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Examination of Substance Use, Risk Factors, and Protective Factors on Student Academic Test Score Performance

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Abstract

BACKGROUND—School administrators and teachers face difficult decisions about how best to use school resources in order to meet academic achievement goals. Many are hesitant to adopt prevention curricula that are not focused directly on academic achievement. Yet, some have hypothesized that prevention curricula can remove barriers to learning and, thus, promote achievement. This study examined relationships between school levels of student substance use and risk and protective factors that predict adolescent problem behaviors and achievement test performance in Washington State.

METHODS—Hierarchical Generalized Linear Models were used to examine predictive associations between school-averaged levels of substance use and risk and protective factors and Washington State students' likelihood of meeting achievement test standards on the Washington Assessment of Student Learning, statistically controlling for demographic and economic factors known to be associated with achievement.

RESULTS—Results indicate that levels of substance use and risk/protective factors predicted the academic test score performance of students. Many of these effects remained significant even after controlling for model covariates.

CONCLUSIONS—The findings suggest that implementing prevention programs that target empirically identified risk and protective factors have the potential to positively affect students' academic achievement.

Keywords

risk factor; protective factor; academic achievement; test scores; prevention

School administrators and teachers have had to decide how to allocate school and classroom resources to meet target goals for academic achievement. Some have suggested that schools should pay more attention to nonacademic factors that act as “barriers to learning” in order to improve students' academic success,¹ and some have argued that schools should promote the development of students' social and emotional skills through the use of curricula focused on the development of these skills as a foundation for successful academic development.^{2,3} Yet, many administrators and teachers have been reluctant to invest time and resources in curricula and programs focused on broader issues of social and emotional development that they do not view as directly linked with improving test scores,^{3,4} or have focused on increasing classroom instructional time devoted to reading, writing, and mathematics in order to improve students' performance in these areas, thereby limiting the amount of classroom time spent on other topics.

With an increased focus on improving achievement test scores, a central question has reemerged. What factors influence the test scores of students in schools? Starting with the Coleman Report,⁵ commissioned by Congress as part of the Civil Rights Act of 1964 to investigate possible inequality in the availability of educational opportunities to students by reason of race, color, religion, or national origin, 40 years of research has examined the

effects of schooling on students' academic achievement. Early studies^{5,6} concluded that schools had relatively little influence on student performance. More recent studies have concluded that school characteristics and teaching practices are related to students' test scores, but that the majority of the variation in test scores is explained by student characteristics.⁷⁻⁹

Numerous studies have investigated relationships between demographic characteristics and academic achievement. For example, lower test scores have been found among lower socioeconomic groups.^{8,10-13} Differences in test scores between boys and girls have been found to depend on grade level, and girls in this study performed better on achievement tests prior to high school, but boys overtook girls at higher grade levels.¹⁴⁻¹⁶ And while studies often have shown that white and Asian students outperform African American, Hispanic, and Native American students on achievement tests,¹⁷⁻¹⁹ differential exposure to poverty and other risk and protective influences accounted for much of this disproportionality.²⁰⁻²²

Some studies have examined the impact of students' involvement in substance use on achievement test scores. A number of studies have reported that students who use substances are more likely to fail academically²³⁻²⁵ and to drop out of school.²⁶⁻²⁸ Students who initiated alcohol and cigarette use early in life were at higher risk of school failure, poor academic achievement, and school dropout,^{23,29} and students who reported even moderate involvement with substance use had poorer achievement test scores.³⁰ The theoretical linkages between student drug use and poor academic achievement are complex; however, they can be generalized into three types of explanations:³¹ (1) both behaviors share common prior causes; (2) educational success protects against drug use; and (3) drug use inhibits educational success through mediators such as poor school bonding,³² cognitive impairment,³³ and poor self-regulatory and coping skills.³⁴

Other factors likely to influence students' achievement test scores are environmental factors and individual characteristics that predict adolescents' involvement in an array of problem behaviors such as delinquency, violence, substance use, teen pregnancy, and school dropout.³⁵⁻³⁸ Risk factors increase the likelihood that adolescents will engage in one or more of these problem behaviors, while protective factors dampen the effects of risk factors on these behaviors. Longitudinal studies of child and adolescent development have identified a number of risk and protective factors.³⁹⁻⁴¹ Most of these studies have not investigated relationships between these factors and achievement test scores. However, Fleming et al.²⁹ found that higher levels of school bonding and better social, emotional, and decision-making skills predicted higher test scores 3 years later.

