Student Health Risks, Resilience, and Academic Performance:

YEAR 1 REPORT

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ABSTRACT

The California Department of Education (CDE), through a grant from the Stuart Foundation, funded WestEd to examine the relationship between student academic performance and health-risks and resilience factors (or assets) to shed light on the connections between promoting resilience, reducing health risk behaviors, and improving academic achievement. The study uses data from the 1999-2001 secondary school Academic Performance Index (API), California's annual testing system to measure student academic performance and school progress, and from the California Healthy Kids Survey (CHKS). The CHKS provides local school data on the health-risk factors that research has identified as important barriers to learning among students, including those related to school climate. These barriers include: 1) poor physical health indicators such as exercise and nutrition; 2) alcohol, tobacco, and other drug use, including use at school; and 3) violence, victimization, harassment, and lack of safety at school. In addition, the CHKS assesses school connectedness as well as other environmental and individual assets that research has consistently identified as promoting positive youth development, resilience, and school success.

Overall, the results indicate that these factors are related to school API scores in expected ways. Schools with large percentages of students who engage in risky behavior or are exposed to health risks have lower API scores than other schools. These results hold for three quarters of the health risk/resilience measures that we examined and persist even after controlling for the socioeconomic characteristics of schools. Schools with large proportions of students who engage in high levels of drug use, who use ATOD substances at school or have been offered/sold drugs on school property, who have been threatened or injured with weapons, and who attend schools with high levels of weapon possession exhibit lower API scores than other schools. Those schools that have high percentages of students who engage in moderate physical activity, eat nutritious food and eat breakfast daily, and feel safe and secure at school have higher API scores than other schools. Additionally, schools with large percentages of students who have high levels of external and internal resilience assets have high API scores. External resilience assets provided by schools, families, communities, and peers are positively related to API scores. Internal resilience assets are also positively related to API scores.

Although these findings do not *necessarily* mean that schools can increase academic performance by implementing programs that reduce students' health risk and increase external and internal resilience assets — they certainly suggest that school performance, health risk, and resilience assets are complementary. It is likely that efforts to improve school performance will

be more successful when students have low levels of health risk and high levels of external and internal resilience assets. Policies and practices focusing exclusively on increasing test scores while ignoring the comprehensive health needs of students are almost certain to leave many children behind, and may actually undermine student learning and academic performance in the long run.

EXECUTIVE SUMMARY

Through a grant from the Stuart Foundation, the California Department of Education (CDE) funded WestEd to analyze the relationship between academic achievement and school-level health-risk and resilience factors. Academic achievement was assessed by the 1999-2001 Academic Performance Index (API) scores— a school-level academic performance measure created by CDE to measure and rank schools based on Stanford 9 Achievement Test scores (SAT-9). To analyze how student health-related factors are related to API scores, California Healthy Kids Survey (CHKS) data were used from 1,694 schools with API data that administered the CHKS between spring 1998 and spring 2001. Together, the API data compiled by the state and the CHKS dataset provided a unique opportunity to examine how a wide variety of health-related factors — such as physical health, substance use, the school-safety environment, and youth resilience assets — are related to school-level academic achievement across the diversity of California schools.

Findings from this study reveal that schools with higher percentages of students who are less engaged in risky behaviors such as substance abuse and violence, who are more likely to eat nutritiously and exercise, and who live in relatively asset-rich environments have higher API scores than other schools. These associations between positive health indicators and high API scores hold for three quarters of all the health-related factors that were examined, even after adjusting for socio-demographic factors. Specifically, the results indicate that the following areas of heath risk and resilience are related to API scores:

Physical Activity and Nutrition

We examined the relationship of API scores to weekly physical activity, weekly nutritious intake, and morning fasting (i.e., skipping breakfast).

- California schools with high percentages of students who engage in moderate physical activity and healthy eating have higher API scores than other schools.
- Although physical activity is important and significant, nutrition is more strongly associated with API scores than physical activity.
- Undernourishment and skipping breakfast appear to have the most deleterious consequences for test scores.

Substance Use

Substance use was measured by lifetime and 30-day use of alcohol, tobacco, marijuana, and other drugs; substance use/intoxication on school property; and drug availability.

- California schools with proportionately high numbers of students who engaged in substance use had lower API scores than other schools.
- Substance use and intoxication on school property was more strongly associated with test scores than substance use in general. These differences suggest that substance use at school reflects particularly problematic substance use behavior.
- Perceived drug availability was not related to API scores, but being offered drugs at school was associated with lower scores.

School Safety Environment

The school safety environment was assessed with measures of student violence; weapons possession; harassment because of race, ethnicity, gender, sexual orientation, or disability; property vandalization or theft; and perceived safety at school.

- California schools with high percentages of students who report being threatened with a weapon on school property had lower API scores than other schools, but differences between these schools and others were not as pronounced as might be supposed.
- Weapons possession at school was negatively associated with test scores. As the percentage of students who bring weapons to school increased, API scores declined in a linear, stepwise fashion.
- Perceived school safety was strongly related to API scores. Regardless of socioeconomic makeup, schools with proportionately high numbers of students who perceived that their school is safe had higher API scores than other schools.
- In contrast, schools with high percentages of students who report engaging in physical fights did not exhibit lower API scores than other schools.

Resilience Assets

Both external and internal assets have been found to promote resilience and protect a young person from involvement in health-compromising behaviors were analyzed. External resilience assets (also called developmental supports or protective factors) were measured by asking students about their perceptions of caring relationships, high expectations, and opportunities for

meaningful participation in four environments: school, home, community, and peers. Internal resilience assets assess students' cooperation and communication skills, self-efficacy, empathy, problem solving abilities, self-awareness, and goals and aspirations.

