# The West Virginia School Climate Index

## Validity and Associations With Academic Outcome Measures

West Virginia Department of EDUCATION
Office of Research
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## Abstract

The term *school climate* refers to the character and quality of school life. The validity of a new index designed to measure school climate—the *WV School Climate Index*—was tested in this study, and it was used to show the impact of school climate in West Virginia schools. The Index was developed in alignment with a model for school climate measurement put forth by the U.S. Department of Education, Office of Safe and Healthy Students. The Index was tested based on the assumptions that a valid measure should (a) differentiate between favorable and unfavorable climate conditions and, based on other research, (b) be correlated with and predictive of academic outcomes. Evidence of the Index's ability to differentiate climate conditions was provided by School Climate Specialists working in intervention schools, who reported that the Index reflected conditions they had observed. Further, statistically significant differences in Index scores were found between intervention and nonintervention schools. The Index also was shown to correlate at moderate to moderately strong levels with school-level proficiency rates in four content areas and median growth percentiles for mathematics and reading/language arts (RLA)—accounting for noteworthy proportions of variation in these measures. Factors such as high poverty rates, large proportion of students with disabilities, larger school size, and certain grade-span configurations of schools are associated with poorer academic outcomes. Even when these conditions were present, this study showed the positive effect of school climate remained strong for four of six academic outcome measures tested. School climate was the most influential predictor in the social studies proficiency and mathematics growth percentile regression models, and was the second and third most influential predictor for RLA proficiency and growth percentile. Further, the study showed positive school climate substantially moderated the effect of poverty as well as the other factors included in the model. For social studies proficiency and mathematics growth percentile, the effects of poverty were entirely moderated by school climate. With all measures considered together, positive school climate lessened the cumulative negative impact of poverty, disability rate, school size, and grade-span configuration from 6% to 100%. Schools have virtually no control of the demographic characteristics of the students and communities they serve, and decisions about school size and grade-span configuration reside at much higher political and administrative levels. The results reported in this study suggest that by addressing a factor that *is* within their sphere of influence—improving school climate—schools may substantially diminish the unfavorable effects of matters over which they have little control. Accordingly, schools should focus their improvement efforts on the needs of their students and staff as they relate to school climate. The WV School Climate Index can help schools identify areas of needed improvement and measure their progress.

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## Introduction

The West Virginia Department of Education (WVDE) Office of Healthy Schools was among 11 state educational agencies (SEAs) that competed successfully in 2010 for the federal Safe and Supportive Schools discretionary grant program. Safe and Supportive Schools, or S3, is sponsored to "support statewide measurement of, and targeted programmatic interventions to improve, conditions for learning in order to help schools improve safety and reduce substance use" (U.S. Department of Education, n.d.). In this context *conditions for learning* refers to *school climate*, which the National School Climate Center (NSCC) defines as "the quality and character of school life," and describes as reflecting "norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures" within the school community (NSCC, n.d.). The S3 program is targeted at school climate conditions at the high school programmatic level.

Each year, state S3 grantees are required to publish a *school safety score* for each school selected to implement programmatic interventions (i.e., *intervention schools*). Furthermore, in the first and final years of the grant a school safety score must be published for all other high schools (i.e., *nonintervention schools*) located in the same school districts as intervention schools. The school safety score was federally defined to mean "a figure calculated with a formula, developed by the state in consultation with LEAs and applied uniformly to all eligible schools in participating LEAs within the state, that uses both the survey data and incident data collected by a measurement system, and that facilitates school comparisons" (Office of Safe and Drug-Free Schools, 2010, p. 39507). Beyond a stipulation that both survey and incident (e.g., discipline) data be used, few other limitations were placed on states as to how the score should be constructed.

The term, *school safety score*, suggests a narrower focus—on risk of injury or harm—than the score is intended to represent. NSCC's definition of school climate, with its broader focus on conditions for learning, more closely aligns with the S3 program's intentions in its support for measurement and interventions. Based on this definition, a school-wide score would incorporate constructs well beyond that of school safety. For this reason, West Virginia has joined other grantee states in referring to the safety score as a *school climate score*, hence the development of the *West Virginia School Climate Index (WVSCI)*.

The WVSCI was developed to align with a model for school climate measurement put forth by the U.S. Department of Education's Office of Safe and Drug Free Schools (OSDFS; Figure 1). The index uses a 9-point stanine scale and 20 indicators, drawing from student and staff survey data and selected discipline incident data reported into the West Virginia Education Information System (WVEIS). It includes three primary domains, each consisting of corresponding subdomains (in italics) as follows:

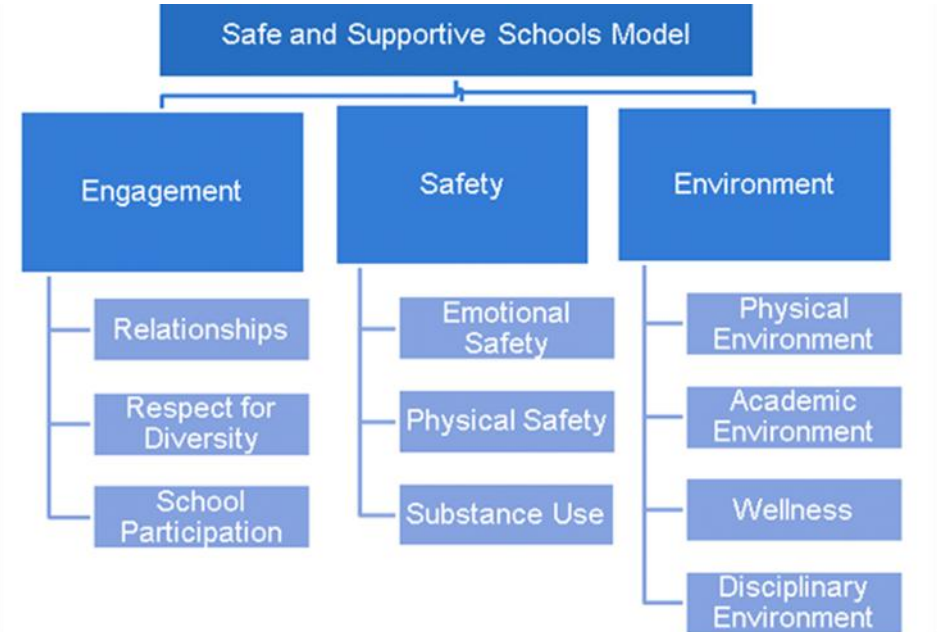
- **Engagement**—the quality of *relationships*—including *respect for diversity*—among students, staff and families; the level of *school participation* and involvement by families, staff, and students in school activities; and efforts by schools to *connect* with the larger community.

- **Safety**—the *physical* and *emotional* security of the school setting and school-related activities as perceived, experienced, and created by students, staff, families, and the community. The *use and trade* of illicit *substances* in the school setting and during school-related activities also is included in this domain.
- **Environment**—the physical and mental health supports available that promote student *wellness*, the *physical* condition of school facilities, the *academic environment*, and the *disciplinary* tone of the school—i.e., the fairness and adequacy of disciplinary procedures.

The WVSCI was designed initially to satisfy three primary conditions (Whisman, 2012): (a) creating an index that provides an overall measure of school climate, tapping all domains and subdomains in the OSDFS model (Figure 1) by synthesizing data from multiple data sources; (b) developing a straightforward, easily understood scale that can be readily interpreted by district and school staff engaged in school climate improvement; and (c) providing information about component parts of the index to enable identification of specific school climate issues in need of intervention. The process of developing the index within the context of these three conditions is described in *The West Virginia School Climate Index: A Measure of School Engagement, Safety, and Environment* (Whisman, 2012).

