

The Academic Characteristics of Black and Latino Boys that Matter in Achievement: An Exploratory Achievement Model of Boys in Single-Sex Schools

METROPOLITAN CENTER FOR URBAN EDUCATION

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Executive Summary

The findings presented in this report provide initial understandings of the single-sex school environment and its effects from an ecological perspective. In other words, the way in which these single-sex schools operate and who is operating them has relevance in understanding whether and how students learn “how to do” school well and are successful. **Our findings demonstrate:**

- 1. Behavioral engagement (i.e., knowing how to do school) is the greatest predictor of positive achievement among the Black and Latino boys attending these schools.**
- 2. More importantly, we found various other school factors that mediate how well students learn to do school, e.g., school climate (including safety, cohesion, and belonging), school-based adult support, perceived instructional quality and rigor, and cognitive engagement in learning.**

In other words, the more students feel intellectually engaged with what they are learning and the better the quality of school-based adult relationships students have at these single-sex schools, the more likely they are to exhibit academically conducive behavior, which in turn bolsters their academic performance (GPA). This pattern of relationship is not entirely surprising given prior research on engagement and school performance (Suarez-Orozco, et. al., 2008) and the

intentional structuring of these schools to impart skills and strategies for “doing school” while disrupting the stereotype of an academic identity as an affront to a racial/ethnic and male identity.

The school climate contribution to academic achievement is also an important finding. Specifically, academic performance (GPA) is positively supported by students getting along with their peers and adults in the school, regardless of their backgrounds, feeling that they belong at the school, and feeling safe at these schools. Students who feel intellectually engaged with what they are learning and have good relationships with teachers and peers reported feeling that they are treated fairly by the adults at the school, that they have quality teachers, and have friends that support their academic endeavors. Finally, participating in school-related activities after-school also helps the students’ grades.

In sum, these baseline findings suggest that the environments these single-sex high schools are creating that involve the interaction of social and academic supports is mirrored in what is contributing to student achievement. Furthermore, these findings begin to suggest that the instructional components of school are mediated by the wellness of the school climate and positive social interaction boys of color feel in these single-sex schools.

INTRODUCTION

In recent years there has been growing concern over the so-called “achievement gap” – the pervasive disparities in academic achievement between Black and Latino students and their White counterparts. Since the enactment of No Child Left Behind (NCLB) in 2001, the achievement gap has emerged as a major priority among educators and policymakers, and has led to a search for sustainable strategies that might improve the academic performance of students who consistently lag behind in academic outcomes. Primary among these are Black and Latino males, who conspicuously are over-represented on most indicators associated with academic failure. While there are many other groups of students also likely to under-perform in school – English language learners, students with learning disabilities, students from low-income families – generally, the vast array of negative outcomes associated with Black and Latino males distinguishes them as among the most vulnerable populations.

Black and Latino males are more likely to obtain low test scores and grades, less likely to enroll in college, and more likely to drop out, to be categorized as learning disabled, to be absent from honors and gifted programs, and to be over-represented among students who are suspended and expelled from school (Gregory, Skiba, and Noguera, 2009). The ubiquity of these patterns, and the ominous implication of these trends on the long-term life chances of adult Black and Latino males

have led to a growing chorus that something must be done to intervene. However, while the problems are clear and undeniable, their causes are murky and complex. Race and gender set this vulnerable population apart, but it is not clear how race and gender are connected with the broad array of academic and social problems Black and Latino males face.

Lack of clarity around the causes has not prevented those who seek to help Black and Latino males from taking action. In the last few years the creation of single-sex schools has been embraced in various parts of the U.S. as a strategy for ameliorating the risks and hardships commonly associated with the academic performance and social development of Black and Latino males.

Following the amendment changes in NCLB in 2002, there has been a rapid proliferation in the number of public schools offering single-sex education. In 1999, only four public schools offered single-sex education. By 2006, there were 223 public single-sex schools. Despite this dramatic increase, the research supporting the benefits of an intervention that isolates males from their female peers varies based on the outcome (Mael, et. al, 2005). Nonetheless, policymakers and educators have begun to embrace all-male schools and classrooms, especially for Black and Latino males, as an intervention they hope will solve some of the problems these at-risk groups face.

Unlike prior research on single-sex schools, we explore the school context as an ecological environment that is responding to societal notions of race/ethnicity and gender identity development. Our contention is that we need to understand the driving assumptions of single-sex schools for Black and Latino boys, and determine whether the school's context, practices, processes and inputs are derived from cultural and structural presumptions of the population served. And if so, do those structural and culturally-based practices, processes and inputs matter in the achievement of Black and Latino boys?

As we noted in the *An Intervention in Search of Theory* Brief, the school practices developed are premised on a cultural and structural perspective of the societal conditions faced by Black and Latino boys. In this brief we explore whether this structural and culturally-based school design matters during the first few years of school implementation.

Achievement Model: What factors influence positive academic achievement?

Research Study Overview

The Black and Latino Male Schools Intervention Study (BLMSIS) is a longitudinal study (2006-2009) of seven single-sex schools serving primarily Black and Latino boys. BLMSIS focuses on

examining the components of these schools (e.g., instruction, leadership, curriculum, climate, out-of-school time activities) and their effect on the boys being served. We captured these components over three years via 3 waves of data collection per year. Each year involved student and teacher surveys, focus groups, interviews, and classroom observations.

These seven single-sex schools developed similar sets of strategies in response to the needs and challenges of Black and Latino young men, including social/emotional development programming, rigorous curriculum, community service, college preparation, and academic skills remediation (See *Intervention in Search of Theory*,

www.steinhardt.nyu.edu/metrocenter).

Based on the school's preliminary theories of change and our conceptual understanding of previous research explanations of academic achievement, the research team designed a student survey to capture, from the student perspective, students' experiences with these strategies and how, if at all, academic performance was influenced.