- Caring relationships, high expectations, and opportunities for meaningful involvement in schools, homes, communities, and among peers—were strongly related to API scores.

- The relationships between external resilience assets and test scores held for all but one of the measures used in the analysis. Caring relationships with peers was not related to API scores, but exposure to prosocial peers was strongly related.

- The results for internal resilience assets indicated that the psychological well-being of the student body was strongly related to API scores. Schools with proportionately large numbers of students who are high on internal resilience assets have higher API scores than other schools.

Although these findings do not *necessarily* mean that schools can increase academic performance by implementing programs that reduce students' health risk and increase external and internal resilience assets — they certainly *suggest* that such programs will improve student test scores for many students and that school performance, health risk, and resilience assets are complementary. It is likely that efforts to improve school performance will be more successful among students who have low levels of health risk and high levels of external and internal resilience assets. The results reported here suggest that policies and practices focusing exclusively on increasing test scores while ignoring the comprehensive health needs of students are almost certain to leave many children behind, and may actually undermine student learning and academic performance in the long run.

1. INTRODUCTION

Context

With passage of the federal *No Child Left Behind Act* of 2001, more emphasis than ever before has been placed on statewide accountability systems to assess student academic performance and monitor school improvement. Even prior to the new federal legislation, California has been in the forefront of this national accountability movement. The Public Schools Accountability Act (PSAA) of 1999 created the state's educational accountability system requiring the California Department of Education to annually calculate academic performance and publish school rankings based on student test scores. The Academic Performance Index (API) is the cornerstone of this new accountability system. The purpose of the API is to measure the academic performance and progress of schools. Based on the API, schools are expected to show improvements in student academic achievement by meeting annual growth targets. A school that meets the growth target is eligible for rewards under the Governor's Performance Award Program. These rewards consist of both monetary incentives for schools and cash bonuses for teachers. A school that fails to meet its annual growth target may be identified as needing assistance, financial resources, or even sanctions through the Immediate Intervention/Underperforming Schools Program (IIUSP).

These increased requirements for student performance and accountability have had a far-reaching impact on public education in California. Test score results dominate the educational landscape, influencing everything from administrator and teacher reassignments to real estate prices. Schools, governments, and the public are now engaged in a concerted search for—and debate over—strategies to improve low performing schools.

How do schools engage, motivate, and support students so that they can achieve to their highest potential? If a new principal is struggling to turn around a troubled, low-performing school, what should be done? Of course the implementation of new standards, curriculum, and teaching techniques should always be considered — but not all students will benefit from these academically oriented reforms. A fundamental challenge to improving academic performance is that too many children are coming to school with a variety of health-related problems that make successful learning difficult, if not impossible (Council of Chief State School Officers 1998). Too little attention is being directed toward removing health-related behavioral and environmental barriers to learning and to creating conditions that promote a sense of connectedness to school that is essential for student motivation (Center for Mental Health in

Schools 2000). Evidence is mounting that meeting the basic developmental needs of students—ensuring that they are safe, drug-free, healthy, and resilient—is central to improving their academic performance. Research studies and reviews over the past decade have consistently concluded that student health status and achievement "are inextricably intertwined" (Symons, Cinelli, Janes & Groff 1997; Marx, Wooley & Northrup 1998; Mitchell 2000; Allensworth, Lawson, Nicholson & Wyche 1997). Incorporating health and prevention programs into school improvement efforts can produce positive achievement gains (National Governors Association Center for Best Practices 2000).

On one level the connection between such health risks as poor nutrition, substance abuse, and violent or distressing environments to student motivation to do well in school is intuitive, as these factors adversely impact a student's ability or desire to study, pay attention in class, and attend school. Unfortunately, for too long, educational reformers have viewed school health programs as tangential to their objectives (Symons et al. 1997). The current intensive focus on raising test scores has only exacerbated this neglect. A chorus of complaints is rising about schools not only overlooking the role of these learning support factors but also about cutting back on their health and prevention programs to concentrate more resources on instruction and test taking skills—actions that the health-related research suggests might be counterproductive (Costante 2002). For example, the Learning First Alliance (2001) observed:

> Most readers will not be surprised by the central assertion of this document; that schools which students experience as safe and supportive will be more successful at promoting student achievement and developing such qualities as good character and citizenship. But as obvious and commonsensical as this priority on a safe and supportive learning community may be, it is sometimes slighted. For example while the movement to raise academic standards has rightly focused the nation on improving student achievement, a narrow concentration on higher standards is, in some places, crowding out attention to the fundamental issue of safe and supportive learning communities.

Similarly, in *Facing the Hard Facts in Education Reform*, Barton (2001) laments the lack of attention that has been directed toward the adverse effect of disruptive behavior—such as substance use and drug sales on campus, fighting, and harassment—not only on students' ability to learn and willingness to attend school but also on the school environment, the ability of teachers to teach, and the willingness of adults to enter the teaching profession. This situation "has attracted almost no national attention…and is not addressed in the standards-based reform movement" (p. 10).

Deutsch (2000) expresses concern over the "vexing problems" created by the "evisceration of coordinated school health programs" that is occurring because of the "the distorted argument" that it is justified by "the drive toward better standardized-test scores." School health professionals now find themselves "having to fight for every scrap of funding, every minute of teacher training and curricular time, every ounce of administrative support."