The purpose of this report is to examine the technical validity of the WVSCI by testing two assumptions: (a) that a valid measure of school climate should differentiate between

**Figure 1. Proposed Federal Model for Measuring School Climate**




U.S. Department of Education (n.d.). Safe and Supportive Schools [Program Page]. Washington, DC: Author, Office of Safe and Drug-Free Schools. Retrieved from www2.ed.gov/programs/safesupportiveschools.

favorable and unfavorable school climate conditions, and (b) that a positive school climate is conducive to learning—and conversely, a negative school climate would impede learning—thus, a valid school climate measure should correlate with and be predictive of school-level academic outcomes.

# Methods

### Participant Characteristics and Sampling Procedure

Forty-two schools were included in the analyses described in this report. In accordance with selection criteria put forth by the U.S. Department of Education (Safe and Supportive Schools, 2010), 22 intervention schools were selected a priori by being classified as low performing. Although school climate research suggests these schools would exhibit more challenging school climate conditions, no assessment of those conditions was performed prior to their selection as intervention schools. Also included in the study are 20 nonintervention schools; together, the 42 schools represent 35% of all West Virginia high schools. They ranged in enrollment from 115 to 1,244 students (Table 7 on page 17); from 7% to 23% in enrollment of students with disabilities; and from 13% to 77% in proportion of students from low-income families (based on free and reduced-price meal participation). Most of the schools were traditional high schools (Grades 9-12), but nine were multiprogrammatic, with wider grade-span configurations.

### Research Design

We took two approaches to assessing the extent to which the WVSCI differentiates between favorable and unfavorable school climate conditions. First, we assessed the face validity as viewed by a cadre of five school climate specialists involved in providing training and technical assistance to S3 intervention schools. These specialists had visited and worked with local school-based S3 teams multiple times during the first year of the S3 project. Shortly after we presented the cadre with the WVSCI results and trained them on its application to the school planning process, we asked them (via e-mail and in face-to-face communications) how well the index aligned with actual school conditions based on their firsthand observations. Our second approach to assessing how well the WVSCI differentiates between favorable and unfavorable school climate conditions was to test for group differences between S3 intervention and nonintervention schools with one-way analyses of variance (ANOVA).

We used two different approaches to study the WVSCI's correlation with and ability to predict school-level academic outcomes. As noted earlier, the primary foci of the S3 program are to support the measurement of conditions for learning and to target programmatic interventions to improve them. These program foci are based on substantial evidence that points to a measureable link between positive school climate and positive behavioral and academic outcomes. For example, in its recent research summary, the NSCC concluded,

> Positive and sustained school climate is associated with and/or predictive of positive youth development, effective risk prevention and health promotion

> efforts, student learning and academic achievement, increased student graduation rates, and teacher retention (Cohen & Geier, 2010, p. 6).

Based on this conclusion one would assume that the WVSCI, if it is a valid measure of school climate, would correlate with or be predictive of selected school-level outcome measures. We examined the presence and strength of those relationships in the participating WV schools for two types of school-wide academic achievement measures. The first was school-level proficiency rates calculated directly from the 2011 WESTEST 2[1] assessment data in four content areas: math, reading/language arts (RLA), science, and social studies. Each of these was examined separately. The second type of measure was the school-level median growth percentiles for math and RLA[2]. It is important to differentiate between the two types of measures. Proficiency rates are point-in-time snapshots of student *performance* for the academic year as measured on the day of the test. Conversely, growth takes into consideration performance over time and provides a measure of academic *progress* over two or more years.

Following an analytical approach applied by Condron (2011), we initially used bivariate scatter plots and ordinary least squares (OLS) regression analysis to demonstrate correlations between the overall school climate index scores and the selected outcomes. From these analyses, we generated coefficients of determination ($R^2$) to indicate the proportion of variability in the outcomes explained by the school climate index, when those two variables were considered alone. $R^2$ is reported as a percentage. Subsequently, we used bivariate correlation analysis to identify which of the 20 school climate indicators making up the overall index were more strongly correlated with the outcomes. The intent with the individual indicator correlation analyses was more to identify indicators that tended to be more highly correlated with multiple outcomes—and thus more likely to promote overall academic success—than to explore which and for what reasons certain indicators correlated with individual outcomes.

As for investigating the ability of the WVSCI to predict favorable school climate conditions, the bivariate analysis was followed with multiple linear regressions incorporating other structural or demographic factors that may strongly influence academic achievement. The purpose of this analysis was to assess whether the relationships between school climate and academic outcomes hold when the other factors are controlled. Among the factors considered were the percentage of low socioeconomic status (LSES) students (i.e., free/reduced-price meal participation), the percentage of students with disabilities (SWD), school size (2nd month headcount enrollment), and grade configuration (i.e., stand-alone grade 9-12 high school compared to multiprogrammatic elementary/middle and high school combinations). In this study grade configuration was dichotomously coded with multiprogrammatic schools having a value of one (1) and grade 9 through 12 schools having a value of zero (0). These factors were chosen based on the research literature, as briefly summarized below.

*Low socioeconomic status*. According to Burney and Beilke (2008) low socioeconomic status may be the most important and influential of student characteristics in relation to

[1] WESTEST2 is West Virginia's annual standardized test. For more information about WESTEST2 go to wvde.state.wv.us/oaa/westest_index.html.

[2] See *An Introduction to the West Virginia Growth Model* at sites.google.com/a/wvde.k12.wv.us/research-filecabinet/research-projects.

academic achievement. They identified several poverty-related issues that impact achievement, among them limited access to resources for developing foundational skills, under-representation of students from struggling economic circumstances in rigorous courses and gifted programs, and although inconclusive, possible cultural differences in terms of the value placed on education.

*Disabilities*. Historically students with disabilities have not performed as well on education assessments as their peers without disabilities, which has prompted state and local school districts nationwide to raise concerns about federal education accountability mandates (Katsiyannis, Zhang, Ryan, & Jones, 2007). These concerns have inspired more intensive focus on minimum standards and appropriate testing accommodations, as well as innovative interventions to improve the academic and behavioral outcomes for students with disabilities. Yet, although improvements have been made in these areas the achievement gap persists, and as such remains important in examining school level performance measures.

*School size*. The preponderance of evidence from nearly 30 years of correlational studies indicates that larger school size is associated with a variety of negative indicators, including lower achievement levels for impoverished students (Bickel & Howley, 2000; Howley & Howley, 2004; Johnson, J., 2007; Lee & Smith, 1995, 1997; Pittman & Haughwout, 1987), larger achievement gaps related to poverty and race (Bickel & Howley, 2000; Friedkin & Necochea, 1988), reduced rates of student participation in cocurricular and extracurricular activities (National Research Council, Institute of Medicine, 2004), more dangerous school environments (Stockard & Mayberry, 1992), and lower graduation rates (McMullan, Sipe, & Wolf, 1994; Pittman & Haughwout, 1987). That the schools involved in the S3 project in West Virginia vary widely in terms of size supports this variable's inclusion in the analysis.

