "a predominance of White staff working with a predominantly minority student population" can cause "a problem of cultural and experiential incompatibility between staff and learners" (p. 58). This suggests that teachers' race/ethnicity is a factor impacting students in alternative schools. Although few studies have explored the relationship between teachers' race and graduation rate in alternative schools, some studies have been conducted in regular schools. For example, Aguilar (2010) suggested that Hispanic teachers can enhance the learning environment for Hispanic students. Because alternative schools have many minority students including Hispanic students (NCES, 2002), the current study investigated the effects of Hispanic teachers in alternative schools by using the most recent national data set.

Alternative High Schools' School Processes and Graduation Rate

School processes, particularly the variables related to teaching and learning, are among the most important variables in the schooling process that can be manipulated (Marzano, 2003). Although Marzano relied on the general literature to conduct a meta-analysis to develop the most important school processes factors for school improvement, the importance of school processes variables is also revealed in the literature on alternative high schools. In the following review, the construct of school processes was divided into three subconstructs: (a) support programs, (b) teaching methods, and (c) instructional opportunities.

Support Programs and Graduation Rate. At-risk students have their unique and diversified needs. Educational programs—academic or nonacademic—are needed to improve graduation rates in alternative schools. Ryan's (2009) study found that programs for school-based health care, summer school

assistance, and summer school enrichment are not statistically significant predictors for the graduation rate. On the other hand, some previous studies identified predictive factors in support programs. For example, Henry (1988) indicated that at-risk students can make up for learning setbacks during the summer session because education in regular classrooms is not enough for the students (Cale, 1992; Heyns, 1978). Moreover, the U.S. Department of Justice (1980) indicated that "supplemental social services" (p. 30) such as health care are one of the effective factors to address the dropout of students enrolled in alternative schools. To provide a new perspective on these inconsistent results, we examined relationships between these academic support programs and the graduation rate by using the most recent national data.

Teaching Methods and Graduation Rate. Teaching methods can be the greatest factor in changing students' graduation rates in alternative schools. Ryan (2009) identified (a) having the same teacher for multiple years, (b) using interdisciplinary teaching, and (c) using block scheduling as positive factors for the graduation rate, while she identified using the self-paced instructional approach as a negative factor. However, some studies came to contradictory conclusions regarding the effect of teaching methods. For example, Griffin, Hoffman, and Hunter (1984) found that "self-paced individualized or small group instruction in the basic skills of reading and math" (p. 7) can help prevent students from dropping out. Cuellar and Cuellar (1990) and Ruebel, Ruebel, and O'Laughlin (2001) also identified small class size and its associated teaching methods as effective in raising the graduation rate. To provide a new perspective on these inconsistent results, we examined relationships between these teaching methods and the graduation rate by using the most recent national data.

In addition to Ryan's (2009) findings on effective factors, Ruebel et al. (2001) identified "nontraditional and varied curricula" and "flexible scheduling" (p. 59) as two factors leading students to successful graduation from alternative schools. Unfortunately, their study did not have a strong generalizability regarding the relationships between these factors and the graduation rate. Thus, we studied the relationships using SASS 2007-2008.

Instructional Opportunities and Graduation Rate. Ryan (2009) doubted the effects of instructional opportunities on graduation rates of at-risk students in alternative schools. According to her findings, both opportunities for work-based learning and earning college credit were not associated with graduation rates. However, some studies suggested that collaboration with community members outside of schools is imperative to stop or reduce the dropout of students in alternative schools (U.S. Department of Justice, 1980). For

example, as to work-based learning, Ruebel et al. (2001) identified "vocational training involving work in community and school" (p. 59) as one of the factors helping in reducing dropout. "Career technical education" (Rumberger, 2011, p. 271) and "career academies, tech-prep, internships or cooperatives" (Husted & Cavalluzzo, 2001, p. 16) were also introduced as factors to improve the graduation rate. As to earning credits, the U.S. Department of Labor (n. d.) introduced dual enrollment opportunities to students who are at-risk for dropout to improve their education. Husted and Cavalluzzo (2001) also indicated that "self-contained high schools located on college campus" (p.11) are effective in reducing the dropout rate of alternative high schools for at-risk students. To provide a new perspective on these inconsistent results, in the current study we examined relationships between these instructional opportunities and the graduation rate by using the most recent national data.