In this section, we present findings from an explanatory student-centered analysis focusing on the contributors to academic achievement as identified in years 1 and 2 of our study (2006-2007 and 2007-2008, respectively). Specifically, we explore a model that takes into account the roles of academic engagement (i.e., relational, behavioral and cognitive, perceived school climate (e.g., safety and avoidance, belonging, fairness), participation in out-of-school time activities

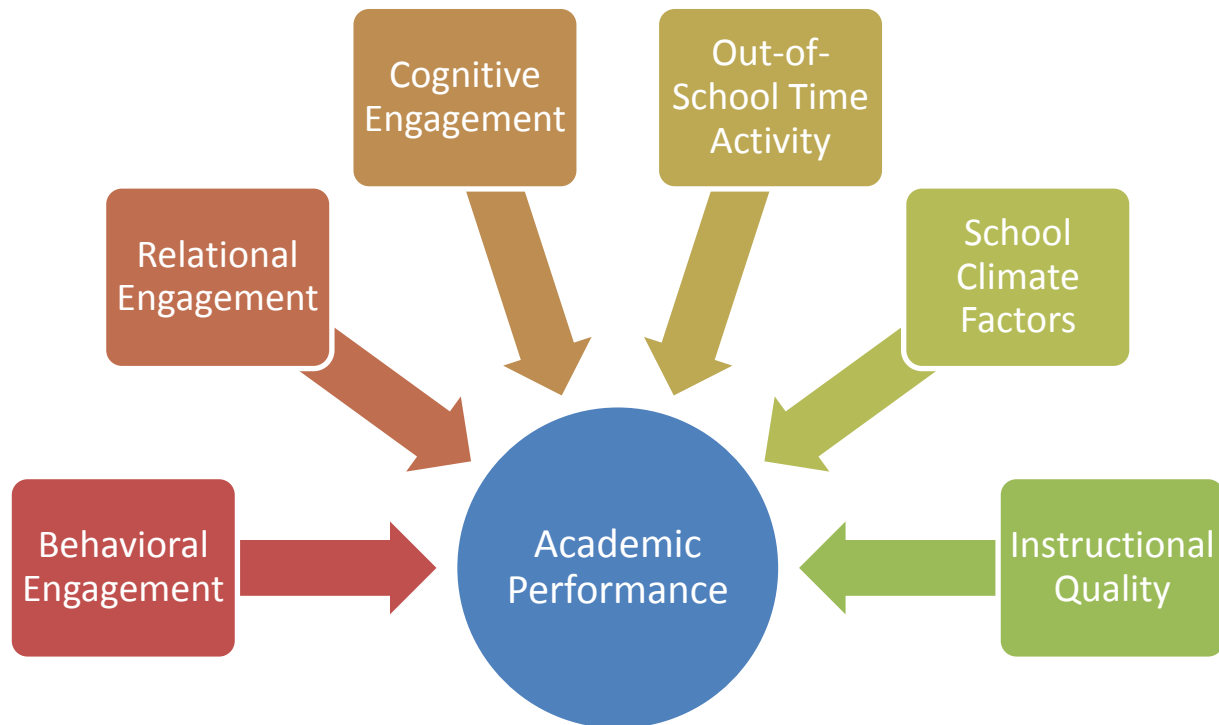
(OST), and perceptions of instruction on academic performance. To do this, we employed hierarchical multiple regression, which allowed us to enter theoretically informed variables in blocks to see whether academic engagement, school climate, instruction, and OST added value in explaining academic performance (See Technical Appendix for explanation of data analysis process).

In order to build our baseline model of achievement for the students attending the participating single-sex schools, it was necessary to find a common outcome variable that was indicative of academic performance. Because the four middle schools who we administered the survey to use entirely different grading systems and standardized achievement measures, we decided to conduct our baseline analysis for the three high schools instead. Further, because many of the student respondents were early in their high school career and

had not yet taken standardized high school exams, previous testing data were not recent enough to accurately reflect their current performance. We determined that the best performance indicator available at this time was cumulative GPA. All three schools provided cumulative GPA data current as of June, 2008.

Based on the Theory of Change findings from year 1 (See *Intervention in Search of Theory* Brief), we developed a model of student performance. This model is presented in Figure 1 below. We hypothesized that regardless of the school they attended, grade level, and students' home language, students will be more academically engaged and maintain high grades in school if they perceive a more positive school climate, are engaged in supplemental educational activities, and find their classes, teachers, and peers academically challenging.

Figure 1: Hypothesized Student-Level Perceptual Model of Academic Achievement



Methods

Who participated in the survey?

Student surveys were administered in March and April, 2008 at 6 of the 7 school sites.¹ In this analysis we focus on data from the three participating high school because they have comparable outcome data. The survey was administered to 613 high school students grades 9 through 12, with an average age of 15.9 years old (sd=1.2). After removing missing data, and extreme outlier cases, 420 cases remained and are used in our regression analyses.² Selected Student Characteristics are presented in Table 1 below.

¹ One school was not in full implementation.

² For scales where 75% of the items were complete, the missing data were imputed by calculating the series mean for each student.

Table 1: Selected Student Respondent Demographic Characteristics³

	HS 1		HS 2		HS 3		Total	
	N	%	N	%	N	%	N	%
<i>School Sample</i>	102	24.3	231	55.0	87	20.7	420	100.0
<i>Grade Level</i>								
Grade 9	45	44.1	82	35.5	35	40.2	162	38.6
Grade 10	57	55.9	65	28.1	16	18.4	138	32.9
Grade 11	n.a.	n.a.	55	23.8	30	34.5	85	20.2
Grade 12	n.a.	n.a.	29	12.6	6	6.9	35	8.3
<i>Ethnic Background</i>								
African American	100	98.0	88	38.1	39	44.8	227	54.0
African*	0	0.0	7	3.0	2	2.3	9	2.1
Asian (including Eurasian)	0	0.0	4	1.7	2	2.3	6	1.4
Caribbean non-Latino	2	2.0	30	13.0	3	3.4	35	8.3
Latino**	0	0.0	102	44.2	41	47.1	143	34.0
<i>Immigrant Generation</i>								
First Generation***	1	1.0	16	13.8	8	9.2	25	6.0
Second Generation	2	2.0	69	16.4	13	14.9	84	20.0
Third Generation or Beyond	99	97.1	136	58.9	59	57.5	285	67.9
Missing or Refused	0	0.0	10	4.3	16	18.4	26	6.2
<i>Home Language other than English</i>	3	2.9	48	20.8	25	28.7	76	18.1

*African students are defined as students who were born in Africa or have one or both parents born in Africa.