While the relevance of these risk and protective factors for efforts to reduce adolescent problem behaviors and promote positive youth development has been well established,^{39,42-44} relationships between the prevalence of these factors in school populations and the achievement test scores of students have not been examined thoroughly. Thus, the relevance of universal school-based prevention activities aimed at reducing risk and enhancing protection in the student population for efforts to improve students' achievement test scores is not well known. Schools are the primary domain by which drug prevention programs are delivered to students.⁴⁵ Identifying aggregate levels of risk and

protection in schools and communities has been shown to be a viable strategy for diagnosing local prevention needs.⁴⁶ This study examined relationships between the prevalence rates of substance use, risk factors, and protective factors in schools and the likelihood of students in those schools meeting standards for achievement on the reading, writing, and mathematics tests of the Washington Assessment of Student Learning (WASL). Specifically, we report findings from an analysis of 10th-grade students to assess relationships between school levels of substance use, risk, and protection, measured in the fall by the Washington State Healthy Youth Survey, and the likelihood of the same students meeting the academic standards established for the WASL the following spring. We examined (1) unconditional models examining bivariate relationships between measures of the prevalence of substance use, risk factors, and protective factors and WASL scores without statistically controlling for covariates; and (2) conditional models controlling for the effects of covariates, which show effects that are independent of demographic and economic characteristics of students, schools, and school districts.

METHODS

Data Sources and Measures

Data for this study came from four different sources and were merged to create the analysis data sets. Measures of academic achievement and demographic characteristics of students came from the spring 2003 administration of the WASL, supplied by the Washington State Office of Superintendent of Public Instruction (OSPI). The WASL is a series of tests first administered in 1997 and designed to assess students' academic proficiency in reading, writing, mathematics, and science.

Although the WASL data were provided at the individual level, no student-specific identifiers were included. Individual-level data also included students' grade level, biological sex, race, ethnicity, special education status, a school-building code, and a school district code. The outcome variables used in the analyses consisted of three dichotomous measures of reading, writing, and mathematics achievement, indicating whether or not a student met the grade-specific performance standards in accordance with the State of Washington Essential Academic Learning Requirements. Student characteristics included in the analyses as covariates were biological sex, coded female = 1 vs. male = 0; race, coded white = 1 vs. non-white = 0; ethnicity, coded Hispanic = 0 vs. non-Hispanic = 1; and whether or not the student was in a special education class. Not enough schools in Washington State had sufficient proportions of students from African American, Asian American, and Native American groups to include these characteristics as covariates in the analyses.

Aggregated school rates of substance use, risk, and protection, along with the same school codes used in the WASL dataset, were obtained from the fall 2002 administration of the Washington Healthy Youth Survey, which is a collaborative effort of the Washington State Office of Superintendent of Public Instruction, the Department of Health, the Department of Social and Health Service's Division of Alcohol and Substance Abuse, the Family Policy Council, and Community Trade and Economic Development. Substance use measures included the proportions of students in each school who reported using cigarettes, alcohol, and marijuana during the past month. Risk and protective factor measures in the Washington

Healthy Youth Survey were derived from the Communities That Care Youth Survey,⁴⁷ a validated and widely used instrument designed for research and prevention programming.^{48–50} Risk and protective factor measures represented the proportion of students in each school who were above the cut point for each of 16 risk factors and seven protective factors representing community, school, family, and student/peer domains. Table 1 provides a description of these risk and protective factors. Cut points were derived by identifying scores on each factor that optimally discriminated between youths engaged in problem behaviors and those who reported only positive behaviors,⁵¹ and have been found to exhibit predictive validity with external criteria.⁵² To facilitate interpretation of the findings, school prevalence rates of substance use and risk and protective factors were scaled in increments of 5 percentage points. Thus, findings are reported in terms of the increase in the percentage of students meeting the WASL standards for each 5% difference in the school-level prevalence of use of each substance, and of each individual risk or protective factor.

Additional data related to the characteristics of schools and school districts were obtained from the OSPI website (<http://reportcard.ospi.k12.wa.us/DataDownload.aspx>). Preliminary analyses found that the percentage of students in a school that received free or reduced-price lunch was, by far, the strongest school-level characteristic predicting achievement test scores; therefore, this school-building covariate was included in the analyses. District-level data were available from the 2002–2003 General Fund Expenditures, Revenue, and Ending Total Fund Balance Report (<http://www.k12.wa.us/safs/PUB/FIN/0203/GFExpReve.pdf>). District-level covariates included in the analyses were (1) total student enrollment and (2) per-pupil expenditures.