Researchers and health practitioners are not the only ones becoming concerned about this situation. Here are the words of Paul Garcia (2001), a former vice-principal who now is an analyst for his California school district:

> Teachers and administrators struggle daily to meet the emotional, psychological, and sociocultural needs of students. Their students may be troubled, delinquent, affiliated with gangs, or the possessors of unusual, unrecognized talents. The challenge is to address these issues creatively, and at times with great risk, without sacrificing precious school time or losing the focus on academic achievement. It is ironic that in a climate of standards and performance-based testing, these daunting challenges for schools go unnoticed, and the noble efforts toward meeting them, unmeasured… My fear is that too much attention on student outcomes in the narrow context of test scores has discouraged creative approaches to meeting the noncognitive needs of students. Emotional, sociopsychological, and cultural needs have strong implications for student learning… The reform in standards-based education will not come from what we do to students based on test scores—retain, tutor, remediate—but from what we do to foster school cultures that respect and address the noncognitive factors that contribute to student learning.

In part, the lack of recognition of the importance of student health and developmental needs for academic performance may be related to the limitations of research in this area. As Barton (2001:12) observes, "As a matter of science…little has been done to enable us to say precisely which behaviors harm achievement, or how much." Here he echoes Symons et al. (1997:221) lament that "research has yet to confirm a direct, empirical, and irrefutable link between comprehensive school health programs and academic achievement." Although suggestive, much of the prior research has used small samples or looked at only one specific aspect of the overall problem (e.g., the relationship of substance abuse to student grades). Research often only establishes that a correlation exists without addressing the question of what is the cause of the relationship. More attention needs to be focused on elucidating how and why these links occur and on demonstrating that programs that increase health and reduce health risks also improve academic achievement.

To help fill this information gap and shed further light on this important issue, the California Department of Education, through a grant from the Stuart Foundation, funded WestEd to analyze the relationship of API scores to student health risk and resilience factors as measured by the state-sponsored ***California Healthy Kids Survey (CHKS)***. California has not only been in the forefront of the movement for assessment and accountability of academic achievement, but also of health-related behaviors. As discussed in more detail in the next section of the report, the CHKS is a comprehensive student self-report assessment tool for monitoring the school environment, student health risks, and student resilience assets. The CHKS provides data to assess and track health risks and problem behaviors that research has identified as ***important barriers to learning*** among students, including those related to school climate. These non-cognitive barriers include:

- Physical health indicators that have been linked to achievement, such as nutrition and exercise.
- Chronic alcohol, tobacco, and other drug use, including use of these substances at school.
- Violence, victimization, and harassment at school (including carrying weapons).

The CHKS also assesses ***school connectedness*** as well as other environmental assets that research has consistently identified as promoting positive youth development and school success. It provides data on:

- The degree to which youth have caring relations with adults, are held to high positive expectations, and are given opportunities for meaningful participation in the school, as well as in the home and community.
- The individual resilience assets of cooperation and communication, empathy, problem-solving, self-efficacy, self-awareness, and achievement or goal motivation among students.

No Child Left Behind of 2001 now requires that all local and state educational agencies receiving federal Safe and Drug-Free Schools and Communities (Title IV) funds regularly assess and report progress in reducing the prevalence of substance use, violence, and associated risk factors among students. The California Department of Education (CDE) funded the development of the CHKS in 1997 and made it available to every school district in the state beginning in the spring of 1998. The CHKS was designed as a tool for local use—to provide data needed to guide local decisions regarding health and prevention programs and policies, and then to monitor progress in meeting those goals. CDE provided support for every school district to

conduct the survey every two years. The survey itself was not mandated, except for schools that received state tobacco use prevention education grants. However, the state did require school districts to conduct some assessment of student substance use and violence at least every two years to be in compliance for Title IV funding. As a result, participation has been widespread, as delineated in the Methods section.

Together, the API data compiled by the state and the CHKS provide a new opportunity to examine the relationship of a wide range of health-risk and resilience measures to high-stakes state achievement test scores across the majority of California's highly diverse schools. In this report, we advance the understanding of health-achievement connections by summarizing the results of a school-level analysis of the aggregated CHKS dataset and API scores for the 1998-1999, 1999-2000, and 2000-2001 school years. The findings from this study corroborate years of research from various social science disciplines demonstrating a strong relationship of academic success to good nutrition, exercise, asset-rich environments, and low levels of substance use and violence.

Report Organization

This report is divided into six parts: methods, physical activity and nutrition, substance use, school safety environment, resilience assets, and conclusion. The methods section describes the data, measures, and analytic strategies used, as well as the limitations of the study. Health risks are covered in three separate sections: physical health, substance use, and the school safety environment. Each provides highlights from previous research, descriptions of variables used from the CHKS, and then the results from the CHKS-API analyses. This format is also the structure of the resilience section, which focuses specifically on external and internal resilience assets and their relationship to API scores. The last section—the conclusion—offers a summary of findings and policy implications.

Each section is designed to stand alone, so that it may be separately copied for audiences with specific interests. Tables provide all of the results—both unadjusted and adjusted results. The adjusted results are based on analyses that statistically control for socioeconomic and demographic differences across schools. Statistically significant results for key variables are also presented graphically at the end of each section (see Methods).

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2. METHODS

Data

The data that are the basis of this report come from two sources: (1) aggregated health-risk and resilience data from local school administration of the California Healthy Kids Survey (CHKS); and (2) the Academic Performance Index research files (1999, 2000, and 2001) released by the CDE.