Conceptualization

Based on the literature, the conceptual framework of the study centered on the relationship among four constructs—whether (a) student characteristics, (b) staffing characteristics, and (c) school processes could predict (d) school outcomes as measured by the graduation rate (Appendix A). The analyses were conducted in such a way that we entered the block of variables in the following order: (a) student characteristics first, then (b) staffing characteristics, and finally (c) school processes. The rationale underlying the progressive block entry from (a) student characteristics, to (b) staffing characteristics, and to (c) school processes is two-fold. First, we were able ascertain whether the later entered block explained a significant amount of variance above and beyond the previous block(s). Second, from (a) to (c), these factors are more and more amenable to policy intervention.

Research Questions

Based on the literature review and conceptualization, the following three questions were asked.

1. To what extent are student characteristics associated with graduation rates in public alternative schools specifically for at-risk students?
2. After controlling for student characteristics, are staffing characteristics associated with graduation rates? If so, what are the significant predictors?

3. After controlling for student characteristics and staffing characteristics, are school processes associated with graduation rates? If so, what are the significant predictors?

Method

Data Source and Sample

The data were extracted from SASS 2007-2008. The survey was developed by NCES and conducted by the United States Bureau of the Census. SASS 2007-2008 was an integrated survey of public and private schools, school districts, principals, and teachers. The data from this study were primarily from the public school survey.

The sample was nationally representative of schools whose principals: (a) answered "yes" to the question, "Is this entire school specifically for students who have been suspended, expelled, or who have dropped out, or who have been referred for behavioral or adjustment problems?"; (b) marked "Alternative School" to the question, "Which of the following best describes this school?"; and (c) answered "yes" to the question, "Last school year (2006-2007), were any students enrolled in 12th grade?" (NCES, 2009, pp. 6-12). The actual sample was 140, representing a population of 2,420 alternative high schools specifically for at-risk students. All sample sizes and degrees of freedom reported later in this paper were rounded to the nearest 10 per NCES clearance requirements.

Variables and Measurement Scale

As discussed in the conceptual framework and research questions, four blocks of variables were included in the data analysis: (a) student characteristics, (b) staffing characteristics, (c) school processes, and (d) school outcome as measured by the graduation rate. As to (a) student characteristics, two variables—the percentage of minority students and the percentage of female students—were included in the study. As to (b) staffing characteristics, two variables were incorporated: teacher–student ratio and Hispanic teacher ratio.

As to (c) school-process variables, SASS 2007-2008 data contained 13 binary variables under three categories of support programs, teaching methods, and instructional opportunities: *support programs*, including (a) extended day academic assistance, (b) before-school or after-school day care, (c) summer academic assistance, and (d) summer enrichment; *teaching methods*, including (e) traditional grades or academic discipline-based departments,

(f) small groups, (g) having same teachers 2 or more years, (h) multiage grouping, and (i) block scheduling; and *instructional opportunities*, including (j) dual or concurrent enrollment, (k) career and technical education (CTE), (l) work-based learning or internships, and (m) specialized career academy. Due to the sample size of the study, to include all 13 variables (plus the previous two blocks of variables on student characteristics and staffing characteristics) would result in over-fitting. Therefore, we first did some preliminary analyses to find those school processes variables that were statistically significantly associated with the outcome measure in a bivariate correlation and carried these variables into the model building. As a result, only two variables—summer academic assistance and summer enrichment—were significant with the outcome, and they were highly correlated with each other, correlation coefficient = .61. We then combined them into a new composite variable—summer academic assistance or enrichment. Second, we then conducted a partial correlation analysis (Appendix B) between graduation rates and all variables in student characteristics, staffing characteristics, and school processes, and a cutoff point was set at 0.1 for selecting the school-process variables. Finally, five school-process variables—(a) before-school or after-school day care, (b) summer academic assistance or enrichment, (c) traditional grades or academic discipline-based departments, (d) having the same teachers over 2 or more years, and (e) dual or concurrent enrollment—were selected as potential predictors included in the final model building. For more detailed information about the definition of the variables, their measurement scales and descriptive statistics please refer to Appendix C.