Participants

Linking student-level WASL data with school-level and district-level data, using the school and district codes in each data set, resulted in analysis samples of $N = 46,713$, $N = 46,743$, and $N = 46,887$ 10th-grade students for reading, writing, and mathematics outcomes, respectively. All three of these samples were nested within 237 schools and 171 school districts. These formed the analysis samples for the unconditional models without school-level predictors. Inclusion of the percentage of students eligible for free or reduced-price lunch reduced the analysis samples to $N = 41,393$ for reading outcomes, $N = 41,424$ for writing outcomes, and $N = 41,556$ for mathematics outcomes; 10th-grade students were nested within 201 schools and 156 districts. These comprised the analysis samples for the conditional models.

To assess the external validity of findings from analyses of the resulting samples, we compared the student and school characteristics of the analysis samples for the unconditional models to the statewide data on students and schools. Results indicated that students in the analysis samples were very similar to the statewide student population in terms of the proportions of students passing each section of the WASL, males and females, whites and non-whites, Hispanics and non-Hispanics, and students receiving special education. The school districts included in the analysis samples had slightly higher levels of per-pupil expenditures and enrollments than school districts statewide, suggesting that very

small school districts were somewhat underrepresented in the analysis samples. Overall, however, the schools included in the analysis appeared to mirror the characteristics of Washington State schools quite closely.

Data Analysis

To address the hierarchical nature of the data, we used a Hierarchical Generalized Linear Model⁵³ which decomposed the variability in the outcome variables across the three levels: students, schools, and districts, and allowed for examination of predictor variables at each level. A logit-link function was used to model the binary outcomes of either meeting or failing to meet the academic standard for each respective section of the WASL. Thus, the level 1 model represented the regression of students' log-odds of meeting the academic standard, conditional on student characteristics. Variables included in the conditional level 2 model assess the effects of school-level predictors of percentage of students receiving free or reduced-price lunch and prevalence of substance use, risk factor, or protective factor on a student's likelihood of meeting the academic standard. Because the school-level predictor variables were scaled in increments of 5% prevalence rates, regression coefficients relate the increase in the log-odds of meeting a WASL standard to a 5% reduction in the percentage of students receiving free or reduced-price lunch, a 5% reduction in the prevalence of a substance use variable or risk factor, or a 5% increase in the prevalence of a protective factor. Standard errors associated with the regression coefficients represent robust standard errors. The level 3 model assessed the effects of the district-level covariates of total district expenditures per pupil and total district student enrollment on the log-odds of meeting the academic standard. For interpretability of level 3 covariate effects, both level 3 variables were grand-mean centered. Additionally, per-pupil expenditures were log-transformed to improve the normality of its distribution.

Effects of the relationships between predictor variables and outcomes were obtained by computing unadjusted and adjusted odds ratios. For individual-level covariates, odds ratios indicated the increased likelihood of meeting the WASL standards given the student characteristic in question. For school-level predictor variables, odds ratios indicated the increased likelihood of meeting the WASL standard given a 5% reduction in the percentage of students receiving free or reduced-price lunch, a 5% reduction in the prevalence of a substance use variable or risk factor, or a 5% increase in the prevalence of a protective factor. All statistical tests were conducted using a .05 type I error rate.

RESULTS

Results for 10th-grade reading, writing, and mathematics achievement outcomes are presented in Tables 2, 3, and 4, respectively. Each table presents unstandardized regression coefficients (B), standard errors (SE), probability values for associated t-tests (p), and odds ratios. Results of the unconditional models in the left set of columns show the bivariate relationships between each predictor variable and achievement outcomes without statistical control for covariates or other predictor variables. Results of the conditional models in the right set of columns demonstrate the relationship between each school-level predictor

variable and achievement outcome, statistically controlling for covariate effects. All covariates were entered simultaneously in the conditional models.

Analysis of Student, School, and District Covariates

First, we examined the extent to which students' demographic characteristics, school characteristics, and district characteristics predicted student academic achievement outcomes. Student characteristics were strong predictors of meeting WASL standards, with the exception that biological sex did not predict math success. Across reading, writing, and mathematics outcomes, white students were 48% to 55% more likely to meet the WASL standards than non-white students; non-Hispanic students were over twice as likely to meet the WASL standards as Hispanic students; and special education students were between 15 to 20 times less likely to meet the WASL standards than students attending regular classes. Female students were 49% more likely than male students to meet the standard on the reading section of the WASL and approximately twice as likely to meet the standard on the writing section of the WASL. With regard to school characteristics, students in schools where greater proportions of students were receiving free or reduced-price lunch were less likely to meet the WASL standards, with the likelihood decreasing by 6% to 8% for every 5% increase in the percentage of students receiving free or reduced-price lunches. With the inclusion of student- and school-level covariates in the models, district-level characteristics were not significantly related to the achievement outcomes.