California Healthy Kids Survey

As described more fully in the Introduction, the CHKS is a repeated cross-sectional, self-report survey that the California Department of Education has made available to all the state's school districts since spring 1998 as part of CDE's accountability system, with the recommendation that it be administered biennially. It assesses all major areas of health-related risk and resilience factors. The survey was designed to meet the local needs of school districts in promoting comprehensive school health and youth development programs and in assessing and monitoring progress in ameliorating student violence; use of alcohol, tobacco, and other drugs; and other behaviors harmful to health. Although to date the survey has only been mandated for districts that receive state categorical grant funding (such as high school Tobacco Use Prevention Education funding), it has been adopted by the great majority of California secondary schools, enabling a school-level analysis of the results in relation to API scores. Starting in the 2003-04 school year, administration of the CHKS will be mandated for all local education agencies that receive Title IV funds.

Survey Methodology

The CHKS is anonymous and confidential — student participation is voluntary and requires written parental consent. For districts that administer the CHKS, the California Department of Education requires that each district conduct a representative survey of 7th-, 9th-, and 11th-grade students in comprehensive schools.[1] In districts with 900 or fewer students per grade, which is the case in 85 percent of the districts in the state, all students in those grades are surveyed. In larger districts, 900 students per grade are randomly selected from required classes. If there are

[1] There is also a 5th-grade version of the CHKS. It was not included in the analysis because it was introduced after the secondary school survey and is not required. Thus there were data from fewer schools. Also, the items differ from the secondary survey, although they assess many of the same phenomena. The 5th-grade survey will be required as part of the new mandate starting in the 2003-04 school year.

over 10 schools per grade in the district, a minimum of 50 percent of schools are randomly sampled (Los Angeles Unified School District had different requirements due to its large size). Thus, the CHKS was designed to be representative of students in the district, but not necessarily representative of students in the state. However, comparisons between the CHKS and the 2001 California Student Survey (CSS), which is designed to be representative of students in the state, showed very few differences in estimates of substance use and attitudes.

Content

The survey is built around a general Core Module (A), required of all districts, and five optional supplements. The required core module assesses demographic information and health risks relating to the use of alcohol, tobacco, and other drugs, school violence, physical health, and mental health. Five topic-specific subject modules (and one customizable module) are used at the discretion of the school districts. Three of these supplementary modules provide more detailed information about subjects also covered by the Core Module, such as tobacco use (Module C); alcohol use, other drug use, and violence (Module D); and nutrition, physical activity, and general health (Module E). The CHKS also contains a module assessing sexual behavior, pregnancy, and HIV risk (Module F) and a Resilience and Youth Development Module (Module B-RYDM), which assesses external and internal assets associated with risk behavior protection and positive youth development.[2] The current analysis relied on the Core and RYDM questionnaire data. Most of the items used in the Core Module were derived from the biennial California Student Survey (Skager & Austin 1998) and the Youth Risk Behavior Survey sponsored by the Centers for Disease Control. The RYDM was developed by WestEd researchers. For more details about the CHKS, see WestEd (2002) and the Healthy Kids Survey website (www.wested.org/hks).

Current Data

The CHKS data were collected from 607,000 students in grades 7, 9, and 11 between spring 1998 and spring 2001 in 65% (688/1,055) of the school districts in California—representing approximately 85% of the district enrollment in the state. The survey was administered in approximately 75% (2,528/3,364) of secondary schools during this time period, with an average student response rate of about 52 percent. The response rate was adversely affected by problems

[2] The modules were reordered in the 2002-03 school year with the RYDM changed to Module B, to encourage its use with the Core Module A to provide a basic assessment of risk and resilience.

at many schools in monitoring and ensuring that written consent forms were distributed to and returned from parents. Parents and/or students infrequently refused to participate.

Academic Performance Index Research Files

The second source of data comes from the 1999-2001 Academic Performance Index research files released by CDE. These are the school-level API Data Files. These API databases contain a wealth of school-level testing and demographic information—including the raw score of the API, percentages of students in racial/ethnic categories enrolled in the school, the percentage of students receiving subsidized meals, the percentage of English language learners (ELL), and the educational level of the parents in the school. The API is a school level index that is based on student performance on the Stanford 9 Achievement Test (SAT-9).

Analytic Sample

To create the data set used in the analysis, the CHKS was converted to a school-level database by aggregating individual student responses within schools—with each observation representing a school and each variable in the data representing the school-level average of each item asked in the Core and RYDM Modules. After dropping elementary schools and nontraditional secondary schools (e.g., continuation schools) from the school-level data set, the data were merged with the API databases. Elementary schools were excluded from the analyses because the elementary survey assesses health risk and resilience differently than the secondary survey. This new database allows examination of how alcohol, tobacco, or other drug use (ATOD), violence, physical health, youth assets, and other health-related factors at the school level are related to a school's academic performance. If a school administered the CHKS more than once, the most recent data prior to fall 2001 was used. Schools that lacked API scores (e.g., they were not calculated for schools with low enrollments) were eliminated from the final analytic sample. The final analytic sample consisted of 1,694 secondary schools with Core Module data and 636 schools with RYDM data. The 1,694 schools in the analytic sample consisted of 961 middle schools, 234 schools with 7^{th}-12^{th} graders, and 499 high schools.[3]

[3] Five percent of the schools (78) in the analytic sample most recently (prior to fall 2001) administered the CHKS in 1998, 34% (581) in 1999, 30% (512) in 2000, and 31% (523) in 2001.