The bivariate correlations between variables of the three constructs—student characteristics, staffing characteristics, and school processes—used in this study are displayed in the following table (Table 1). The coefficients were generally very low and the largest was 0.4. Therefore, it appears that colinearity is not a concern for the current study.

Finally, as to (d) school outcome, this study used answers for the question, "What percentage graduated with a diploma last school year?" in SASS 2007-2008 data. This variable was called the graduation rate in this study.

Data Analysis

To answer the three research questions, this study used multiple regression with progressive block entry corresponding to the three research questions. In other words, using graduation rates as the outcome measure, we first entered the block of (a) student characteristics, then the block of (b) staffing characteristics, and finally the block of (c) school processes. As discussed earlier, by doing so, we could test whether the later block of variables could explain

Table 1. Intercorrelations Between Variables in Three Constructs.

	1	2	3	4	5	6	7	8	9
1. Percentage of minority students	1								
2. Percentage of female students	–0.23**	1							
3. Teacher–student ratio	0.14	–0.24**	1						
4. Hispanic teacher ratio	0.39***	0.11	–0.06	1					
5. Day care	–0.04	0.06	–0.15	–0.04	1				
6. Summer programs	–0.04	0.15	–0.07	0.40***	–0.07	1			
7. Traditional grades	0.28***	–0.24**	–0.02	0.08	–0.18*	–0.15	1		
8. Same teachers	0.01	0.04	–0.15	0.07	0.10	0.05	0.12	1	
9. Dual enrollment	0.17	0.05	–0.12	0.07	–0.08	–0.02	–0.02	0.04	1

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

a significant amount of variance above and beyond the previous block(s) and have a clear picture of policy implications of the findings, with a focus on those more policy amenable variables such as staffing and school processes rather than student demographics.

Because the sample design of SASS 2007-2008 involved stratification, disproportionate sampling of certain strata, and clustered probability sampling, the resultant SASS 2007-2008 sample was not a random one. Therefore, a set of relative sample weights, which was based on SASS 2007-2008 public principals' final weight, was used to approximate the population and adjust it down to the actual sample size of the study. After weighting, the findings of the study are generalizable to the population of the United States.

Results

Research Question 1

The overall fit of the model after entering the block of student characteristics was as follows: $R^2 = .041$, $F(2, 140) = 2.878$, $p = .060$ (see Table 2). Therefore, the block of the two variables of the percentage of minority students and the

Table 2. Multiple Regression Results Predicting the Graduation Rate at Alternative Schools Specifically for At-Risk Students With 12th Graders Based on Student Characteristics.

	B	Std. Error	β	*t*
Percentage of minority students	–0.121	0.107	–0.098	–1.132
Percentage of female students	0.285	0.158	0.156	1.800

Note. Overall model: R^2= .041. F (2, 140) = 2.878. p = .060.

Table 3. Multiple Regressions Predicting the Graduation Rate at Alternative Schools Specifically for At-Risk Students With 12th Graders Based on Student Characteristics and Staffing Characteristics.