Analysis of Substance Use Predictors of Student Achievement

Across all 10th-grade academic achievement outcomes, school-level rates of 30-day alcohol, marijuana, and cigarette use were associated negatively with the likelihood of students' meeting WASL academic standards. Unadjusted odds ratios associated with these effects ranged from 1.11 for prevalence of 30-day marijuana use predicting reading achievement to 1.17 for prevalence of 30-day cigarette use predicting mathematics achievement. Thus, for each 5% increase between schools in the prevalence of drug use, students were, on average, 11% to 17% less likely to meet the standards on the WASL. Adjusted odds ratios from the conditional models, controlling for the demographic and economic variables, were slightly smaller, ranging from 1.09 to 1.14 for the same achievement outcomes and substances. This indicated an average 9% to 14% decrease in the likelihood of a student's meeting a WASL standard for every 5% increase in the prevalence of substance use among 10th-grade students across schools after controlling for the variation associated with students' demographic and schools' economic characteristics.

Analysis of Risk and Protective Factor Predictors of Student Achievement

Results of unconditional models examining the relationship between each risk factor and individual achievement test outcomes revealed that almost all of the 16 risk factors examined were significantly negatively associated with 10th-grade reading, writing, and mathematics achievement test outcomes. Unadjusted odds ratios corresponding to significant risk factors ranged from 1.04 to 1.10 for reading, 1.05 to 1.11 for writing, and 1.06 to 1.15 for mathematics outcomes. These values indicated an average 4% to 15% decrease in a 10th-grade student's likelihood of meeting a WASL standard given a 5% increase in the prevalence of a single risk factor reported by 10th graders in that school.

In the conditional models, the majority of risk factors were still significantly associated with the achievement outcomes. With student- and school-level covariates in the models, adjusted odds ratios from the conditional models were slightly smaller than those from the unadjusted models; that is, adjusted odds ratios from the conditional models ranged from 1.04 to 1.08 for reading, 1.04 to 1.09 for writing, and 1.05 to 1.10 for mathematics outcomes.

Examination of the seven protective factors in the unconditional models indicated that five were significantly positively associated with the achievement outcomes. Unadjusted odds ratios from the unconditional models ranged from 1.04 to 1.12, indicating a 4% to 12% increase in an average student's likelihood of meeting a WASL standard given a 5% increase in the prevalence of a protective factor across schools. Four of the seven protective factors examined, Community Recognition for Prosocial Involvement, Family Opportunities for Prosocial Involvement, Family Recognition for Prosocial Involvement, and Student Social Skills, remained significant in the conditional models predicting reading and writing achievement, and 2, Family Opportunities for Prosocial Involvement and Student Social Skills, remained significant in the conditional models predicting mathematics achievement. Adjusted odds ratios from the conditional models ranged from 1.04 to 1.09.

DISCUSSION

The results of these analyses indicate that average levels of substance use and risk and protective factors reported by students in a school predict the academic test score performance of students within that school. These effects remain after controlling for demographic and economic factors that are often related to achievement. These effects were observed not only in unconditional models examining the direct relationships between risk/protective factors and test scores, but also in conditional models accounting for student, school, and district covariates. These findings suggest that student substance use and the risk/protective factors experienced by students within a school population act as important influences on the ability of students in that school to reach targeted levels of academic achievement. Findings from this study also provide evidence for the viability of targeting schools as an important contextual domain for implementing prevention programs. It is notable that the significant risk and protective factors represent the multiple domains of school, community, family, and peer/individual domains. This suggests that schools should partner with communities, families, and youth to raise awareness and address environmental opportunities and supports for the prevention of youth substance use.

The amount of variation in students' test scores predicted by these school levels of risk and protective factors and student substance use was similar in magnitude to other school-level factors, such as the percentage of students eligible for free and reduced-price lunch, that have been more widely studied with regard to effects on achievement.^{7,54} These findings are consistent with the findings from other studies that have linked substance use and various risk and protective factors to academic performance at both an individual^{24,29,55,56} and aggregate group level.³⁰ The findings show that school-building levels of substance use, risk, and protection are related to the achievement test scores of individual students within those schools.

Limitations

These analyses used measures of both predictors: substance use and risk/protective factors, and outcomes: achievement test scores. This was done to provide estimates of the potential improvements in the proportions of students in a school who meet the standards for achievement on the WASL, an important concern of school officials, given modest reductions in the prevalence of substance use and related risk factors or modest increases in protective factors that could be expected from implementation of effective prevention curricula and programs in that school. These are the data that school administrators often use to gauge their progress in meeting the needs of their students; however, it is possible that the nature of the data used in this study, students' use or non-use of marijuana during the past 30 days, restricted the variability in both predictor and outcome measures by dichotomizing the variables at the student level. It has also been noted that achievement test scores are only one measure of student achievement,⁵⁷ and that other measures such as school dropout rates and transfer rates should be considered in evaluating school effects on student achievement.