*Grade-span configuration*. Grade-span configuration is a less studied structural factor, especially at the high school level. In general, studies of middle grades show more positive outcomes for students in K-8 schools than those in traditional middle school configurations. Franklin & Glascock (1996), in a statewide analysis of Louisiana schools, found that sixth- and seventh-grade students performed better in elementary and K-12 schools than in traditional middle or secondary schools. They also looked at the high school level and found K-12 schools had higher student persistence than traditional (9-12) high schools. As mentioned earlier, most schools included in the present analysis are traditional (9-12) high schools, yet nine of the 42 schools were multiprogrammatic and as such warrant the inclusion of this predictor.

In accordance with Condron's (2011) approach, since the schools included in the S3 project do not represent a sample based upon which inferences can be made about all West Virginia high schools, the usual assumptions about statistical significance do not apply in the following analyses. As such, the magnitude of associations among the predictor and dependent variables was of greater importance than statistical significance. Nonetheless, statistically significant correlations and regression coefficients are noted where present. Lastly, prior to any analysis, inspection of data across all outcome measures served to identify outlier schools, which we excluded on a listwise basis to guard against their disproportionate influence on results.

# Findings

## Differentiating Between Favorable and Unfavorable School Climate Conditions

Since the construction of the WVSCI was closely aligned with the model for school climate measurement put forth by the U.S. Department of Education, we expected it to accurately measure what was intended—school climate. This expectation was met by the responses from the school climate specialists. They indicated that the index reflected the conditions they had observed in their respective schools, although they did indicate that some indicator scores were higher or lower than they had expected. One made the following observation:

> I am surprised by how much the School Climate Index and supporting data is aligning with what I know about our schools so far. There are some instances where a school scored higher on certain indicators or scored lower in certain areas than I would have guessed. I know that perceptions play a role in our expectations as well. Even though we need to look at the data for our schools in depth, I think that overall I can see that the reports meet with reality.[3]

That the specialists reported general alignment between WVSCI scores and their firsthand observations further supports its face validity.

In terms of the overall school climate conditions present, the process of developing the WVSCI using stanine scoring (Whisman, 2012) ensured a near normal distribution of overall school climate index scores among the 42 schools for which it was calculated. The mean and median were virtually equal and very near the midpoint (5.0) of the 9-point stanine scale (Table 1). The standard deviation was 0.90 and the range of scores was clustered around the central third of the stanine scale (3.11 to 6.51), indicating the absence of outlier scores on either end of the scale. This was not unexpected and was to some extent a result of standardizing, then averaging indicators into a single index score. Beyond that, however, overall scores below three would indicate extraordinarily bleak conditions on most if not all school climate indicators. Conversely, scores skewed to the positive end of the stanine scale presumably would be very challenging to achieve and sustain. It is unlikely that any high school in West Virginia would have such very bad or very good conditions as to fall beyond these ranges.

**Table 1. Descriptive Statistics for the WV School Climate Index.**

| | Number of schools | Mean WVSCI | Median WVSCI | Std. dev. | Min. | Max. |
|---|---|---|---|---|---|---|
| S3 intervention | 22 | 4.72 | 4.74 | 0.88 | 3.11 | 5.86 |
| Non-S3 intervention | 20 | 5.27 | 5.29 | 0.85 | 3.60 | 6.51 |
| Overall among all schools | 42 | 4.98 | 5.00 | 0.90 | 3.11 | 6.51 |

The S3 intervention and nonintervention schools do appear to differ on mean (4.72 vs. 5.27) and median (4.74 vs. 5.29) WVSCI scores (Table 2). ANOVA results provide sufficient

[3] Nancy Brown, personal email communication, August 26, 2011.

evidence to confirm that WVSCI scores for S3 intervention schools differed statistically from the nonintervention schools, ($F$ = 4.199, p< 0.05). Also, recalling that higher WVSCI scores indicate more positive school climate conditions, the difference was in the expected direction; that is, as a group the intervention schools presented with lower WVSCI scores.

**Table 2. Comparison of Average School Climate Index Scores Between Intervention and Nonintervention Schools.**

| | Sum of squares | *df* | Mean Square | *F* | *p* |
|---|---|---|---|---|---|
| Between Groups | 3.15 | 1 | 3.15 | 4.199 | .047 |
| Within Groups | 29.972 | 40 | 0749 | | |
| Total | 33.12 | 41 | | | |

## Correlating With and Predicting School-Level Outcomes

### Bivariate findings

Given the measures used and myriad factors that could potentially influence the relationships analyzed, correlation coefficients from 0.30 to 0.50 are considered moderate in strength, coefficients greater than 0.50 to 0.70 as moderately strong, and coefficients greater than 0.70 as strong. By these cut points, moderate to moderately strong positive correlations were observed between the school climate index and all of the school-level outcomes, and all except math proficiency were statistically significant ($p$ < 0.05, Table 3). The correlation coefficient between math proficiency rates and school climate (0.30) was only slightly lower than that for the median growth percentile for math. The proportion of variance in proficiency rates accounted for by the school climate index ranged from about 9.0% for math to about 33.1% for social studies (Figure 2 on page 19). As such, the strengths of the observed correlations are consistent with conclusions of the NSCC regarding the associations between school climate and school performance, at least for the outcome measures used in the analysis.[4]

**Table 3. Bivariate Correlation Between the WVSCI and Selected School Outcome Measures.**

| Outcome Measure | School Climate Index | Interpretation |
|---|---|---|
| Math proficiency (%) | 0.300 | Moderate |
| RLA proficiency (%) | 0.475** | Moderate |
| Science proficiency (%) | 0.365* | Moderate |
| Social studies proficiency (%) | 0.575** | Moderately strong |
| Median growth percentile for math | 0.318* | Moderate |
| Median growth percentile for RLA | 0.451** | Moderate |

*Significant at the 0.05 level (2-tailed). ** Significant at the 0.01 level (2-tailed).

[4] The correlation analysis is replicated as a bivariate OLS regression for each outcome measure under the bivariate model scenarios in Table 10 on page 18.

The correlation analysis between the outcomes and the 20 individual school climate indicators shows that all three indicators addressing the *Engagement* subdomains (i.e., positive relationships, respect for diversity, and meaningful participation in school) were found to have moderate and statistically significant correlations with three or more outcome measures (Table 9 on page 20). Within the *Safety* primary domain, three of the four *Emotional Safety* indicators correlated with three or more outcomes. These included low rates of bullying at school/cyber-bullying anywhere, low rates of students avoiding school activities/specific places in school, and students' perceptions of personal safety at school. Conversely, few indicators within the *Physical Safety* subdomain were correlated with the outcomes, the exceptions being low rates of threats/injuries with weapons on school property and low rates of physical fights on school property. Interestingly, the latter was the only indicator of the twenty that correlated at a moderate to moderately strong, statistically significant level with all six outcomes. As for the *Environment* primary domain, three indicators correlated with two or more outcomes: supportive academic environment, students' physical and mental health, and low rates of discipline problems reported at school.

Taken together this pattern of correlations suggests that conditions related to school engagement and relationships, emotional safety, and the environmental setting, as conceived in the school climate model, may contribute more to desired academic outcomes than physical safety. At the same time, the fact that lower rates of physical fights at school correlated somewhat strongly with all academic outcomes, whereas most other physical safety indicators did not, suggests that while threats to physical safety may manifest themselves in many ways, the issue of fighting at school may have a particularly visible and salient effect on academic achievement.