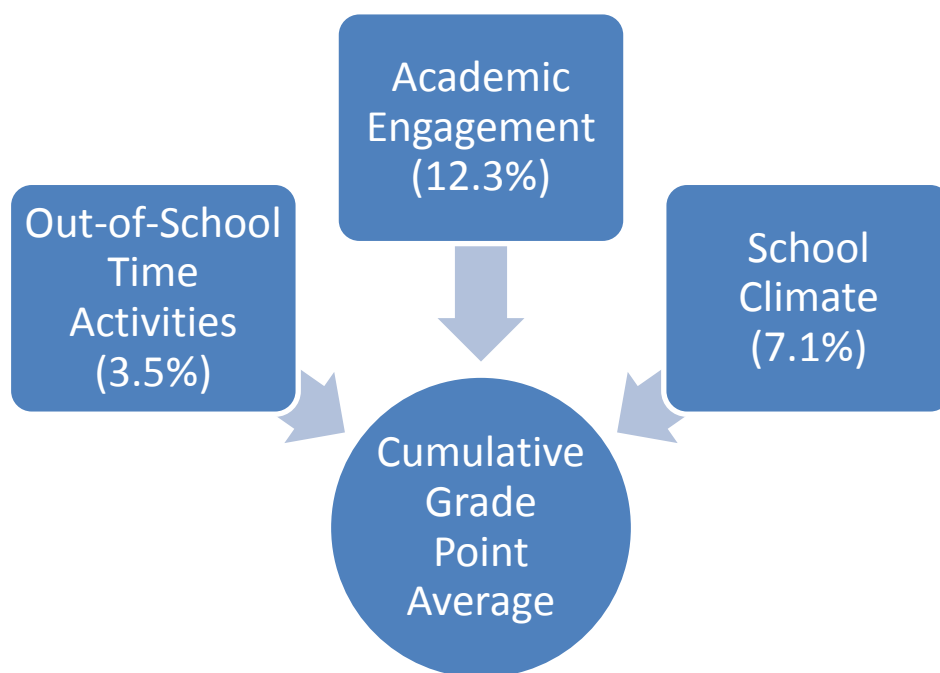
**In order to create distinct categories, students from Spanish-speaking Caribbean countries are categorized as Latino descent.

***Foreign born includes both first (arrived at or before age 9) and 1.5 (arrived after age 9).

Finding 1: Knowing how to do school (behavioral engagement) positively contributed to and predicted academic performance.

Academic engagement predicted the largest amount of academic performance (12.3%) across schools. And within academic engagement, behavioral engagement or the degree to which students know how to do school was the strongest predictor of achievement. After this measure, school climate (7.1%) and out-of-school time activities (3.5%) helped predict academic performance to a smaller degree (See Figure 2). All of these effects were found to be statistically significant after controlling for school attended, grade level, and home language of the students. Since academic engagement accounted for a large share of the effect on academic performance as measured by grade point average (GPA), we investigated what factors best predicted behavioral, relational (e.g., school-based adult supports), and cognitive engagement (Figures 3-5) to see how they might be related.

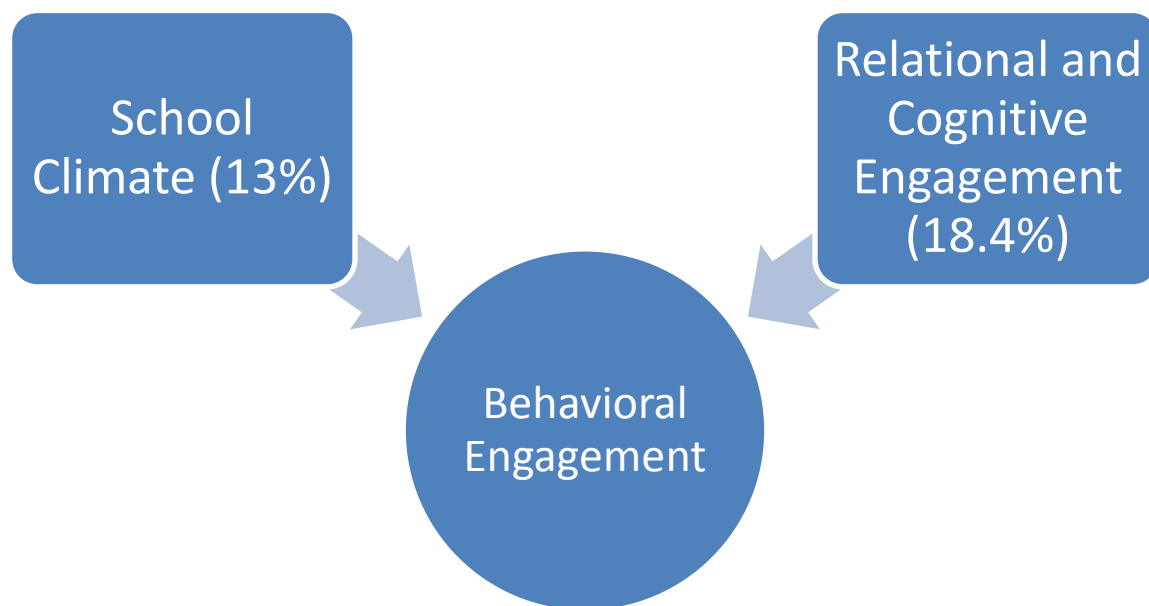
Figure 2: School and Student Factors Contributing to Grade Point Average



Finding 2: School climate and relational and cognitive engagement significantly contributes to behavioral engagement.