Additionally, the current study did not measure the degree of evidence-based prevention programming occurring in the participating schools. These data were not available in the administrative data sets used in this study. Prevention science research has identified the role of risk and protective factors as the link between effective programs and youth outcomes. It may be the case that unaccounted implementation of social-emotional learning programs in this study's schools depressed risk and enhanced protection in schools, which may have attenuated the reported predictive relationships between schools' levels of risk/protection and achievement outcomes.

Given the correlational design of this study, the findings do not indicate whether the levels of substance use and risk and protection in a school building exert a causal influence on students' achievement test scores. It is also important to recognize that these analyses examined the effects of substance use and risk and protective factors on academic achievement of students averaged across the schools in the sample. It is possible that the strength of these relationships may vary across schools. That is, the effects of the prevalence of substance use and risk and protection among students may be stronger or weaker in schools where fewer students are meeting the standards for achievement.

Conclusions

This study examined the influence of student substance use and risk and protective factors as contextual variables for student academic success. Findings suggest that curricula and programs that promote the development of social and emotional skills among all students in a school may also influence the academic performance of students in that school. These findings also support the idea that social and emotional development is an important element of school reform efforts designed to promote the academic achievement of all students.^{2,29,58} In sum, the findings from this study indicate that schools may be able to increase the academic test scores of their students by implementing prevention programs that reduce risk, enhance protection, and reduce the prevalence of substance use within their student populations.

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IMPLICATIONS FOR SCHOOL HEALTH

The present findings support the idea that schools are an appropriate venue for curricula and other programs and policies that address the social and emotional development and learning of students.^{2,59} Given these findings, educators may need better access to information about prevention science, including information about risk and protective factors and tested, effective prevention curricula and programs that have been shown to reduce risk and enhance protection among student populations. The results of this study also support the importance of schools monitoring the prevalence of risk and protective factors experienced by their students. Efforts to improve the social and behavioral health and development of students by reducing risk and enhancing protection also may benefit their academic performance, and thus should be an integral part of the monitoring and strategic planning process in schools. Measures of risk and protective factors can and should be used to assist schools and communities to work together to select and implement effective programs to address the elevated risks and depressed protective factors in student populations. These measures also can be used to set performance objectives for school and community prevention efforts, and to monitor progress over time in achieving these objectives.

Human Subjects Approval Statement

This study used non-identified administrative data and was exempt from Institutional Review Board review.

Table 1**Risk and Protective Factor Scales and Example Questions**

Risk Factors	Description
Low neighborhood attachment in the community	Students report that they are not emotionally connected to their neighborhood. <i>Example question: "I'd like to get out of my neighborhood."</i>
Community laws and norms favorable to drug use	Laws regulating alcohol and other drug sales and use are poorly enforced. Further, adults communicate that it is normative or acceptable for minors to use alcohol or other drugs. <i>Example question: "How wrong would most adults in your neighborhood think it is for kids your age to drink alcohol?"</i>
Perceived availability of drugs in the community	Students report that it would be easy for them to obtain cigarettes, alcohol, marijuana, and other illegal drugs. <i>Example question: "If you wanted to get some marijuana, how easy would it be for you to get some?"</i>
Perceived availability of handguns in the community	Students report that it would be easy for them to obtain a handgun. <i>Example question: "If you wanted to get a handgun, how easy would it be for you to get one?"</i>
Poor family management	Parents do not provide clear expectations and rules for their children's behavior; fail to monitor their children's behavior; and/or use inconsistent or excessively harsh or severe punishment when disciplining their children. <i>Example question: "The rules in my family are clear."</i>
Antisocial behavior among familiar adults	There has been a history of problem behaviors (e.g., crime, violence, or alcohol or drug abuse or dependence) among members of the child's family. <i>Example question: "Has anyone in your family ever had a severe alcohol or drug problem?"</i>
Academic failure	Beginning in the late elementary grades (grades 4–6), students who fall behind academically for any reason are at greater risk of drug abuse, school dropout, teen pregnancy, violence, and delinquency. <i>Example question: "Putting them all together, what were your grades like last year?"</i>
Low commitment to school	Factors such as not liking school, spending little time on homework, and perceiving coursework as irrelevant are predictive of drug use, violence, delinquency, and school dropout. <i>Example question: "Now, thinking back over the past year in school, how often did you try to do your best work in school?"</i>
Early initiation of student drug use	Students report that they first used alcohol and other drugs at an early age (prior to the age of 15). <i>Example question: "How old were you when you first smoked marijuana?"</i>
Early initiation of student antisocial behavior	Students report that they initiated violent and delinquent behaviors during childhood. <i>Example question: "How old were you when you first attacked someone with the idea of seriously hurting them?"</i>
Favorable attitudes towards antisocial behavior	Students accept or condone violent and delinquent behavior. <i>Example question: "How wrong do you think it is for someone your age to steal something worth more than \$5?"</i>
Favorable attitudes towards drug use	Students accept or condone alcohol and other drug use by people their age. <i>Example question: "How wrong do you think it is for someone your age to smoke marijuana?"</i>
Intentions to use drugs	Students think it is likely that they will use alcohol and other drugs when they are adults. <i>Example question: "When I am an adult I will smoke marijuana."</i>
Low perceived risks of drug use	Students report that alcohol and other drug use is not likely to cause people harm. <i>Example question: "How much do you think people risk harming themselves (physically or in other ways) if they try marijuana once or twice?"</i>
Friends' use of drugs	Students associate with peers who use alcohol or other substances. <i>Example question: "Think of your four best friends (the friends you feel closest to). In the past year (12 months), how many of your best friends have smoked cigarettes?"</i>
Peer rewards for antisocial involvement	Students report that drug use and delinquent behavior is socially rewarding. <i>Example question: "What are the chances you would be seen as cool if you smoked marijuana?"</i>
Protective Factors	Description
Community recognition for prosocial involvement	Students are recognized by adults in the community for positive participation in community activities. <i>Example question: "My neighbors notice when I am doing a good job and let me know about it."</i>
Family opportunities for prosocial involvement	Opportunities are present for students to participate meaningfully in the responsibilities and activities of their family. <i>Example question: "My parents ask me what I think before most family decisions affecting me are made."</i>