### Multivariate findings

As noted above, the purpose of the multivariate analysis was to assess if relationships between school climate and academic achievement—as seen in the bivariate correlation analyses (i.e., Table 3 and Figure 2, page 19)—hold when other factors are added. Although lessened to varying degrees, the positive effect of school climate remained influential for four of the six academic outcomes (see the Multivariate Models in Table 10, page 21). These included proficiency rates for RLA and social studies, and median growth percentiles for math and RLA. For math and science proficiency, the influence of school climate was substantially diminished by the other factors, but this was not unexpected based on the weaker bivariate relationships previously observed. Judging from the relative magnitude of the standardized regression coefficients (β) among the five predictor variables (irrespective of direction), school climate was the most influential in the social studies proficiency and math growth percentile models, and was the second and third most influential predictor, respectively, in the RLA proficiency and RLA growth percentile models. Standardized regression coefficients refer to the extent to which the academic outcome measures change, in standard deviations, relative to a standard deviation increase in the predictor variables. The sign or direction of the coefficients indicates whether the outcomes improve (+) or decline (-) in response to those changes.

As expected, including the additional factors increased the total proportion of variation ($R^2$) in the academic outcomes. In these models the total $R^2$ ranged from 17.9% for math median growth percentile to 50.9% for social studies proficiency (Table 10, page 21). The amounts by

which $R^2$ increased, however, were modest for those outcomes for which the influence of school climate remained strong—they ranged from 7.8% for math growth percentile to 17.8% for social studies proficiency. For math and science proficiency where school climate was less influential the $R^2$ increases were larger (21.3% and 25.9%, respectively), further illustrating the impact the other factors exerted on these particular outcomes.

More times than not the effects of low socioeconomic status, students with disabilities, school size, and grade-span configuration were negative—that is, increases in these factors tended to result in poorer academic outcomes.[5] Conversely the effect of school climate was consistently positive, indicating its potential to moderate the negative consequences of the other factors. For example, as expected from the literature, low socioeconomic status (LSES) had a moderately strong but negative effect on all of the academic outcomes (Table 10). Yet, for social studies proficiency and math growth percentile the negative influence of low socioeconomic status was more than totally moderated by school climate ($\beta$ = 0.331 vs. -0.309 and 0.214 vs. -0.174, respectively). The overall magnitude of moderation for each outcome was assessed by comparing the cumulative effects of the multivariate models (i.e., as determined by the sum of the standardized regression coefficients ($\beta$) to similar multivariate models in which school climate was excluded. The comparison indicates that school climate moderated the negative impacts from about 6% for science proficiency to 100% for math growth percentile (Table 4), suggesting that substantial benefits can be gained by having a positive school climate, especially among schools that serve communities with high poverty, or schools that have high proportions of students with disabilities.

The results so far support the conclusion of the NSCC (Cohen & Geier, 2010) about the benefits associated with positive school climate conditions, and suggest that schools could improve student academic achievement by improving school climate. To illustrate the potential improvements the unstandardized regression coefficients (B) from the multivariate models were used to calculate predicted average values for the six academic outcomes with data from two schools involved in the S3 project, namely Intervention School 1 and Nonintervention School 20 (see Table 7 on page 17). With the unstandardized regression coefficients, linear equations were specified stating the outcomes (e.g., math proficiency) as a function of the predictor variables used in the multivariate models (Table 10). In terms of the predictor variables the two schools are very similar: enrollment differed by only 77 students; the percentage of students with disabilities differed by less than three percentage points; and the percentage of low socioeconomic status students differed by only seven percentage points (Table 5). The schools differed substantially in terms of school climate conditions. Intervention School 1 had the lowest school climate index score (3.11) among the 42 schools for which the index was calculated, whereas Nonintervention School 20 had the highest score (6.51). They differed also on grade-span configuration, i.e., Nonintervention School 20 was a grade 9 to 12 high school but Intervention School 1 was multiprogrammatic. Grade-span configuration however was shown to have only a minimal effect on most of the outcome variables, so its impact on the predictions was expected to be small.

[5] The effect of *school size* was observed to be positive in the math and social studies proficiency and math growth multivariate models; however, the effects were small. Likewise, *students with disabilities* demonstrated a positive effect for RLA growth, but it was of negligible magnitude.

**Table 4. Moderating Effects of School Climate Relative to Low Socioeconomic Status, Students With Disabilities, School Size, and Grade-span Configuration.**

| Outcome | Cumulative effect excluding school climate[1] | Cumulative effect including school climate[2] | Percent moderation |
|---|---|---|---|
| Math (Percent Proficient) | -0.510 | -0.426 | 16.5% |
| RLA (Percent Proficient) | -0.857 | -0.339 | 60.4% |
| Science (Percent Proficient) | -1.164 | -1.089 | 6.4% |
| Social studies (Percent Proficient) | -0.963 | -0.293 | 69.6% |
| Math growth (Median Percentile) | -0.426 | 0.000 | 100.0% |
| RLA growth (Median Percentile) | -0.727 | -0.473 | 34.9% |

[1] These values were derived by summing standardized regression coefficients from multivariate regressions excluding school climate as a predictor variable.
[2] These values were derived by summing standardized regression coefficients from multivariate regressions including school climate as a predictor variable as shown in Table 10 (page 21).

The results so far support the conclusion of the NSCC (Cohen & Geier, 2010) about the benefits associated with positive school climate conditions, and suggest that schools could improve student academic achievement by improving school climate. To illustrate the potential improvements the unstandardized regression coefficients (B) from the multivariate models were used to calculate predicted average values for the six academic outcomes with data from two schools involved in the S3 project, namely Intervention School 1 and Nonintervention School 20 (see Table 7 on page 17). With the unstandardized regression coefficients, linear equations were specified stating the outcomes (e.g., math proficiency) as a function of the predictor variables used in the multivariate models (Table 10). In terms of the predictor variables the two schools are very similar: enrollment differed by only 77 students; the percentage of students with disabilities differed by less than three percentage points; and the percentage of low socioeconomic status students differed by only seven percentage points (Table 5). The schools differed substantially in terms of school climate conditions. Intervention School 1 had the lowest school climate index score (3.11) among the 42 schools for which the index was calculated, whereas Nonintervention School 20 had the highest score (6.51). They differed also on grade-span configuration, i.e., Nonintervention School 20 was a grade 9 to 12 high school but Intervention School 1 was multiprogrammatic. Grade-span configuration however was shown to have only a minimal effect on most of the outcome variables, so its impact on the predictions was expected to be small.

As an example of how the linear equations were specified, the unstandardized regression coefficients for math proficiency are used. The corresponding linear equation is

Math proficiency = 44.923 + 0.318 (school climate) + 0.003 (school size) - 0.182 (SWD) - 0.238 (LSES) - 1.09 (multiprogrammatic).

**Table 5. Characteristics of Schools Used to Illustrate Potential Benefits of Improving School Climate.**

| Characteristic | Intervention School 1 | Nonintervention School 20 |
|---|---|---|
| School Climate Index | 3.11 | 6.51 |
| School size | 631 | 708 |
| Students with disabilities (%) | 12.2 | 9.6 |
| Low socioeconomic status (%) | 58.5 | 51.4 |
| Multiprogrammatic School | Yes (1) | No (0) |

Application of the linear equations involved plugging in the values for Intervention School 1 for each outcome using its own WVSCI score (3.11) to obtain model-based estimates, then substituting the WVSCI score from Nonintervention School 20 (6.51) into the equations to estimate gains in the outcome variables relative to improvement in school climate conditions. To illustrate the magnitude of the changes, the observed values on each outcome measure for Intervention School 1 are shown (Table 6, Column A) as are predicted values using its own WVSCI score (Column B). The former are the actual proficiency rates and median growth percentiles for Intervention School 1 calculated directly from the 2011 statewide assessment data. The latter represent what the linear equations from the multivariate regression analysis would predict the actual values to be for Intervention School 1. The latter also serve as the standards by which the predicted values derived by substituting the higher school climate score shown in Column C are assessed. Essentially the values in Column C address the question as to *what the values for Intervention School 1 would be if it experienced school climate conditions on a level equivalent to Nonintervention School 20, holding constant all other factors*.