Since behavioral engagement accounted for a large percentage of academic performance, we looked at which factors significantly predicted behavioral engagement. Our results showed that school climate and relational (e.g., school-based adult supports), and cognitive engagement were unique predictors of behavioral engagement (See Figure 3). **In other words, the degree to which students know how to do school is predicted by their sense of fairness, safety and belonging in the school setting, their intellectual interest in school, and feeling they have supportive adult relationships in school.** In particular, a sense of fair treatment accounted positively while suspensions and lack of a sense of belonging accounted negatively for behavioral engagement.

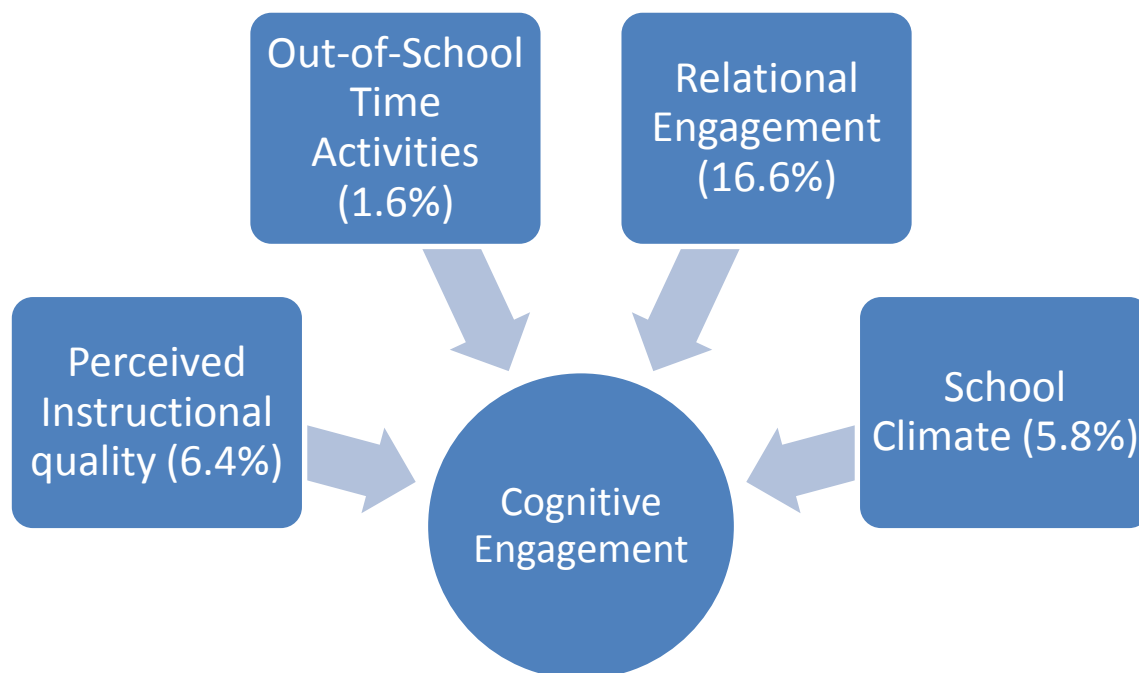
Figure 3: School and Student Factors Contributing to Behavioral Engagement



Finding 3: School Climate, relational engagement, out-of-school time activities, and perceived instructional quality were significant contributors to cognitive engagement. Additionally, fair treatment, English Language Arts teacher quality, and academic peer support were significant contributors to cognitive engagement.

Relational engagement (e.g., school-based adult supports) added 16.6% to the model, with school climate, OST, and instruction adding 5.8%, 1.6%, and 6.4%, respectively. These were significant predictors of cognitive engagement. Of the individual school climate variables, fair treatment was a significantly unique and positive predictor of cognitive engagement, as were two instructional predictors—ELA teacher quality and academic peer support. On the other hand, ELA course challenge was a small but significantly negative predictor of cognitive engagement, perhaps suggesting a weak but fragile balance between course content being challenging vs. being too difficult as related to students' cognitive engagement. **Thus, the degree to which students were intellectually interested in school interacted with and was determined by the degree to which they felt adult support, perceived quality in the instruction, and experienced the school environment as fair.**

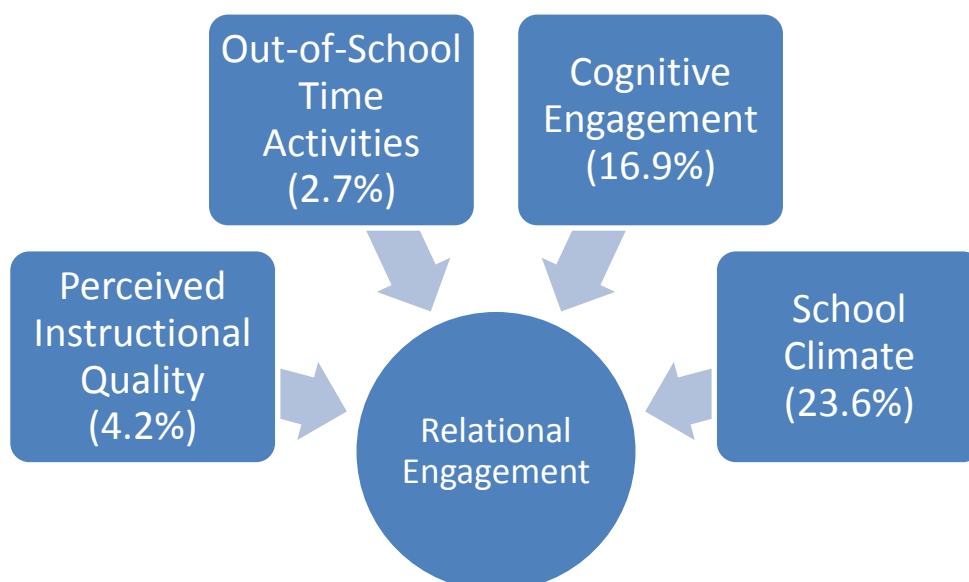
Figure 4: School and Student Factors Contributing to Cognitive Engagement



Finding 4: In addition to school climate, cognitive engagement, out-of-school time activities, and perceived instruction, fair treatment, belonging, participation in sports, ELA Teacher Quality, and peer academic support all significantly contribute to relational engagement.