Measures

Academic Performance

As discussed above, school-level academic performance was assessed by 1999-2001 API scores. The API ranges from 200-1000, with a score of 490 indicating a low performing school, 650 indicating an average performing school, and 800 indicating a high performing score. The 1999-2001 API is a school-level, summary measure for California schools based on the national percentile ranking of student scores on the Stanford 9 Achievement Test (SAT-9). In 2001 and later cycles, API scores have been calculated using a number of other indicators, including California standards-based test scores in Language and Mathematics and high school exit examination results (in 2002). However, the 1999 Base API score and the 2000 and 2001 Growth API scores rely exclusively on the SAT-9—and are thus directly comparable across time.

The *subject-specific* API, which is used in the calculation of publicly-released API scores, is the weighted sum of the percentage of students in the school who score at each quintile of the national percentile ranking distribution. For middle school students, the API score is a weighted average of the school scores in Mathematics, Reading, Language, and Spelling. For high school students, the API score is the average of the school scores in Mathematics, Reading, Language, History/Social Science, and Science.

In the analyses, the 1999 Base API score was used for schools that administered the CHKS prior to fall 1999, the 2000 Growth API score was used when the CHKS was administered in fall 1999 or spring 2000, and the 2001 Growth API score was used when it was administered in fall 2000 or spring 2001. Thus, health risk and resilience were assessed prior to or concurrently with the SAT-9 assessment. The average API score across all the schools in the analytic sample was 655.65 (SD 113.73).

Health Risks

School-level summary scales were used for most of the measures of health risks. Using scale scores rather than individual items offers the advantage of increasing the reliability of each measure and reducing the number of final measures used in the analysis—thus reducing the probability of finding significant results purely by chance. A series of exploratory and confirmatory factor analysis models was estimated to determine which items to use for a particular scale. Further details are provided in the Analytic Strategy Section.

At the end of this chapter, **Table 1** describes the health-related items and scales used in the analyses and the individual items in each scale. Information on the response categories can be obtained by examining the questionnaire items presented in the Appendix to this report. Scales were constructed by averaging "items," where each item represents the school average among students. For convenience, the relevant information in **Table 1** is repeated prior to presenting the results in each chapter. **Table 2** presents descriptive statistics and reliability coefficients for each measure.

Control Variables

To accurately assess the relationship between the school API and health risk/resilience, we controlled for the racial/ethnic-, demographic, socioeconomic-, and grade composition of the school, as described in the Analytic Strategy section below. The following variables were used as controls: percent of males who responded to the CHKS survey, race/ethnic composition (American Indian, Asian, African American, Filipino, Hispanic, Pacific Islander, White), parental education, percentage of students receiving subsidized meals, percentage of English language learners, and the grade composition of the school. Most of the control variables come from the California Basic Educational Data System (CBEDS). Parental education information came from student header sheets attached to the Stanford 9 Achievement Test. For secondary school students, this information was primarily provided by students prior to taking the exam. **Table 3** presents descriptive statistics for the control variables used in the analysis.

Analytic Strategy

Constructing School-Level Measures

While it might appear straightforward to construct a school-level database in which each observation in the data represents the school average of each questionnaire item, variation in CHKS administrations across schools makes the usage of such school-level averages problematic. Because of variation in student consent rates, schools exhibited wide variation in the grade composition of the students who provided CHKS data. In many high schools, for example, a far higher percentage of 9th graders were represented in the CHKS than 11th graders, and the grade composition of CHKS responders did not match the grade composition of the school. Because 9th graders generally exhibit lower levels of drug use than 11th graders, a school with more 9th than 11th graders represented in the sample will likely exhibit lower rates of drug use than a school with similar numbers of 9th and 11th graders represented—even when the two

schools do not differ in their true, underlying drug use patterns. Thus, variation across schools in the composition of students who provided CHKS data makes comparisons of health-risk behavior and resilience across schools difficult. This type of school-to-school variation also reduces the reliability of school averages, and thus reduces the accuracy and precision of estimates of the relationship between health risk/resilience and API scores.

To address this problem, school-level averages were calculated that adjusted for CHKS-respondent compositional differences across schools. A series of random-effects regression models were estimated to calculate these adjusted averages. These regression models took the following form:

$$Y_{ij} = \beta + \beta 1*Male_{ij} + \beta 2*Grade9_{ij} + \beta 3*Grade11_{ij} + \beta 4*Race/Eth_{ij} + \alpha_i + \varepsilon_j, \quad \textbf{[1]}$$

where subscript i and j represent the school and respondent, respectively, Y is the health risk/resilience item, $\beta 1$ is the average male-female difference on the item, $\beta 2$ and $\beta 3$ represent the mean differences of 9th and 11th graders from 7th graders on the item, respectively, $\beta 4$ represents race/ethnic differences on the item, and ε_j is a random error term. The α_i term is a random effect for each school, and reflects the underlying level of the health risk/resilience item after adjusting for the gender, grade, and racial/ethic composition of each school. An adjusted school mean for each item was calculated by summing the product of each coefficient (β) in **[1]** by the corresponding sample mean and then adding α_i. In this way, the adjusted school means reflect the level of each health risk/resilience item after accounting for differences in the composition of CHKS respondents across schools. In all cases, the reliability of scales constructed using adjusted school means exceeded those of scales using unadjusted schools means.

Examining the Relationship of Health Risk & Resilience to API Scores

We used ordinary least squares regression techniques to examine the relationship between school health risk/resilience and API scores, with controls for the demographic, socioeconomic, and grade composition of the school. Without such controls, estimates of the relationships between health risk/resilience measures and the API are likely to be inaccurate. This is because race/ethnicity, parental education, and free/reduced meals are likely to be related to *both* the API and the health measures. For example, any observed relationship between drug use and the API may actually be due to the demographic composition of the school rather than to drug use *per se*. In the regression estimates presented in the following sections, results without- (unadjusted) and with (adjusted) controls are presented.