Risk Factors	Description
Family recognition for prosocial involvement	Recognition, praise, and encouragement are provided by parents, siblings, and other family members when the child exhibits healthy behaviors. <i>Example question: "How often do your parents tell you they're proud of you for something you've done?"</i>
School opportunities for prosocial involvement	Opportunities are available for students to participate meaningfully in their classroom and school. <i>Example question: "In my school, students have lots of chances to help decide things like class activities and rules."</i>
School recognition for prosocial involvement	Recognition is given for contributions, efforts, and progress of children in school. <i>Example question: "My teachers praise me when I work hard in school."</i>
Student social skills	Students display more skillful social behaviors, such as social problem-solving, better communication, refusal skills, etc. <i>Example question: "You are at a party at someone's house, and one of your friends offers you a drink containing alcohol. What would you do?"</i>
Student belief in the moral order	Students have a positive belief system of what is "right" or "wrong." <i>Example question: "It is important to be honest with your parents, even if they become upset or you get punished."</i>

Table 2

Predictors of 10th-Grade Reading Achievement

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Level 1 (student)								
Race/ethnicity (white)					0.441	0.060	<.001	1.55
Race/ethnicity (non-Hispanic)					0.703	0.073	<.001	2.02
Biological sex (female)					0.399	0.024	<.001	1.49
Not in special education classes					2.703	0.092	<.001	14.93
Level 2 (school)								
No free/reduced-price lunch					−0.057	0.014	<.001	1.06
No 30-day alcohol use	−0.117	0.018	<.001	1.12	−0.107	0.022	<.001	1.11
No 30-day marijuana use	−0.102	0.022	<.001	1.11	−0.090	0.025	<.001	1.09
No 30-day cigarette use	−0.113	0.013	<.001	1.12	−0.110	0.016	<.001	1.12
Risk factors (absence of)								
Low neighborhood attachment	−0.099	0.018	<.001	1.10	−0.047	0.026	ns	1.05
Community laws and norms favorable to drugs	−0.040	0.019	.032	1.04	−0.029	0.017	ns	1.03
Perceived availability of drugs in the community	−0.055	0.018	.003	1.06	−0.047	0.019	.014	1.05
Perceived availability of handguns in the community	−0.028	0.022	ns	1.03	−0.022	0.024	ns	1.02
Poor family management	−0.039	0.020	ns	1.04	−0.025	0.022	ns	1.03
Antisocial behavior among familiar adults	−0.084	0.014	<.001	1.09	−0.059	0.019	.003	1.06
Academic failure	−0.080	0.019	<.001	1.08	−0.037	0.026	ns	1.04
Low school commitment	−0.028	0.023	ns	1.03	−0.042	0.020	.040	1.04
Early initiation of student drug use	−0.082	0.013	<.001	1.09	−0.073	0.015	<.001	1.08
Early initiation of student antisocial behavior	−0.087	0.013	<.001	1.09	−0.045	0.020	.023	1.05
Favorable attitudes towards antisocial behavior	−0.052	0.020	.010	1.05	−0.016	0.025	ns	1.02
Favorable attitudes towards drug use	−0.059	0.017	<.001	1.06	−0.060	0.019	.002	1.06
Intentions to use drugs	−0.072	0.017	<.001	1.07	−0.068	0.018	<.001	1.07
Perceived risks of drug use	−0.067	0.015	<.001	1.07	−0.055	0.018	.003	1.06
Friends' use of drugs	−0.082	0.013	<.001	1.08	−0.082	0.016	<.001	1.09
Peer rewards for antisocial involvement	0.019	0.020	ns	1.02	0.020	0.021	ns	1.02