	B	Std. Error	β	t
Percentage of minority students	–0.252	0.111	–0.204	–2.274*
Percentage of female students	0.037	0.165	0.020	0.224
Teacher–student ratio	–0.577	0.339	–0.150	–1.702
Hispanic teacher ratio	0.592	0.157	0.329	3.765***

Note. *p < .05. **p < .01. ***p < .001. Overall model: R^2 = .152. F (4, 140) = 5.957. p < .001.

percentage of female students only explained 4% of the variance in the outcome measure and was not associated with the school graduation rates, a finding that was contradictory to most of the studies reported in the literature. The finding of the current study could indicate that whether the student is male or female and whether he or she is from a minority family or not are not significant predictors for the graduation rate.

Research Question 2

The block of staffing characteristics was then added as the second block of predictors. The overall fit of the model was statistically significant, R^2 = .152, F (4, 140) = 5.957, p < .001(see Table 3). This means that the second block of variables explained an additional 11.1% of variance in the outcome measure above and beyond the first block, and the additional amount of variance explained by the second block of staffing characteristics was statistically significant (F change (2,130) = 8.71, p < .001). The results in Table 3 indicated that the Hispanic teacher ratio had a statistically significant positive relationship with the graduation rate (p < .001) while the percentage of minority

Table 4. Multiple Regressions Predicting Graduation Rates at Alternative Schools Specifically for At-Risk Students With 12th Graders Based on Student Characteristics, Staffing Characteristics, and School Processes.

	B	Std. Error	β	*t*
Percentage of minority students	–0.159	0.109	–0.129	–1.454
Percentage of female students	0.034	0.161	0.019	0.212
Teacher–student ratio	–0.505	0.334	–0.131	–1.511
Hispanic teacher ratio	0.457	0.159	0.254	2.881**
Day care	–32.604	11.789	–0.222	–2.766**
Summer program	13.502	6.779	0.166	1.992*
Traditional grades	–16.038	7.834	–0.171	–2.047*
Same teachers	18.340	10.285	0.139	1.783
Dual enrollment	–9.837	6.708	–0.116	–1.466

Note. *$p < .05$. **$p < .01$. ***$p < .001$. Overall model: $R^2 = .266$. F (9, 140) = 5.149. $p < .001$.

students had a statistically significant negative relationship with the graduation rate ($p = .025$).

Research Question 3

The block of school processes was finally added as the third block of predictors. The overall fit of the model was also statistically significant, $R^2 = .266$, F (9, 140) = 5.149, $p < .001$ (see Table 4). This means that the third block of variables explained an additional 11.4% of variance in the outcome measure above and beyond the first and second blocks, and the additional amount of variance explained by the third block of school processes was statistically significant (F change (5,130) = 3.97, $p = .002$). Moreover, the regression results indicated that both Hispanic teacher ratio and summer academic assistance or enrichment had a significant positive relationship with the graduation rate while both before-school or after-school day care and traditional grades or academic discipline-based departments had significant negative relationships. Having the same teachers for 2 or more years is positively associated with graduation rate, although the effect was marginal ($p = .08$).

Summary and Discussion

The aim of this study is to determine whether staffing characteristics and school processes are predictors of the graduation rate. For this purpose, our study built a series of three models for: (a) student characteristics; (b) staffing

characteristics using student characteristics for control purposes; and (c) school processes using both student characteristics and staffing characteristics for control purposes. The summary of major findings and implications for policy and future research are discussed in the following sections.

Summary of Major Findings

First, the finding of the study indicated that staffing and school processes were associated with graduation rates in alternative high schools for at-risk students. The model of student characteristics explained only 4% of the total variance in graduation rate. The second block of staffing added 11% more, bringing the total amount of variance explained to 15%, both of which were statistically significant. The third block of school processes added an additional 12%, raising the total of variance accounted for to 27%, both of which were statistically significant. Therefore, both staffing and school processes appeared to be useful vehicles for improving the graduation rate in alternative high schools.