The margins by which the outcomes improve are reflected by the difference between two predicted values as shown in Column D (i.e., the values in Column C minus Column B). For the four content area proficiency rates these margins ranged from very modest gains of about one percentage point each for math and science proficiency, to more substantial gains of about 7 and 9 percentage points for RLA and social studies, respectively (Table 6). For math and RLA growth, the gains were 4 and 3 percentile points, respectively.

Between the 2010 and 2011 academic testing periods, Intervention School 1 experienced increases in math, RLA, and science proficiency rates, but a slight decrease in social studies proficiency (Column E in Table 6). These changes may be interpreted as the natural annual variation in proficiency under business as usual conditions. Thus by adding these to the predicted improvements achieved under the enhanced school climate scenario, an estimate is obtained of the potential cumulative academic boost that may have been achieved by Intervention School 1 (Column F in Table 6). It is noteworthy to point out that the combined effect of the natural increase plus the predicted increase in RLA placed Intervention School 1 within approximately 5 percentage points of the annual measurable objectives for this content area as established by the West Virginia Department of Education. For low-performing schools this would represent a substantial advantage in their school improvement efforts. The net improvements in the other content areas are more modest, yet deserve consideration for any

school with a commitment to continuously improving outcomes for students. Using the same process described for Intervention School 1, potential cumulative improvements were calculated for all 42 schools (Table 11 on page 23).

**Table 6. Predicted Average Improvement in Academic Outcomes Under Variable School Climate Conditions**

| Outcome | (A) Observed value for 2011 school year | (B) Predicted value with actual school climate score (3.11) | (C) Predicted value with substituted school climate score (6.51) | (D) Difference between predicted values | (E) Observed proficiency change from 2010 school year | (F) Potential cumulative improvement |
|---|---|---|---|---|---|---|
| Math proficiency (%) | 28.62 | 30.27 | 31.35 | 1.08 | 1.54 | 2.63 |
| RLA proficiency (%) | 26.40 | 33.42 | 40.81 | 7.38 | 5.46 | 12.84 |
| Science proficiency (%) | 30.17 | 28.70 | 29.65 | 0.95 | 8.33 | 9.28 |
| Social studies proficiency (%) | 19.38 | 24.64 | 33.79 | 9.14 | -0.84 | 8.31 |
| Math growth (median percentile) | 41.00 | 41.38 | 45.48 | 4.10 | n/a | n/a |
| RLA Growth (median percentile) | 30.00 | 39.48 | 42.87 | 3.40 | n/a | n/a |

## Discussion

School climate refers to the character and quality of school life, and a positive school climate has been demonstrated to contribute to positive behavioral and academic outcomes (Cohen & Geier, 2010; NSCC, n.d.). The *WV School Climate Index* (WVSCI) was developed in the context of a model for school climate measurement put forth by the U.S. Department of Education. That the index closely aligned with the federal model virtually ensured that it is a valid measure of school climate. Furthermore, the accounts of school climate specialists that the index reflected observed conditions within their respective schools, and that the index scores detected statistically significant differences in school climate index scores between S3 intervention and nonintervention schools, provided further evidence of validity. Intervention schools were identified a priori on the basis of being classified as low performing, and as such were expected to present with WVSCI scores reflecting more challenging school climate conditions.

The era of high-stakes testing has to some extent resulted in the unintended consequence of reinforcing practices that focus exclusively on assessment results and test preparation. According to Amrein-Beardsley (2009), such practices as teaching to the test, narrowing the curriculum to cover only that which is covered on tests, cheating on test procedures and accountability reporting, and other practices have been undertaken to game accountability systems. Even appropriate and legitimate—but narrowly focused—pathways to boost test scores have been undertaken at the expense of other practices such as promoting a positive school climate that can impact academic achievement.

The WVSCI, however, was shown to correlate at moderate to moderately strong levels with school-level proficiency rates in four content areas and median growth percentiles for math and RLA, and accounted for noteworthy proportions of variation in these measures ($R^2$ = 9% to 33%). As such, the findings are consistent with research demonstrating the impact positive school climate can have on improving student and school-level academic achievement measures. Schools should be encouraged to focus continuous improvement efforts broadly to address the needs of their students and staff as they relate to school climate.

The West Virginia Board of Education (WVBE) recently adopted a new policy titled *Expected Behavior in Safe and Supportive Schools*. This policy directs schools to engage in proactive approaches to foster academic, social, and emotional learning (WVBE, 2011). Further analysis of individual indicators comprising the WVSCI suggests that conditions related to enhancing school engagement and promoting positive relationships, safeguarding the emotional safety of students and staff, setting an environmental tone that is supportive of academic success, mental and physical health, and minimizing discipline problems and rates of physical fights at school may contribute substantially to improved academic outcomes. Interventions targeting these and similar indicators may be implemented relatively inexpensively such that schools can realize substantial improvements in school climate with modest financial investments (Whisman, 2012). Further, the associations reported above suggest these benefits may extend to academic outcomes as well.

Issues such as poverty rates, proportion of students with disabilities, school size, and school organization are associated with poorer academic outcomes. Even in consideration of these conditions, in our study the positive effect of school climate remained strong for four of six academic outcomes measures. School climate was the most influential predictor in the social studies proficiency and math growth percentile regression models, and was the second and third most influential predictor for RLA proficiency and growth percentile.

Hopson and Lee (2011) reported that school climate did not moderate a negative association between poverty and self-reported grades among middle and high school students in New York. Although the unit of analysis in the present study was schools, and actual versus self-reported academic measures were used, school climate in this study *substantially moderated* the effect of poverty as well as the other factors included. For social studies proficiency and math growth percentile, the effects of low socioeconomic status were totally moderated by school climate. With all measures considered together, school climate lessened the cumulative negative impact of low socioeconomic status, students with disabilities, school size, and grade-span configuration, ranging from 6% to 100%. Schools have virtually no control of the demographic characteristics of the students and communities they serve, and decisions about school size and grade-span configuration reside at much higher political and administrative levels. The results reported in this study suggest that by addressing a factor within their sphere of influence—improving school climate—schools may diminish substantially the unfavorable effects of issues over which they have little say.

Generally, only incremental gains in academic achievement are realized on a year-to-year basis. For example, on a statewide basis between 2010 and 2011 in West Virginia, proficiency rate gains were on the order of 1 to 7 percentage points. For one school, however, it was demonstrated in this analysis that additional proficiency rate gains of 1 to 9 percentage

points across the four content areas, and 3 to 4 percentage points for math and RLA growth, might be realized by improving school climate conditions. For proficiency, adding these additional gains to the natural increment by which this school improved from 2010 to 2011 would have substantially boosted its efforts to show adequate yearly progress, further supporting an emphasis on school climate improvement.