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Protective factors								
Community recognition for prosocial involvement	0.059	0.020	.004	1.06	0.057	0.026	.033	1.06
Family opportunities for prosocial involvement	0.067	0.020	<.001	1.07	0.051	0.020	.012	1.05
Family recognition for prosocial involvement	0.065	0.019	<.001	1.07	0.042	0.021	.046	1.04
School opportunities for prosocial involvement	0.043	0.018	.017	1.04	0.014	0.022	ns	1.01
School recognition for prosocial involvement	0.001	0.022	ns	1.00	0.007	0.023	ns	1.01
Student social skills	0.086	0.017	<.001	1.09	0.069	0.021	.002	1.07
Student belief in the moral order	0.020	0.021	ns	1.02	0.009	0.025	ns	1.01
Level 3 (district)								
Per-pupil total expenditures					0.491	0.287	ns	1.63
Number of students in district					<0.001	<0.001	ns	1.00

Note. B = unstandardized regression coefficient. SE = standard error. p = probability. Adj = adjusted (for covariates). ns = nonsignificant; p > .05.

Table 3

Predictors of 10th-Grade Writing Achievement

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Level 1 (student)								
Race/ethnicity (white)					0.392	0.054	<.001	1.48
Race/ethnicity (non-Hispanic)					0.823	0.067	<.001	2.28
Biological sex (female)					0.704	0.026	<.001	2.02
Not in special education classes					2.720	0.094	<.001	15.18
Level 2 (school)								
No free/Reduced-price lunch					−0.078	0.015	<.001	1.08
No 30-day alcohol use	−0.119	0.016	<.001	1.13	−0.113	0.017	<.001	1.12
No 30-day marijuana use	−0.119	0.019	<.001	1.13	−0.118	0.021	<.001	1.12
No 30-day cigarette use	−0.110	0.013	<.001	1.12	−0.109	0.014	<.001	1.11
Risk factors (absence of)								
Low neighborhood attachment	−0.092	0.018	<.001	1.10	−0.046	0.026	ns	1.05
Community laws and norms favorable to drugs	−0.069	0.016	<.001	1.07	−0.062	0.015	<.001	1.06
Perceived availability of drugs in the community	−0.072	0.016	<.001	1.07	−0.074	0.016	<.001	1.08
Perceived availability of handguns in the community	−0.033	0.020	ns	1.03	−0.014	0.021	ns	1.01
Poor family management	−0.047	0.019	.012	1.05	−0.041	0.020	.046	1.04
Antisocial behavior among familiar adults	−0.091	0.012	<.001	1.09	−0.066	0.016	<.001	1.07
Academic failure	−0.096	0.017	<.001	1.10	−0.053	0.023	.022	1.05
Low school commitment	−0.035	0.023	ns	1.04	−0.055	0.019	.005	1.06
Early initiation of student drug use	−0.096	0.011	<.001	1.10	−0.084	0.012	<.001	1.09
Early initiation of student antisocial behavior	−0.104	0.013	<.001	1.11	−0.070	0.016	<.001	1.07
Favorable attitudes towards antisocial behavior	−0.061	0.017	<.001	1.06	−0.029	0.020	ns	1.03
Favorable attitudes towards drug use	−0.071	0.014	<.001	1.07	−0.074	0.015	<.001	1.08
Intentions to use drugs	−0.083	0.014	<.001	1.09	−0.086	0.014	<.001	1.09
Perceived risks of drug use	−0.093	0.012	<.001	1.10	−0.090	0.014	<.001	1.09
Friends' use of drugs	−0.088	0.012	<.001	1.09	−0.089	0.013	<.001	1.09
Peer rewards for antisocial involvement	−0.016	0.018	ns	1.02	−0.038	0.021	ns	1.04