As we know, relational engagement measures the degree to which students perceive themselves as supported by adults in and out of their school. In our single-sex schools, high relational engagement was predicted by feelings of belonging, fair treatment in school process, interest in school, and instructional quality. Cognitive engagement (Figure 5) added 16.9% while school climate accounted for the largest addition to the variance, adding 23.6% to the model on factors predicting relational engagement. OST and instruction provided for an additional 2.7% and 4.2%, respectively. In terms of survey items: fair treatment, belonging, participation in sports, ELA teacher quality and peer academic support were all significantly unique predictors of cognitive engagement. **Thus the degree to which boys in these single-sex schools felt school-based adult supports existed was contributed by how intellectually interested they were in school and the nature of safety, fairness, and belonging they perceived in school. This is an important finding because it situates the importance of school-based adult supports as strongly tied to the wellness of school climate (e.g., safety, fairness, and belonging).**

Figure 5: School and Student Factors Contributing to Relational Engagement



SUMMARY OF FINDINGS

As stated earlier, the purpose of this report is to outline baseline relationships and factors contributing to academic achievement (GPA) in single-sex schools for Black and Latino boys. We found that academic engagement, school climate, and out-of-school activities were key contributors to the academic performance of boys of color in single-sex schools. Among these factors, *academic engagement was the single most important contributor to academic performance*. The contribution of academic engagement dimensions emerged as follows: cognitive and relational engagement were significant predictors of behavioral engagement. In other words, the more students feel intellectually engaged with what they are learning and the better the quality of school-based adult relationships students have at these single-sex schools, the more likely they are to exhibit academically supportive behavior, which in turn bolsters their academic performance (GPA). This pattern of relationship is not entirely surprising given prior research on engagement and school performance (Suarez-Orozco, et. al., 2008) and the intentional structuring of these schools to impart skills and strategies for “doing school” and disrupting the stereotype of an academic identity as an affront to a racial/ethnic and male identity.

The school climate also contributes to academic achievement. Specifically, academic performance (GPA) is positively supported by students getting along with their peers and adults in the school, regardless of their backgrounds, feeling that they belong at the school, and feeling safe at these schools. Students who felt intellectually engaged with what they are learning and had good relationships with teachers and peers reported feeling that they are treated fairly by the adults at the school, that they have quality teachers, and have friends that support their academic endeavors. Finally, participating in activities that were school-related after school also helps the students’ grades.

In sum, these baseline findings suggest that the environments these single-sex high schools are creating that involve the interaction of social and academic supports is mirrored in what is contributing to student achievement. Furthermore, these findings begin to suggest that the instructional components of school are mediated by the wellness of the school climate and positive social interaction boys of color feel in these single-sex schools.

Technical Appendix: *Procedures*

Survey

The demographic distribution of students across school sites is reflective of the ethnic diversity that exists in the neighborhoods in which the schools are situated. As such, chi square analyses indicated significant differences in the ethnic background ($X^2_{(8,420)} = 113.38, p < .0001$), immigration status ($X^2_{(6,420)} = 80.58, p < .0001$), and home language other than English ($X^2_{(2,420)} = 23.57, p < .0001$) in the Northeast high schools (HS 2 and HS 3) as compared to the Midwest school (HS 1). Further, there are significant grade-level differences, primarily due to the fact that HS 1 is two years younger than its Northeast counterparts, consisting of only 9th and 10th grade cohorts during the 2007-2008 school year ($X^2_{(6,420)} = 69.48, p < .0001$). To account for these differences, we control for school site, grade level, and home language in our regression analyses. Due to the strong relationships between ethnic background, immigration status, and home language, we tested all three controls and determined that home language was the most appropriate variable to include.

Descriptive Statistics

The measures and descriptive statistics and correlations for each of the tested variables are presented in Technical Appendix. The skewness and kurtosis for each variable was examined and there were no values greater than an absolute value of one, suggesting reasonably normal distributions. Histograms for each variable were also examined. These examinations showed that most scales were moderately positively skewed, with floor effects evident for three of the instructional scales: ELA teacher quality, ELA course challenge, and Peer academic support to an extent which appeared to violate the assumption of normality. Thus, the scales were transformed through a normal scaling process. Subsequent regression analyses were conducted using both the non-transformed and transformed scores, and this was not found to make any significant differences to the overall amount of variance explained or the individual regression coefficients. We report analyses using transformed scores.

Procedure

We employed hierarchical multiple regression to test the relative influence of academic engagement, perceptions of school context, reported OST activities, and perceptions of instruction on students' cumulative GPA. To test the relationship between school climate, OST activities, and perceptions of instruction on academic engagement, three hierarchical multiple regressions were performed using behavioral, cognitive, and relational engagement as dependent variables. These regressions were performed to predict unique variation of school climate, OST and instruction variables on aspects of academic engagement, and the relationship of cognitive and relational engagement on behavioral engagement and each other. Initially, the correlations of all independent variables in the model were examined (see Technical Appendix). Correlations were between small, moderately strong to strong in both the positive and negative direction, but

ranging between .10 (leadership-behavioral engagement, and academic enrichment-employment) and .56 (fair treatment-perceived safety). Multicollinearity exists when independent variables are correlated at an absolute value of .9 and above; therefore, correlations indicated that the data were suitably correlated with the dependent variable for examination through hierarchical multiple regression to be reliably undertaken. Regression procedures and results are summarized for each outcome tested in detail in the context of specific hypotheses. The same respondent demographic indicators were entered as control variables—school attended, grade level, and home language—across all regression analyses.