Measuring School-Level Health Risk and Resilience

When possible, multi-item scales, rather than individual questionnaire items, were used as school-level measures of health risk and resilience. As discussed above, scale scores have the advantage of higher reliability and of data reduction. A series of exploratory and confirmatory factor analysis models was estimated to determine which items to use for a particular scale. We experimented with measures that assessed the percentage of students who engaged in a particular behavior (e.g., any 30-day drug use) as well as measures that assessed the level of behavior (e.g., frequency of 30-day drug use). In most cases, using items that assessed the percentage of students who engaged in a behavior resulted in more meaningful and reliable scales than when using items reflecting levels of behavior. When the factor analyses suggested that these two types of items measured distinct dimensions (e.g., Any Physical Activity vs. Physical Activity Level), the relationships of both to academic performance scores were examined. In addition, it was not possible or desirable to combine items into scales when individual items measured unique concepts (e.g., harassment).

Data Presentation

In each section of this report, the results are first presented in tables in their unadjusted form and then adjusted to show the effect of these controls on the results. We also present unstandardized and standardized results in each table. The unstandardized coefficients show how a unit change in a health measure is related to change in the API. The standardized (normalized) coefficients, shown in brackets, show how a standard deviation change in the health measure is related to a standard deviation change in API. The standardized coefficients are useful for comparing the strength of relationships across different health risk/resilience measures,

Statistically significant results for key variables are presented graphically at the end of each section to further illustrate how health risks and resilience are related to API scores when schools are subdivided into quintiles according to their API scores. A quintile represents 20 percent of the distribution of API scores. Schools that score in the top 20 percent of all scores are at the highest performance quintile, while schools in the bottom 20 percent of all schools are in the lowest performance quintile. API quintile cut-points were determined by examining API scores among *all* middle-, junior high-, and high schools in the state. Different API quintile cut-points were used for schools with different configurations (i.e., middle, junior high, high). After classifying schools by API quintile, the average of each health risk/resilience measure was

plotted for each quintile. These averages are adjusted for socio-demographic differences across schools.

Methodological Limitations

Several methodological limitations should be noted in interpreting the results presented in this report. First and foremost, only school-level academic performance information is available to us. Student-level test score information is unavailable. This limits us to the examining how the characteristics of schools are related to each other—not how the characteristics of individual students are related to each other. One should not interpret any relationship that is observed or is not observed at the school-level as evidence that there *is* or *is not* a relationship between health risk/resilience and academic performance at the student-level. Matching the CHKS information to student-level test score information would be necessary to make such a link. This type of inappropriate generalization is commonly referred to as the ecological fallacy.

Second, the relationships that we examine are correlational. The presence of a correlational relationship between a health risk or resilience measure and academic performance is not sufficient to demonstrate that the indicator is *causally* related to academic performance. To establish such a link, it is necessary to also show that the health risk or resilience indicator precedes academic performance in time, and that the relationship between the two factors is not due to some other measured or unmeasured phenomena. The data to establish such a link are not available to us, or to most other researchers working with survey data. Additionally, we examine the relationship of each health risk/resilience indicator to API scores independently—even though there is overlap across the measures. For example, when examining the relationship between substance use on school property and API scores, we do not control for other measures of health risks. The relationship between substance use at school and API scores could be due to some other health risk behavior that we do not control for. Therefore, the results presented may be overestimates of the relationship between any particular health risk and API scores.

Finally, for two reasons, the CHKS data may not necessarily be representative of all students in the state. First, in many cases, districts used their own discretion in choosing to administer the survey, and those that administered the survey may differ from those that did not. Although other analyses performed by WestEd suggest that students in CHKS schools exhibit similar levels of substance use as other students in the state as measured by the CSS, the results in this report should not be generalized to all schools in California. The problem of district self-selection is particularly problematic for the analysis of the resilience data. Approximately 57

percent of schools in the CHKS administered the resilience module. Separate analyses suggest that schools in districts that chose to administer the Resilience Module have higher API scores and lower percentages of Hispanic students than other schools that administered the CHKS. These 636 schools also may differ from other schools in unobservable ways. Second, CHKS schools were often not successful in obtaining high response rates from students, reducing the representativeness of the CHKS data at the school-level and perhaps reducing the accuracy of the school-level health-risk measures.

Summary

Because of these data limitations, further study is clearly warranted, especially in regard to the data on assets for school connectedness from the less frequently used RYDM. The mandate that all schools with Title IV funds must biennially administer the Core and RYDM Modules starting in the 2003-04 school year will further enhance the value of this dataset for analysis. It can be anticipated as well that this mandate will contribute to increasing the representation of the data in any given year and the ability of schools to increase their student response rates. Nevertheless, even with their limitations, the data from these two large-scale, statewide databases provide an unprecedented opportunity to explore the relationship between health risks/resilience and API scores across a highly diverse range of schools, as the following results show.

References

Skager, R., & Austin, G. (1998). *Sixth biennial statewide survey of drug and alcohol abuse among California students in grades 7, 9, and 11*. Sacramento, CA: Office of Attorney General.

WestEd. (2002). *Guidebook for the California Healthy Kids Survey*. Los Alamitos, CA: WestEd.