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# Appendix A. Participant School Characteristics

Table 7 . Participant School Characteristics

| S3 Grant Involvement | School Climate Index | Total enrollment (2010-11 SY) | Students with disabilities (%) | Low socioeconomic status (%) | Multi-programmatic |
|---|---|---|---|---|---|
| Intervention School 1 | 3.11 | 631 | 12.2 | 58.5 | Yes |
| Intervention School 2 | 3.20 | 302 | 13.6 | 76.8 | Yes |
| Intervention School 3 | 3.32 | 795 | 19.7 | 73.3 | Yes |
| Intervention School 4 | 3.33 | 449 | 14.7 | 58.6 | No |
| Intervention School 5 | 3.79 | 771 | 6.9 | 49.7 | No |
| Intervention School 6 | 4.46 | 340 | 14.7 | 69.7 | Yes |
| Intervention School 7 | 4.48 | 694 | 18.6 | 51.6 | No |
| Intervention School 8 | 4.57 | 773 | 17.6 | 54.9 | No |
| Intervention School 9 | 4.62 | 331 | 9.7 | 62.2 | No |
| Intervention School 10 | 4.71 | 483 | 15.3 | 56.7 | No |
| Intervention School 11 | 4.73 | 586 | 18.1 | 70.8 | No |
| Intervention School 12 | 4.75 | 891 | 20.1 | 61.1 | No |
| Intervention School 13 | 5.04 | 1244 | 9.7 | 38 | No |
| Intervention School 14 | 5.10 | 318 | 9.1 | 50 | No |
| Intervention School 15 | 5.33 | 266 | 22.6 | 60.5 | Yes |
| Intervention School 16 | 5.42 | 826 | 9.3 | 41.9 | No |
| Intervention School 17 | 5.47 | 202 | 14.9 | 43.1 | No |
| Intervention School 18 | 5.48 | 818 | 17.5 | 41.8 | No |
| Intervention School 19 | 5.59 | 432 | 16.9 | 47.9 | No |
| Intervention School 20 | 5.72 | 739 | 12.4 | 30.4 | No |
| Intervention School 21 | 5.85 | 614 | 11.2 | 32.6 | No |
| Intervention School 22 | 5.86 | 633 | 15.8 | 43.4 | No |
| Nonintervention School 1 | 3.60 | 533 | 10.5 | 59.5 | Yes |
| Nonintervention School 2 | 3.97 | 713 | 16.3 | 43.1 | Yes |
| Nonintervention School 3 | 4.19 | 1041 | 14.1 | 34.4 | No |
| Nonintervention School 4 | 4.42 | 692 | 12.9 | 63.3 | No |
| Nonintervention School 5 | 4.56 | 510 | 10 | 52 | Yes |
| Nonintervention School 6 | 4.92 | 627 | 20.3 | 49.1 | No |
| Nonintervention School 7 | 4.93 | 1075 | 11.3 | 46.8 | No |
| Nonintervention School 8 | 4.95 | 648 | 17.6 | 42.9 | No |
| Nonintervention School 9 | 4.96 | 712 | 10.3 | 48.9 | No |
| Nonintervention School 10 | 5.20 | 1236 | 13.7 | 43.4 | No |
| Nonintervention School 11 | 5.38 | 775 | 16.1 | 47.5 | No |
| Nonintervention School 12 | 5.46 | 422 | 13.3 | 39.6 | No |
| Nonintervention School 13 | 5.69 | 115 | 19.1 | 47.8 | No |
| Nonintervention School 14 | 5.89 | 232 | 11.2 | 62.5 | Yes |
| Nonintervention School 15 | 5.97 | 392 | 11 | 51.5 | No |
| Nonintervention School 16 | 6.00 | 1070 | 11.3 | 51.7 | No |
| Nonintervention School 17 | 6.08 | 755 | 11.3 | 24.8 | No |
| Nonintervention School 18 | 6.30 | 1036 | 9.7 | 35.3 | No |
| Nonintervention School 19 | 6.44 | 794 | 8.1 | 13.4 | No |
| Nonintervention School 20 | 6.51 | 708 | 9.6 | 51.4 | No |

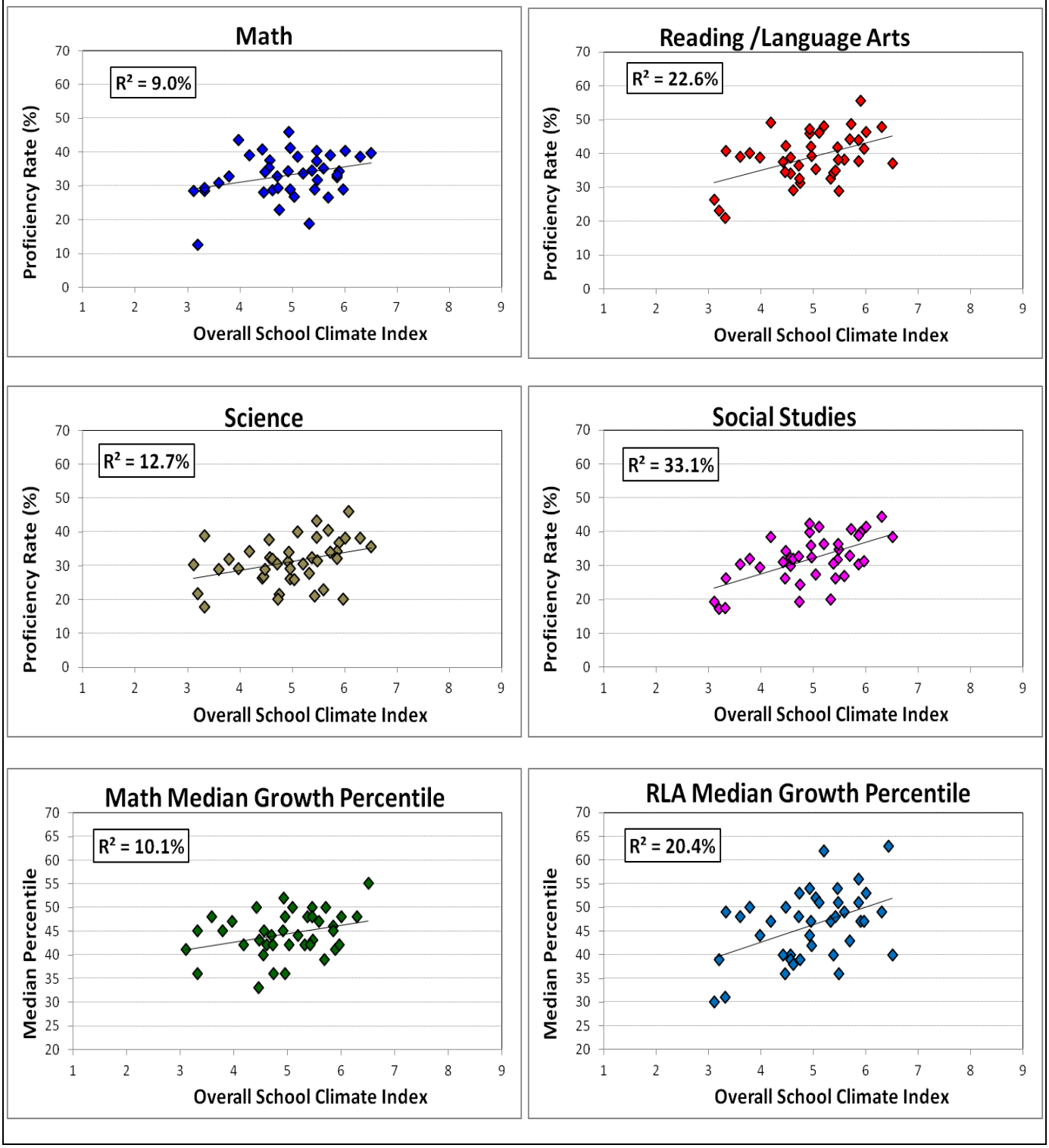
# Appendix B. WV School Climate Index Indicators