Second, in the current study the two variables of the percentage of minority students and the percentage of female students were not statistically significant predictors for graduation rate. Our finding was consistent with Ryan's (2009) study using SASS 2003-2004 data, but was inconsistent with findings of other studies (e.g., National Center on Addiction and Substance Abuse at Columbia University, 2001; Mitchell & Waiwaiole, 2003; U.S. Department of Health and Human Services, 2000). The inconsistency between our findings and the literature might be due to the fact that our focus was on alternative high schools for at-risk students and students in these schools tend to be more homogeneous, resulting in less variation in the percentage of minority students and the percentage of female students in our sample.

Third, our study indicated that school staffing can be a key factor for improving education in alternative schools specifically for at-risk students, explaining an additional 11% of variance after control for student demographics. Our general finding on the importance of school staffing was consistent with those of other scholars (e.g., Croninger & Lee, 2001; U.S. Department of Justice, 1980; Zhang, 2008). However, our finding that there was no significant relationship between the teacher–student ratio and the graduation rate did not support the findings from some previous studies suggesting that the low student–teacher ratio is effective for at-risk students (e.g., Nichols & Steffy, 1999; U.S. Department of Justice, 1980). On the other hand, we found that the percentage of Hispanic teachers had a positively significant relationship with graduation rates, supporting Aguilar's (2010) hypothesis. As to the characteristics of the teaching staff, our study

suggested that the composition of the teaching staff seemed to be related to school outcomes.

Finally, our study also suggested that school processes were statistically significantly associated with the graduation rate in alternative high schools, accounting for an additional 12% of variance after control for student demographics and school staffing. Among the variables included in the model, "summer academic assistance or enrichment" had a statistically significant, positive relationship with graduation rate. In fact, providing "summer academic assistance or enrichment" is associated with increasing the graduation rate by about 14%. Similarly, "having the same teachers for two or more years" was a marginally statistically significant positive predictor, with this practice being associated with an increase of about 18% in graduation rate. Conversely, "providing day care service" and "having traditional grades or academic discipline-based departments" were statistically significant, negative predictors for graduation rates. It appears that the educational system adopted at traditional schools is an ineffective practice for alternative high schools for at-risk students. The needs of the students in alternative high schools require a more flexible structure such as nongraded or interdisciplinary courses. As to "providing day care" being a negative predictor, more research is needed. The need for day care services implies that the students are most likely teenage parents. Being a teenage parent itself is a predictor for low graduation rates. The finding seemed to suggest that the day care service as currently provided is not able to overcome the disadvantages associated with being a teenage parent.

Implications for Policy and Future Research

Based on the findings of the study, a few policy implications can be drawn. The study also suggests some directions for future research. We expect that knowing what types of practices relate to alternative students' graduation can be useful for alternative schools to improve their teaching qualities for at-risk students.

First, from the perspective of policy development and implementation, we learn from the study that school staffing and school processes, particularly school processes, can make a difference—above and beyond the effect of student demographics—in the graduation rate of alternative high schools for at-risk students. The study offers an image of the possible. In other words, the study provides some empirical evidence for us to transcend the pessimism associated with alternative high schools for at-risk students. School staffing and school processes can become levers for improving alternative high schools for at-risk students.

Second, the study points out the offering of some effective practices in alternative high schools. The findings of this study indicate that summer academic assistance or enrichment programs is an effective practice. Such programs

seem to promote students' academic achievement and thus lead to graduation (Kellmayer, 1995; U.S. Department of Justice, 1980). Therefore, summer learning opportunities are important for students in alternative high schools. The percentage of Hispanic teachers on staff is also found to be positively associated with graduation rate, a finding that supports the literature on culturally relevant and responsive pedagogy (e.g., Boykin & Cunningham, 2001; Ladson-Billings, 1994, 1995a, 1995b, 1998; Dill & Boykin, 2000). Given the high level of minority students in alternative schools, how to staff these schools should be an important policy issue. Having the same teacher for 2 or more years seemed to make a marginally statistically significant, positive impact, a finding that was consistent with the existing literature (e.g., Ryan, 2009).