Table 1. *Constructs and Items Used in the Analysis**

Construct	Question	Description
PHYSICAL ACTIVITY AND NUTRITION		
Physical Activity		
Any Physical *Activity* (%)		On how many of the past 7 days did you…
Average percentage reporting any physical activity	A10	▪ exercise or participate in physical activity for at least 20 minutes that made you sweat and breathe hard?
	A11	▪ participate in physical activity for at least 30 minutes that did not make you sweat and breathe hard?
	A12	▪ do exercises to strengthen or tone your muscles?
Physical Activity Level *Average level (days) among those reporting any physical activity*	A10-12	Same as Above
Nutrition		
Any Nutritious Intake (%)		During the past 7 days, how many times did you…
Average percentage reporting any intake	A14	▪ drink 100% fruit juices, such as orange, apple or grape?
	A15	▪ eat fruit?
	A16	▪ eat green salad?
	A17	▪ eat potatoes?
	A18	▪ eat carrots?
	A19	▪ eat other vegetables?
Nutrition Intake Level *Average level (days) among those reporting any intake*	A14-19	Same as Above
Breakfast (%) *Percent reporting "yes"*	A20	Did you eat breakfast today?
SUBSTANCE USE		
Alcohol, Tobacco, and Other Drug Use		
Lifetime ATM Use (%)		During your life, have you ever used or tried…
Average percentage reporting any use	A21	▪ even one or two puffs of a cigarette?
	A22	▪ a whole cigarette?
	A24	▪ at least one drink of alcohol, not just a sip?
	A26	▪ marijuana?
Lifetime Hard Drug Use (%)		During your life, have you ever used or tried…
Average percentage reporting any use	A28	▪ cocaine in any form, including powder, crack, or freebase?
	A29	▪ methamphetamines?
	A31	▪ heroin?
	A32	▪ any other illegal drug?
Lifetime Intoxication (%)		During your life, how many times have you been…
Average percentage reporting any use	A33	▪ very drunk or sick after drinking alcohol?
	A34	▪ "high" from using drugs?
30-day ATM Use (%)		During the past 30 days, on how many days did

Table 1. *Constructs and Items Used in the Analysis**

Construct	Question	Description
Average percentage reporting any use		you…
	A36	▪ smoke cigarettes?
	A38	▪ have at least one drink of alcohol?
	A39	▪ have five or more drinks of alcohol in a row, that is, within a couple of hours?
	A40	▪ use marijuana?
30-day Hard Drug Use (%)		During the past 30 days, on how many days did you…
Average percentage reporting any use	A42	▪ use cocaine or crack?
	A43	▪ use methamphetamines?
	A44	▪ use LSD or other psychedelics?
	A45	▪ use any other illegal drug?
Substance Use at School		
Lifetime Intoxication on School Property (%) *Percentage reporting any use*	A35	During your life, how many times have you been drunk or "high" on drugs on school property?
30-day ATM Use on School Property(%)		During your life, how many times have you been drunk or "high" on drugs on school property?
Average percentage reporting any use	A46	▪ smoke cigarettes?
	A47	▪ have at least one drink of alcohol?
	A48	▪ smoke marijuana?
Availability of Drugs		
Cigarette/Alcohol Availability (%) *Average percentage reporting substance is "easy" or "very easy" to obtain*		How difficult is it for students in your grade level to get…
	A57	▪ cigarettes if they really want them?
	A58	▪ alcohol if they really want it?
Marijuana Availability (%) *Percentage reporting substance is "easy" or "very easy" to obtain*	A59/A57	How difficult is it for students in your grade level to get… ▪ marijuana if they really want it?
Methamphetamine Availability (%) *Percentage reporting substance is "easy" or "very easy" to obtain*	A60	How difficult is it for students in your grade level to get… ▪ methamphetamine if they really want them?
Offered Illegal Drugs at school (%) *Percentage reporting that this happened 1 or more times*	A63	During the past 12 months, how many times on school property have you… ▪ been offered, sold, or given an illegal drug?
SCHOOL SAFETY ENVIRONMENT		
Victimization and Fighting		During the past 12 months, how many times on school property have you…
Harassed (%) *Percentage reporting that this happened 1 or more times*	A64	▪ been harassed because of your race, ethnicity, gender, sexual orientation, or disability?
Threatened/Injured with Weapon (%) *Percentage reporting that this happened 1 or more times*	A65	▪ been threatened or injured with a weapon such as a gun, knife, or club?
Property Stolen/Damaged (%) *Percentage reporting that this happened 1 or more times*	A67	▪ had your property stolen or deliberately damaged, such as your car, clothing, or books?
Physical Fight at School (%) *Percentage reporting that this*	A66	▪ been in a physical fight?