Technical Appendix: Multiple Regression Tables

The baseline model of demographic indicators was found to be a significant predictor of cumulative GPA, predicting 10.9% of the variance ($F_{(8, 16.95)}, p < .001$). Of the control variables, it is important to note that the school attended was a unique predictor of cumulative GPA. When academic engagement was added to the second step, it predicted an additional 12.3% ($F_{(8, 20.79)}, p < .001$) of the variance. The addition of school climate variables, and out-of-school time in the 3rd and 4th steps added 7.1% ($F_{(8, 16.11)}, p < .001$) and 3.5% ($F_{(8, 10.76)}, p < .001$), respectively. Instruction variables did not significantly predict cumulative GPA and as such, the 4-step model was determined to best predict cumulative GPA, accounting for just over one-third of the total variance ($R^2 = 33.8\%$, $p < .001$). In addition to the school attended, the results identified several variables that predicted unique variance in cumulative GPA. Of the unique predictors of cumulative GPA, behavioral engagement was a positive predictor of cumulative GPA ($r_{sp}^2 = .14$, $p < .01$) along with participating in a leadership-related OST activity ($r_{sp}^2 = .01$, $p < .01$), while the number of suspensions ($r_{sp}^2 = .09$, $p < .01$) and students who served as caretakers to younger siblings or relatives ($r_{sp}^2 = .02$, $p < .01$) uniquely predicted GPA in a negative direction.

Table 2: Hierarchical Multiple Regression of Academic Engagement, School Climate, and OST on Cumulative GPA at Three High Schools

	Dependent Measure		
	Cumulative GPA, Spring, 2008		
	R ² change	F-Value	Standardized β
Step 1: Control Variables			
School Attended			.21**
Student Grade Level			0.01
Home Language (other than English)			0.04
R ² change (Baseline)	10.90%***	16.95	
Step 2: Engagement Predictors			
Behavioral Engagement			0.20**
Cognitive Engagement			0.07
Relational Engagement			0.03
R ² change	12.3%***	20.79	
Step 3: School Climate Variables			
Sense of Fair Treatment			-0.02
Sense of Belonging to School			-0.06
Sense of School Cohesion			-0.01
Perceived Safety			0.02
Suspensions in Fall Semester, 2008			-0.31**
R ² change	7.1%***	16.11	
Step 4: Out of School Time Activity Predictors (OST)			
Clubs or Programs Related to Racial, Ethnic, Cultural, or Religious Background			0.06
Academic Enrichment			0.05
Leadership			0.11*
Arts (Art, Music, or Performance)			-0.07
Tutoring or Home/Schoolwork Help			-0.03
Sports			-0.02
Caretaker of Younger Siblings or Relatives			-0.11**
Employment			-0.08
R ² change	3.5%**	10.76	
R² Total	33.8%***		

*Correlation is significant <0.05 level (2-tailed).

**Correlation is significant < 0.01 level (2-tailed).

***Correlation is significant < 0.001 level (2-tailed).

Behavioral Engagement

After entering the 5-step model, it was determined that the model of best fit was a three-step model which included the control variables, engagement subscales (relational and cognitive), and school climate variables. Step 1 of the model did not significantly predict behavioral engagement, accounting for a baseline of only 1.2% ($F_{(5, 1.66)}$); however, the school attended remained a significant unique predictor in the full model. When relational and cognitive engagement was added to the second step, it predicted an additional 18.4% ($F_{(5, 20.13)}$, $p < .001$) of the variance. The addition of the school climate variables added another 13.0% ($F_{(5, 19.73)}$, $p < .001$), with the full regression model accounting for a total of 32.6% of the variance. Both cognitive engagement ($r_{sp}^2 = .16$, $p < .001$) and relational engagement ($r_{sp}^2 = .12$, $p < .01$) were uniquely significant predictors on behavioral engagement. One school climate indicator—A sense of fair treatment—was also a significant predictor ($r_{sp}^2 = .04$, $p < .05$), while two other school climate indicators were negatively associated with behavioral engagement. As one would expect, suspensions was negatively predictive to behavioral engagement ($r_{sp}^2 = .13$, $p < .001$); however, and surprisingly, a sense of belonging to the school was also found to be unique predictor in a negative direction ($r_{sp}^2 = .04$, $p < .01$).

Table 3: Hierarchical Multiple Regression of Relational and Cognitive Engagement and School Climate on Behavioral Engagement at Three High Schools

	Dependent Measure		
	Behavioral Engagement		
	R ² change	F-Value	Standardized β
Step 1: Control Variables			
School Attended			-0.19***
Student Grade Level			-0.03
Home Language			-0.03
R ² change (Baseline)	1.20%	1.66	
Step 2: Engagement Predictors			
Cognitive Engagement			0.31***
Relational Engagement			0.18**
R ² change	18.40%**	20.13	
Step 3: School Climate Variables			
Sense of Fair Treatment			0.12*
Sense of Belonging to School			-0.21**
Sense of School Cohesion			0.02
Perceived Safety			0.10
Suspensions in Fall Semester, 2008			-.35***
R ² change	13.0%***	19.73	
R² Total	32.6%***		

*Correlation is significant <0.05 level (2-tailed).