Table 8 . Domains, Subdomains, and Indicators Comprising the WV School Climate Index (WVSCI)

| Domain | Subdomain | Indicator | Measures |
|---|---|---|---|
| Engagement | Relationships | Positive relationships at school | 5 |
| | Participation | Respect for racial, ethnic, or cultural diversity | 3 |
| | Respect for diversity | Meaningful participation in school | 4 |
| Safety | Emotional Safety | Lower rates of bullying at school and cyber-bullying anywhere | 4 |
| | | Lower rates of students' reports of avoiding school activities or specific places in school | 2 |
| | | Lower rates of students' reports of being called hate-related words and seeing hate-related graffiti | 2 |
| | | Students' perceptions of personal safety at school | 1 |
| | Physical safety | Lower rates of physical fights on school property | 2 |
| | | Lower rates of students carrying weapons on school property | 1 |
| | | Students' reports of safety and security measures observed at school | 1 |
| | | Lower rates of teachers threatened with injury or physically attacked by students | 1 |
| | | Lower rates of threats and injuries with weapons on school property | 1 |
| | | Lower rates of violent and other crime incidents at school | 1 |
| | Substance use | Lower rates of student use of tobacco/alcohol/drugs on school property | 6 |
| Environment | Physical environment | Teachers' and students' reports on school conditions | 2 |
| | Academic environment | Supportive academic environment | 8 |
| | Wellness | Students' physical or mental health | 5 |
| | Disciplinary environment | Lower rates of discipline problems reported at school | 5 |
| | | Lower rates of reports of gangs at school | 2 |
| | | Lower rates of serious disciplinary actions taken by schools | 1 |

# Appendix C. Bivariate Scatter Plots Between the School Climate Index and Selected Academic Outcomes

**Figure 2. Scatter Plots of 2010-11 School Climate Index Scores and Selected Academic Outcome Measures.**



# Appendix D. Bivariate Correlation Between School Climate Indicators and Selected Academic Outcomes

Table 9. Bivariate Correlation Between Individual School Climate Indicators and School-Level Outcomes.

| Domain/subdomain | | Indicator | Math proficiency rate | RLA proficiency rate | Science proficiency rate | Social studies proficiency rate | Math median growth percentile | RLA median growth percentile |
|---|---|---|---|---|---|---|---|---|
| Engagement | Relationships | Positive relationships at school | 0.137 | **0.487**** | **0.354*** | **0.484**** | 0.119 | 0.228 |
| | Respect for diversity | Respect for racial, ethnic, or cultural diversity | 0.066 | **0.377*** | **0.324*** | **0.350*** | 0.056 | **0.3002** |
| | Participation | Meaningful participation in school | 0.072 | **0.405**** | **0.306** | **0.313*** | -0.030 | 0.160 |
| Safety | Emotional safety | Low rates of bullying at school/ cyber-bullying anywhere | **0.313*** | 0.292 | 0.284 | **0.357*** | **0.391*** | 0.286 |
| | | Low rates of students avoiding school activities/specific places in school | **0.371*** | **0.351*** | -0.002 | **0.450**** | **0.449**** | **0.318*** |
| | | Low rates of students called hate-related words/seeing hate graffiti | 0.133 | 0.131 | 0.113 | 0.169 | 0.288 | **0.318*** |
| | | Students' perceptions of personal safety at school | 0.247 | **0.535**** | **0.419**** | **0.622**** | 0.239 | **0.401*** |
| | Physical safety | Low rates of physical fights on school property | **0.564**** | **0.424**** | **0.431**** | **0.616**** | **0.509**** | **0.533**** |
| | | Low rates of students' carrying weapons on school property | 0.132 | 0.0731 | 0.028 | 0.179 | 0.239 | 0.248 |
| | | Students' reports of safety/ security measures observed at school | 0.219 | 0.016 | 0.013 | 0.273 | **0.323*** | 0.163 |
| | | Low rates of teachers threatened with injury/attacked by students | 0.187 | -0.013 | 0.016 | 0.012 | 0.187 | 0.154 |
| | | Low rates of threats/injuries with weapons on school property | **0.330*** | 0.150 | 0.029 | 0.298 | **0.343*** | 0.285 |
| | | Low rates of violent/other crime incidents at school | 0.036 | 0.089 | 0.217 | 0.114 | -0.170 | 0.168 |
| | Substance use | Low rates of student substance use on school property | -0.032 | 0.144 | 0.281 | 0.231 | -0.006 | -0.003 |
| Environment | Physical environment | Teachers' and students' reports on school conditions | -0.031 | 0.289 | -0.045 | 0.271 | -0.043 | 0.260 |
| | Academic environment | Supportive academic environment | 0.202 | **0.441**** | 0.282 | **0.481**** | 0.157 | 0.242 |
| | Wellness | Students' physical or mental health | 0.043 | **0.378*** | **0.367*** | 0.289 | 0.003 | 0.298 |
| | Disciplinary environment | Low rates of discipline problems reported at school | 0.073 | **0.358*** | 0.294 | **0.364*** | 0.128 | 0.218 |
| | | Low rates of reports of gangs at school | 0.078 | 0.250 | 0.288 | 0.253 | -0.002 | 0.225 |
| | | Low rates of serious disciplinary actions taken by schools | 0.066 | 0.262 | 0.297 | 0.287 | 0.051 | 0.249 |

Moderate to strong correlation coefficients (>0.30) are in bold font.
*. Significant at the 0.05 level (2-tailed). ** Significant at the 0.01 level (2-tailed).

# Appendix E. Bivariate and Multivariate Regression Estimates

**Table 10. Bivariate and Multivariate OLS Regression of the Effect of School Climate on Selected Academic Outcomes.**

| **Dependent variable:** | **Math (percent proficient)** | | | | | |
|---|---|---|---|---|---|---|
| | Bivariate model | | | Multivariate model | | |
| Independent variable[1] | B | SE | β | B | SE | β |
| School Climate Index | 2.82 | 1.18 | 0.300 | 0.318 | 1.381 | 0.042 |
| School size | | | | 0.003 | 0.534 | 0.108 |
| SWD | | | | -0.182 | 0.473 | -0.105 |
| LSES | | | | -0.238 | 0.023 | -0.401 |
| Multiprogrammatic | | | | -1.090 | 0.624 | -0.070 |
| Intercept | 21.93 | 5.88 | | 44.923 | 12.318 | |
| $R^2$ = 9.0% | | | | $R^2$ = 30.3% | | |

| **Dependent variable:** | **Reading/language arts (percent proficient)** | | | | | |
|---|---|---|---|---|---|---|
| | Bivariate model | | | Multivariate model | | |
| Independent variable | B | SE | β | B | SE | β |
| School Climate Index | 4.03 | 1.21 | 0.475 | 2.173 | 1.475 | 0.256 |
| School size | | | | -0.002 | 0.004 | -0.061 |
| SWD | | | | -0.268 | 0.274 | -0.139 |
| LSES | | | | -0.259 | 0.124 | -0.392 |
| Multiprogrammatic | | | | -0.056 | 3.001 | -0.003 |
| Intercept | 19.00 | 6.04 | | 46.167 | 13.154 | |
| $R^2$ =22.6% | | | | $R^2$ =35.9% | | |

| **Dependent variable:** | **Science (percent proficient)** | | | | | |
|---|---|---|---|---|---|---|
| | Bivariate model | | | Multivariate model | | |
| Independent variable | B | SE | β | B | SE | β |
| School Climate Index | 2.694 | 1.133 | 0.356 | 0.28 | 1.299 | 0.037 |
| School size | | | | -0.009 | 0.004 | -0.363 |
| SWD | | | | -0.343 | 0.241 | -0.196 |
| LSES | | | | -0.318 | 0.104 | -0.562 |
| Multiprogrammatic | | | | -0.077 | 2.627 | -0.005 |
| Intercept | 17.80 | 5.693 | | 56.203 | 11.453 | |
| $R^2$ = 12.7% | | | | $R^2$ = 38.6% | | |