Third, the study also found some negative factors associated with the graduation rate in alternative high schools. The inclusion of traditional grade or academic discipline-based departments is one of the negative predictors. Students in alternative high schools have already had a difficult experience; to continue the same arrangements for these students does not appear to work. Providing day care is also found to be negatively associated with the graduation rate. This finding has to be interpreted with caution. For example, students who need day care services might be too busy in raising their own children to concentrate on their learning, even if some of their needs are supported by schools. Students who need day care service tend to be more disadvantaged given the fact that most likely they are teenage parents. The day care services as currently provided do not seem able to overcome the disadvantages associated with teenage parenthood.

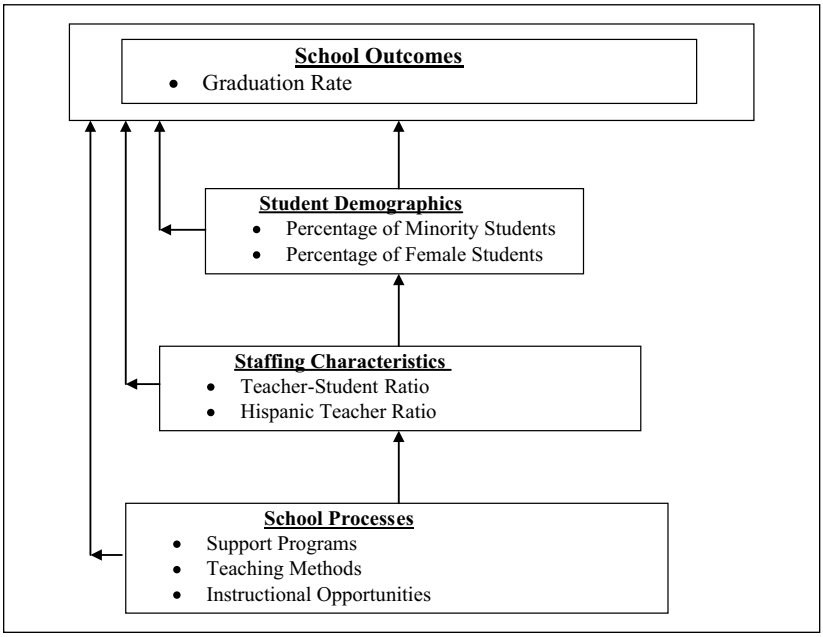
Fourth, the fact that many important factors illustrated in the literature did not come up as statistically significant factors seems to suggest that alternative high schools for at-risk student have their own dynamics. For example, typically statistically significant factors such as teacher–student ratio and student gender are not statistically significant in this study. The special needs of the student population in alternative high schools for at-risk students and the resulting unique dynamics in these schools require us to think and practice outside the box of regular schools so that we can have the most effective alternative schools.

Finally, the current study points out some directions for further research. First, qualitative studies on how the summer programs help the students will improve alternative high schools; SASS 2007-2008 does not ask about the details of such summer programs. One of the strengths of the study is its nationally representative sample, but the accompanying weakness is the lack of knowledge about the "how" questions. Our study provides some evidence for the effectiveness of summer assistance or enrichment programs. Second, for this study only data collected from school principals and schools were used. To further study the complexities of graduation rates, data from other stakeholders such as teachers, parents, and students should be used in future research. Third,

longitudinal, cause-and-effect studies can explore more detailed findings on relationships between the graduation rate and variables. Because our study is correlational, no definitive, causal statements can be offered. For example, as to the effect of day care services, only a rigorous experimental design will be able to tease out the possible effect. Finally, future studies should explore many other aspects of alternative high school for at-risk students to discover more effective practices. The current study uses data from an existing database and the selection of variables is limited. For example, the current study found a positive relationship between the percentage of Hispanic teachers and the graduation rate. The positive relationship may mean that Hispanic teachers can positively influence the education for Hispanic students. However, this result does not mean that the simple increase of Hispanic teachers can lead to the improvement of education for minority students other than Hispanic students. To fill the gap, future research should examine the effects of other minority teachers. This continuous inquiry into many other practices in alternative high schools will increase our knowledge on this topic and improve the policy and practice related to alternative high schools for at-risk students.