**Correlation is significant < 0.01 level (2-tailed).

***Correlation is significant < 0.001 level (2-tailed).

Cognitive Engagement

Respondent demographics entered in the first block of the 5-step model provided for a baseline of 3.5% of the total variance ($F_{(4, 4.97)}, p < .01$). Relational engagement ($r_{sp}^2 = .17, p < .05$) added an additional 16.6% to the model ($F_{(4, 26.04)}, p < .001$), with school climate, OST, and instruction adding 5.8%, 1.6%, and 6.4%, respectively. The full regression model accounted for just over one-third of the variance ($p < .001$). Of the individual school climate variables, fair treatment was a significantly unique and positive predictor of cognitive engagement ($r_{sp}^2 = .18, p < .01$), as were two instructional predictors—ELA teacher quality ($r_{sp}^2 = .03, p < .01$) and academic peer support ($r_{sp}^2 = .05, p < .001$). On the other hand, ELA course challenge was a small but significantly negative significant predictor of cognitive engagement ($r_{sp}^2 = .005, p < .05$), perhaps suggesting a weak but fragile balance between course content being challenging vs. being too difficult in students' cognitive engagement.

Table 4: Hierarchical Multiple Regression of Relational Engagement, School Climate, OST, and Perceptions of Instruction on Cognitive Engagement at Three High Schools

	Dependent Measure		
	Cognitive Engagement		Standardized β
	R ² change	F-Value	
Step 1: Control Variables			
School Attended			-.06
Student Grade Level			0.03
Home Language			-0.04
R ² change (Baseline)	3.5% **	4.97	
Step 2: Engagement Predictors			
Relational Engagement			0.12*
R ² change	16.6% ***	26.04	
Step 3: School Climate Variables			
Sense of Fair Treatment			0.17**
Sense of Belonging to School			-0.02
Sense of School Cohesion			0.04
Perceived Safety			0.04
Suspensions in Fall, 2008			-0.02
R ² change	5.8% ***	15.91	
Step 4: Out of School Time Activity Predictors (OST)			
Academic Enrichment			0.08
Leadership			.05
Tutoring or Home/			
Schoolwork Help			-0.02
R ² change	1.6% **	12.86	
Step 5: Instructional Predictors			
ELA Teacher Quality			0.17**
ELA Course Challenge			-0.10*
Peer Academic Support			0.23***
Exposure to Instruction Related			
to High Literacy			0.01
R ² change	6.4% ***	12.93	
R² Total	33.9%		

*Correlation is significant <0.05 level (2-tailed).

**Correlation is significant < 0.01 level (2-tailed).

***Correlation is significant < 0.001 level (2-tailed).

Relational Engagement

Consistent with the other engagement models, the demographic block model was significant ($R^2 = 2.0\%$; $F_{(2, 2.89)}, p < .05$), while none of the individual variables were unique significant predictors of relational engagement. Cognitive engagement ($r_{sp}^2 = .17, p < .05$) added an additional 16.9% to the model ($F_{(2, 24.16)}, p < .001$). School climate accounted for the largest addition to the variance, adding 23.6% to the model ($F_{(2, 33.72)}, p < .001$). OST and instruction provided for an additional 2.7% ($F_{(2, 19.54)}, p < .05$) and 4.2% ($F_{(2, 20.60)}, p < .001$), respectively. The full regression model accounted for just under half of the variance ($R^2 = 49.5\%$; $p < .001$). Fair treatment ($r_{sp}^2 = .30, p < .001$), belonging ($r_{sp}^2 = .25, p < .001$), participation in sports ($r_{sp}^2 = .01, p < .05$), ELA teacher quality ($r_{sp}^2 = .13, p < .01$), and peer academic support ($r_{sp}^2 = .10, p < .05$) were all significantly unique predictors of relational engagement.

Table 5: Hierarchical Multiple Regression of Cognitive Engagement, School Climate, OST, and Instruction on Relational Engagement at 3 High Schools

	Dependent Measure		
	Relational Engagement		Standardized β
	R ² change	F-Value	
Step 1: Control Variables			
School Attended			-.04
Student Grade Level			-0.05
Home Language			0.02
R ² change (Baseline)	2%*	2.89	
Step 2: Engagement Predictors			
Cognitive Engagement		24.16	0.10*
R ² change	16.9%***		
Step 3: School Climate Variables			
Sense of Fair Treatment			0.25***
Sense of Belonging to School			0.25***
Sense of School Cohesion			-0.01
Perceived Safety			0.01
Suspensions in Fall Semester, 2008			-0.14
R ² change	23.6%***	33.72	
Step 4: Out of School Time Activity Predictors (OST)			
Clubs or Programs Related to			
Racial, Ethnic, Cultural, or Religious Background			-0.06
Academic Enrichment			0.01
Leadership			.06
Arts (Art, Music, or Performance)			0.04
Tutoring or Home/Schoolwork Help			-0.04
Sports			0.10*
Caretaker of Younger Siblings or Relatives			0.07
Employment			-0.03
R ² change	2.7%*	19.54	

Step 5: Instructional

Predictors

ELA Teacher Quality			0.21**
Peer Academic Support			0.11*
R ² change	4.2%***	20.60	
R² Total	49.5%		

*Correlation is significant <0.05 level (2-tailed).

** Correlation is significant < 0.01 level (2-tailed).

*** Correlation is significant < 0.001 level (2-tailed).

Technical Appendix: *Measures*

Academic Engagement

Behavioral Engagement

This 7-item scale was adapted from the LISA student interview (Suarez-Orozco, 2001) and focuses on the behaviors of academic engagement reported by students. This scale assesses whether the students were completing the tasks necessary to be successful in school, including attending and participating in class and completing homework and course assignments. Respondents were asked to determine the frequency of behavioral engagement occurrences from “never” to “every day or almost every day.” Scores ranged from 0 to 3 with higher scores indicating higher levels of engagement (Cronbach’s $\alpha = .73$).

Cognitive Engagement

This 9-item scale (Martin and Suarez-Orozco, unpublished) measures the degree to which students are interested and intellectually engaged in what they are learning (e.g., “I enjoy learning new things”). Responses were coded on a 4-point scale ranging from “strongly agree” (4) to “strongly disagree” (1) (Cronbach’s $\alpha = .75$).