**Table 10. Bivariate and Multivariate OLS Regression of the Effect of School Climate on Selected Academic Outcomes, Continued**

**Dependent variable: Social studies (percent proficient)**

| | Bivariate model | | | Multivariate model | | |
|---|---|---|---|---|---|---|
| Independent variable | B | SE | β | B | SE | β |
| School Climate Index | 4.675 | 1.079 | 0.575 | 2.690 | 1.240 | 0.331 |
| School size | | | | 0.000 | 0.003 | 0.020 |
| SWD | | | | -0.391 | 0.230 | -0.211 |
| LSES | | | | -0.196 | 0.104 | -0.309 |
| Multiprogrammatic | | | | -2.078 | 2.522 | -0.124 |
| Intercept | 8.89 | 5.391 | | 34.299 | 11.054 | |
| $R^2$ = 33.1% | | | | $R^2$ = 50.9% | | |

**Dependent variable: Math growth (median percentile)**

| | Bivariate model | | | Multivariate model | | |
|---|---|---|---|---|---|---|
| Independent variable | B | SE | β | B | SE | β |
| School Climate Index | 1.789 | 0.88 | 0.318 | 1.207 | 1.082 | 0.214 |
| School size | | | | 0.002 | 0.003 | 0.104 |
| SWD | | | | -0.135 | 0.200 | -0.110 |
| LSES | | | | -0.078 | 0.092 | -0.174 |
| Multiprogrammatic | | | | -0.398 | 2.182 | -0.034 |
| Intercept | 35.43 | 4.43 | | 43.126 | 9.556 | |
| $R^2$ = 10.1% | | | | $R^2$ = 17.9% | | |

**Dependent variable: Reading/language arts growth (median percentile)**

| | Bivariate model | | | Multivariate model | | |
|---|---|---|---|---|---|---|
| Independent variable | B | SE | β | B | SE | β |
| School Climate Index | 3.718 | 1.193 | 0.451 | 1.000 | 1.461 | 0.126 |
| School size | | | | -0.001 | 0.004 | -0.053 |
| SWD | | | | 0.002 | 0.271 | 0.001 |
| LSES | | | | -0.188 | 0.128 | -0.292 |
| Multiprogrammatic | | | | -4.152 | 2.980 | -0.255 |
| Intercept | 27.82 | 5.986 | | 52.322 | 13.192 | |
| $R^2$ = 20.4% | | | | $R^2$ = 29.3% | | |

[1] Independent Variables: Students with disabilities (SWD); Low socio-economic status (LSES – i.e., free/reduced meal participation); School size (i.e., second month enrollment headcounts); Multiprogrammatic school (i.e., stand alone high school vs. elementary/middle and high school combined).

# Appendix F. Potential Cumulative Proficiency Rate Improvement Estimates

Table 11. Estimated Potential Proficiency Rate Gains Through Enhanced School Climate Conditions.

| S3 Grant involvement | Math proficiency | RLA proficiency | Science proficiency | Social studies proficiency |
|---|---|---|---|---|
| Intervention School 1 | 2.62 | 12.84 | 9.28 | 8.30 |
| Intervention School 2 | -0.01 | 9.21 | 9.31 | 10.97 |
| Intervention School 4 | 2.30 | 15.06 | 32.17 | 7.64 |
| Intervention School 5 | 5.75 | 14.43 | 26.69 | 7.12 |
| Intervention School 6 | 2.89 | 13.09 | 8.35 | 10.09 |
| Intervention School 7 | 3.97 | 17.77 | 21.05 | 9.60 |
| Intervention School 8 | 4.13 | 8.65 | 24.18 | 4.20 |
| Intervention School 9 | -0.20 | -2.35 | 20.72 | -1.29 |
| Intervention School 10 | 6.92 | 9.10 | 21.23 | 9.62 |
| Intervention School 12 | -2.50 | 9.66 | 17.27 | 6.97 |
| Intervention School 13 | 3.78 | 13.02 | 18.41 | 6.01 |
| Intervention School 14 | 0.65 | 13.75 | 32.66 | 12.06 |
| Intervention School 15 | -2.83 | 5.89 | 0.32 | -4.44 |
| Intervention School 16 | 1.51 | 5.05 | 14.77 | 3.92 |
| Intervention School 17 | 11.66 | 11.39 | 34.10 | 10.19 |
| Intervention School 18 | -0.27 | 3.59 | 21.54 | 6.07 |
| Intervention School 19 | 8.12 | 6.85 | 17.49 | 3.72 |
| Intervention School 20 | 8.99 | 30.45 | 25.75 | 9.33 |
| Intervention School 21 | 8.54 | 13.73 | 21.68 | 11.70 |
| Intervention School 22 | 4.51 | 14.01 | 24.09 | 12.00 |
| Nonintervention School 1 | 5.89 | 19.22 | 8.08 | 11.92 |
| Nonintervention School 2 | -0.89 | 12.96 | 7.53 | 4.67 |
| Nonintervention School 3 | 5.91 | 13.28 | 24.53 | 8.02 |
| Nonintervention School 4 | 5.22 | 11.09 | 20.28 | 3.23 |
| Nonintervention School 5 | 1.70 | 5.22 | 12.51 | 4.02 |
| Nonintervention School 6 | 2.12 | 16.70 | 22.47 | 4.97 |
| Nonintervention School 7 | 5.65 | 11.55 | 24.01 | 10.91 |
| Nonintervention School 8 | 1.19 | 5.90 | 15.45 | 7.94 |
| Nonintervention School 9 | -6.96 | 3.05 | 20.14 | -0.91 |
| Nonintervention School 10 | 6.67 | 16.71 | 22.41 | 12.20 |
| Nonintervention School 11 | 5.99 | 9.58 | 24.84 | 4.55 |
| Nonintervention School 12 | 2.54 | 12.14 | 29.53 | 4.99 |
| Nonintervention School 13 | -6.09 | 3.40 | 33.34 | 0.97 |
| Nonintervention School 14 | -1.98 | 10.65 | 16.29 | 6.57 |
| Nonintervention School 15 | -3.02 | 8.84 | 13.30 | 6.73 |
| Nonintervention School 16 | 4.06 | 6.19 | 26.89 | 3.70 |
| Nonintervention School 18 | 4.04 | 9.54 | 25.07 | 7.66 |
| Nonintervention School 20 | n/a | n/a | n/a | n/a |

Notes: Estimates were derived by adding actual proficiency rate gains from 2010 to 2011 to estimated proficiency gains achieved through improving school climate conditions to those of Nonintervention School 20 (WVSCI = 6.51).

Negative values indicate that the 2010 to 2011 proficiency gains were negative and of a sufficient magnitude to nullify positive impact projected under the improved school scenario.

Four schools were omitted because they were new in 2011 so had no previous year proficiency rate gains or were identified as statistical outlier values and thus were excluded from the regression analyses on a listwise basis.

GLOBAL21

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West Virginia Department of EDUCATION

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