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Protective factors								
Community recognition for prosocial involvement	0.063	0.018	<.001	1.06	0.081	0.024	<.001	1.08
Family opportunities for prosocial involvement	0.078	0.020	<.001	1.08	0.060	0.020	.003	1.06
Family recognition for prosocial involvement	0.071	0.021	<.001	1.07	0.048	0.021	.024	1.05
School opportunities for prosocial involvement	0.053	0.017	.003	1.05	0.039	0.021	ns	1.04
School recognition for prosocial involvement	0.009	0.022	ns	1.01	0.016	0.025	ns	1.02
Student social skills	0.099	0.014	<.001	1.10	0.085	0.016	<.001	1.09
Student belief in the moral order	0.031	0.017	ns	1.03	0.019	0.020	ns	1.02
Level 3 (district)								
Per-pupil total expenditures					0.276	0.238	ns	1.32
Number of students in district					>0.001	>0.001	ns	1.00

Note. B = unstandardized regression coefficient. SE = standard error. p = probability. Adj = adjusted (for covariates). ns = nonsignificant; p > .05.

Table 4

Predictors of 10th-Grade Mathematics Achievement

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Level 1 (student)								
Race/ethnicity (white)					0.397	0.055	<.001	1.49
Race/ethnicity (non-Hispanic)					0.807	0.092	<.001	2.24
Biological sex (female)					0.009	0.024	ns	1.00
Not in special education classes					2.989	0.126	<.001	19.87
Level 2 (school)								
No free/reduced-price lunch					−0.072	0.017	<.001	1.07
No 30-day alcohol use	−0.144	0.022	<.001	1.15	−0.099	0.022	<.001	1.10
No 30-day marijuana use	−0.147	0.023	<.001	1.16	−0.113	0.023	<.001	1.12
No 30-day cigarette use	−0.155	0.018	<.001	1.17	−0.128	0.020	<.001	1.14
Risk factors (absence of)								
Low neighborhood attachment	−0.130	0.021	<.001	1.14	−0.071	0.023	.003	1.07
Community laws and norms favorable to drugs	−0.064	0.021	.003	1.07	−0.048	0.017	.006	1.05
Perceived availability of drugs in the community	−0.074	0.022	<.001	1.08	−0.059	0.020	.004	1.06
Perceived availability of handguns in the community	−0.046	0.025	ns	1.05	−0.030	0.022	ns	1.03
Poor family management	−0.056	0.022	.013	1.06	−0.042	0.023	ns	1.04
Antisocial behavior among familiar adults	−0.106	0.019	<.001	1.11	−0.071	0.019	<.001	1.07
Academic failure	−0.120	0.021	<.001	1.13	−0.064	0.022	.005	1.07
Low school commitment	−0.055	0.021	.010	1.06	−0.079	0.020	<.001	1.08
Early initiation of student drug use	−0.114	0.014	<.001	1.12	−0.093	0.013	<.001	1.10
Early initiation of student antisocial behavior	−0.143	0.013	<.001	1.15	−0.099	0.016	<.001	1.10
Favorable attitudes towards antisocial behavior	−0.081	0.022	<.001	1.08	0.034	0.021	ns	1.03
Favorable attitudes towards drug use	−0.087	0.017	<.001	1.09	−0.079	0.017	<.001	1.08
Intentions to use drugs	−0.097	0.017	<.001	1.10	−0.081	0.016	<.001	1.08
Perceived risks of drug use	−0.096	0.015	<.001	1.10	−0.071	0.017	<.001	1.07
Friends' use of drugs	−0.101	0.017	<.001	1.11	−0.084	0.017	<.001	1.09
Peer rewards for antisocial involvement	0.025	0.021	ns	1.03	0.020	0.019	ns	1.02

Predictor Variable	Unconditional Model				Conditional Model			
	B	SE	p	Odds Ratio	B	SE	p	Adj. Odds Ratio
Protective factors								
Community recognition for prosocial involvement	0.058	0.020	.004	1.06	0.046	0.024	ns	1.05
Family opportunities for prosocial involvement	0.077	0.023	<.001	1.08	0.055	0.021	.009	1.06
Family recognition for prosocial involvement	0.052	0.021	.012	1.05	0.021	0.019	ns	1.02
School opportunities for prosocial involvement	0.053	0.020	.008	1.05	0.024	0.022	ns	1.02
School recognition for prosocial involvement	0.001	0.023	ns	1.00	0.016	0.025	ns	1.02
Student social skills	0.111	0.018	<.001	1.12	0.083	0.017	<.001	1.09
Student belief in the moral order	0.042	0.025	ns	1.04	0.030	0.027	ns	1.03
Level 3 (district)								
Per-pupil total expenditures					0.229	0.306	ns	1.26
Number of students in district					<0.001	<0.001	ns	1.00

Note. B = unstandardized regression coefficient. SE = standard error. p = probability. Adj = adjusted (for covariates). ns = nonsignificant; p > .05).