Relational Engagement

This 9-item scale was adapted from the LISA student interview (Suarez-Orozco, 2001) and assesses the degree to which students felt that they had a supportive relationship with an adult or a peer that helped them feel connected to school (e.g., “There is at least one adult in school I can always count on”). Responses were coded on a 4-point Likert scale ranging from “strongly agree” (4) to “strongly disagree” (1) (Cronbach’s $\alpha = .79$).

School Climate

School Climate consists of 4-subscales to gain a comprehensive sense of the school ethos or positive climate that exists at the school (Cronbach’s $\alpha = .86$). While the alpha for the entire scale was quite high, in our testing a counterintuitive pattern emerged that suggested that climate, while not significant or large, contributed negatively to achievement. As a result we decided to compute each subscale and test each subscale separately within our analytical models. These subscales are described below.

Sense of Fair Treatment

This 4-item scale developed by Fergus and Martin (unpublished) measures the extent to which students report feeling that students are treated fairly by school adults, both generally (e.g., “The punishment for breaking school rules is the same no matter who you are”) or by group (e.g., “Teachers treat students from different backgrounds in the same way”). Items are measured on a 4-point Likert scale where 1= Strongly Disagree and 4=Strongly Agree (Cronbach’s $\alpha = .79$).

Sense of Belonging to School

These three items taken from the Chicago Consortium measure the extent to which students feel like they belong in their school (e.g., “I fit in with the students at this school”). Items are measured on a 4-point Likert scale where 1= Strongly Disagree and 4=Strongly Agree (Cronbach’s $\alpha = .69$).

Sense of School Cohesion

This 4-item scale measures the extent to which students report students and adult respect and get along with each other, regardless of differences in their backgrounds (e.g., “Everyone gets along in this school”). Responses were coded on a 4-point Likert scale ranging from “strongly agree” (4) to “strongly disagree” (1) (Cronbach’s $\alpha = .75$).

Perceived Safety

Based on findings from year 1, there was a very strong and positive relationship between our three safety measures, of which perceived safety was determined to be as strong a measure as safety incidents or avoidance. To avoid concern around multicollinearity, the research team decided to use the 1-item perceived safety skill by ELS (2002) to determine the student perceptions of safety at school for this year. Respondents were asked to indicate the extent that they agreed or disagreed with the statement “I feel safe at my school.” Responses were coded on a 4-point Likert scale ranging from “strongly agree” (4) to “strongly disagree” (1).

Suspensions

The number of suspensions is useful in gauging school-wide discipline policies. This 1-item scale asked students to indicate the number of times they had been suspended from school during the fall semester of the current school year. Each item ranged from Never (1), Once or Twice (2), More than Twice (3) for the first semester of the present school year.

Out-of-School Time Activity (OST)

Supplemental Education Activity

Supplemental programming plays a central role across the school sites; therefore, it is important to try to capture the extent to which participation in such programs contribute to academic achievement. To account for the wide variation of programs covered, we separated the kinds of programs into the following categories: 1) programs/clubs related to racial, ethnic, cultural, or religious background of the students, 2) academic enrichment, academic remediation, leadership, tutoring, or home/schoolwork help, 3) creative arts, and 4) sports. Items were tested for those who participate in activities based at their school, based outside of school, or in either situation. The differences among the influences of each were few and effect size decreased as variables increased, and so with both in mind the team determined that participation in each type of program, regardless of location, would be most appropriate for our model. Dichotomous variables were created for each type of program, where 1=student participation and 0=nonparticipation.

Student Responsibility

In addition, two items were similarly used to capture outside responsibilities students may have that could impact their performance at school. Students reported if they were caretakers of younger siblings or relatives before or after school, or if they were employed. Dichotomous variables were created for each item of program, where 1= participation and 0=nonparticipation. The influence of students who work or take care of others on performance is also explored in Section IV.

Perceptions Related to Instruction

Due to the variation of teacher instruction within school sites, it was deemed inappropriate to try to capture perceptions of instruction school-wide. Because literacy is such an important indicator of competency, we decided to focus in on ELA for year two; hence, 3 of the 4 instructional scales hone in on ELA courses and literacy. Math skill is an equally important indicator and will be tested similarly next year.

ELA Teacher Quality

This 5-item scale from the Chicago Consortium measures the extent to which students report that teachers have high expectations of students' schoolwork, believe in their ability to achieve, and are attentive to their learning needs. Items are measured on a 4-point Likert scale where 1= Strongly Disagree and 4=Strongly Agree (Cronbach's $\alpha = .90$).

ELA Course Challenge

This 5-item scale from the Chicago Consortium measures the extent to which students report instruction as academically challenging (e.g., "In this class, how often do you find the work difficult?"). Respondents were asked to determine the frequency of challenging occurrences from "never" to "every day or almost every day." Scores ranged from 0 to 4 with higher scores indicating higher levels of challenge (Cronbach's $\alpha = .79$).

Exposure to Instruction Related to High Literacy

A 7-item scale adapted from items developed by the Chicago Consortium and further developed by Martin (forthcoming), based on the college readiness research literature. The scale measures the extent to which students report exposure to instruction related to preparedness for university studies and consists of items related to higher-order thinking, such as presenting or discussing literature, collaboration, and extended critical writing. Scores ranged from 0 to 4 with higher scores indicating higher levels of exposure or participation in the instructional activities (Cronbach's $\alpha = .75$).

Peer Academic Support

This 5-item scale developed by the Chicago Consortium measures the extent to which students have friends who support the student to do well in school. Support includes such items as valuing education (“My friends think it’s important to do well in school”) and tangible help (“My friends and I help each other prepare for tests”). Items are measured on a 4-point Likert scale where 1= Strongly Disagree and 4=Strongly Agree (Cronbach’s $\alpha=.83$).

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