Appendix A

Conceptual Framework of Study



Appendix B

Partial Correlations Between Variables in School Processes and Graduation Rate

	Partial correlation coefficients
1. Extended program	0.06
2. Day care	–0.24
3. Summer assist./enrich.	0.12
4. Traditional grades	–0.21
5. Small groups	0.08
6. Same teachers	0.16
7. Multiage grouping	–0.04
8. Block scheduling	0.06
9. Dual enrollment	–0.17
10. Career and technical education (CTE)	0.08
11. Internship	–0.01
12. Specialized career	0.04

Appendix C

Variables Used in the Analyses: Definition, Measurement Scale, and Descriptive Statistics

Variable	Calculation	Wording on survey and calculation	Measurement and descriptive statistics
Percentage of minority students	MINENR	Percentage of students in school who are of a racial/ethnic minority	Continuous Mean = 59.78 *SD* = 32.17 Range: 0-100
Created variable: Percentage of female students	(0039-0041)/0039 *100	First, the number of female students was calculated by subtracting the number of total male students (Around the first of October, how many male students in grades K-12 and comparable ungraded levels were enrolled in this school?) from the number of total students (Around the first of October, how	Continuous Mean = 33.66 *SD* = 21.75 Range: 0-100

(continued)

Appendix C (continued)

Variable	Calculation	Wording on survey and calculation	Measurement and descriptive statistics
		many students in grades K-12 and comparable ungraded levels were enrolled in this school?). Then, to calculate percentage of female students, the number of female students was divided by the number of total students and multiplied by 100.	
Created variable: Teacher–student ratio	0127/0039*100	Of the full-time and part-time teachers in this school around the first of October, how many were total teachers? The number was divided by the total number of enrolled students.	Continuous Mean = 13.96 *SD* = 10.34 Range: 1.68-50
Created variable: Hispanic-teacher ratio	0122/0127*100	Of the full-time and part-time teachers in this school around the first of October, how many were Hispanic or Latino, regardless of race? The number was divided by the total number of teachers.	Continuous Mean = 8.84 *SD* = 22.08 Range: 0-100
Day care	0088	Are before-school or after-school day care programs currently available at this school for students in any of grades K-12 or comparable ungraded levels, regardless of funding source?	Categorical 1 = Yes (7.8%) 0 = No (92.2%)
Created variable: Summer academic assistance or enrichment	0089|0091	Last summer or last school year, were summer school activities or academic intercessions provided for students enrolled in this school who needed Academic Assistance?	Categorical

(continued)

Appendix C (continued)

Variable	Calculation	Wording on survey and calculation	Measurement and descriptive statistics
		Last summer or last school year, were summer school activities or academic intercessions provided for students enrolled in this school who sought Academic Advancement or Enrichment?	1 = Yes (61.1%)
		If a participant selected 1 in at least one previous variable, the answer was recognized as 1 in this new variable. Others were recognized as 0.	0 = No (38.9%)
Traditional grades	0100	This school year, does this school use traditional grades or academic discipline-based departments to organize most classes or most students?	Categorical 1 = Yes (76.9%) 0 = No (23.1%)
Same teachers	0102	Student groups that remain two or more years with the same teacher (e.g., looping)	Categorical 1=Yes (10.0%) 0 = No (90.0%)
Dual or concurrent enrollment	0108	Are dual or concurrent enrollment that offers both high school and college credit funded by the school or district available for students in Grades 9-12 in this school?	Categorical 1 = Yes (32.1%) 0 = No (67.9%)
Graduation rate	0113	What percentage graduated with a diploma last school year?	Continuous Mean = 47.70 *SD* = 39.73 Range: 0-100

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