Table 1. *Constructs and Items Used in the Analysis**

Construct	Question	Description
happened 1 or more times		
Weapon Possession		
Weapon Possession at School (%) *Average percentage reporting that this happened 1 or more times*		During the past 30 days, on how many days did you carry…
	A68	▪ a gun on school property?
	A70	▪ a club on school property?
	A71	▪ any other weapon on school property?
Safety		
School Safety (%) *Percentage reporting feeling "safe" or "very safe"*	A72	How safe do you feel when you are at school?
EXTERNAL RESILIENCE ASSETS		
School Assets		
Caring Relationships at School (%) *Average percentage reporting "pretty much true" or "very true"*		At my school, there is a teacher or some other adult who…
	F32	▪ really cares about me.
	F34	▪ notices when I'm not there.
	F37	▪ listens to me when I have something to say.
High Expectations at School (%) *Average percentage reporting "pretty much true" or "very true"*		At my school, there is a teacher or some other adult who…
	F33	▪ tells me when I do a good job.
	F36	▪ always wants me to do my best.
	F38	▪ believes that I will be a success.
Meaningful Participation at School (%) *Average percentage reporting "pretty much true" or "very true"*	F19	I do interesting activities at school.
	F24	At school, I help decide things like class activities or rules.
	F25	I do things at my school that make a difference.
Home Assets		
Caring Relationships as Home (%) *Average percentage reporting "pretty much true" or "very true"*		In my home, there is a parent or some other adult who is…
	F6	▪ interested in my schoolwork.
	F9	▪ talks with me about my problems.
	F32	▪ really cares about me.
	F11	▪ listens to me when I have something to say.
High Expectations at Home (%) *Average percentage reporting "pretty much true" or "very true"*		In my home, there is a parent or some other adult who is…
	F5	▪ expects me to follow the rules.
	F7	▪ believes that I will be a success.
	F10	▪ always wants me to do my best.
Meaningful Participation at Home (%) *Average percentage reporting "pretty much true" or "very True"*	F13	I do fun things or go fun places with my parents or other adults.
	F21	I do things at home that make a difference.
	F23	I help make decisions with my family.
Community Assets		
Caring Relationships in Community(%) *Average percentage reporting "pretty much true" or "very true"*		Outside of my home and school, there is an adult who…
	F26	▪ really cares about me.
	F28	▪ notices when I am upset about something.
	F31	▪ I trust.

Table 1. *Constructs and Items Used in the Analysis**

Construct	Question	Description
High Expectations in Community (%)		Outside of my home and school, there is an adult who…
Average percentage reporting "pretty much true" or "very true"	F27	▪ tells me when I do a good job.
	F29	▪ believes that I will be a success.
	F30	▪ always wants me to do my best.
Meaningful Participation in Community (%)	F50	▪ Outside of my home and school, I help other people.
Average percentage reporting "pretty much true" or "very true"	F51	▪ I am part of clubs, sports teams, church groups or other extra activities away from school.
Peer Assets	F52	▪ Outside of my home and school, I take lessons in music, art, sports or a hobby.
Peer Assets		
Caring Relationships with Peers (%)		I have a friend about my own age who…
Average percentage reporting "pretty much true" or "very true"	F1	▪ really cares about me.
	F2	▪ talks with me about my problems.
	F4	▪ helps me when I'm having a hard time.
High Expectations with Peers (%)		My friends…
Average percentage reporting "pretty much true" or "very true"	F18	▪ get into a lot of trouble.
	F20	▪ try to do what is right.
	F22	▪ my friends do well in school.
INTERNAL RESILIENCE ASSETS		
Internal resilience assets (%)	F12	I feel bad when someone gets their feelings hurt.
Average percentage reporting "pretty much true" or "very true"	F14	I try to understand what other people go through.
	F15	When I need help, I find someone to talk with.
	F16	I know where to go for help with a problem.
	F17	I try to work out problems by talking about them.
	F39	I can work out my problems.
	F40	I can do most things if I try.
	F41	I can work with someone who has different opinions than mine.
	F42	There are many things that I do well.
	F43	I enjoy working together with other students my age.
	F44	I stand up for myself without putting others down.
	F45	I try to understand how other people feel.
	F47	There is a purpose to my life.
	F48	I understand my moods and feelings.
	F49	I understand why I do what I do.
	F54	I have goals and plans for the future.

*Questions numbers are those of the CHKS items during the 1999-2001 period. Subsequently the RYDM became Module B, to facilitate combined use of Modules A & B as a comprehensive assessment of risk and protective factors.

Table 2. *Descriptive Statistics and Reliability Coefficients for CHKS Health Measures*

	Mean(%)	SD	Sample Size	Reliability(α)
PHYSICAL HEALTH				
Any Physical Activity[A]	85.40	3.78	875	0.80
Physical Activity Level [A, B]	4.02	0.21	874	0.76
Any Nutritious Intake	76.22	2.50	1693	0.82
Nutrition Intake Level [C]	0.84	0.05	1693	0.87
Breakfast	62.24	4.90	1396	NA
SUBSTANCE USE & AVAILABILITY				
Lifetime ATM Use [D]	32.13	11.35	1693	0.96
Lifetime Hard Drug Use[A]	6.54	1.98	737	0.75
Lifetime Intoxication	22.82	9.94	1692	0.98
30-day ATM Use [D]	16.43	6.01	1693	0.94
30-day Hard Drug Use[A]	3.38	1.53	736	0.77
Any Lifetime Intoxication on School Property	11.95	6.07	1692	NA
Any 30-day ATM Use on School Property [D]	4.99	1.91	1692	0.84
Alcohol/Cigarette Availability at School[A]	73.15	6.46	714	0.96
Marijuana Availability at School[A]	62.41	8.26	714	NA
Methamphetamine Availability at School[A]	26.92	3.73	704	NA
Offered Illegal Drugs	23.85	9.33	1689	NA
SCHOOL SAFETY ENVIRONMENT				
Harassed	24.70	4.17	1690	NA
Threatened/Injured with Weapon	8.32	2.74	1653	NA
Property Stolen/Damaged	30.81	4.42	1692	NA
Physical Fight	23.54	4.74	1690	NA
Weapon Possession	3.10	0.78	1675	0.77
Perceived School Safety	85.15	5.81	1691	NA
EXTERNAL RESILIENCE ASSETS				
Total External Assets at School	61.33	5.68	586	0.91
Caring Relationships at School	65.09	5.61	582	0.92
High Expectations at School	73.53	6.58	583	0.85
Meaningful Participation at School	45.23	7.52	578	0.87
Total External Assets at Home	76.33	4.35	574	0.92
Caring Relationships at Home	74.16	4.51	569	0.86
High Expectations at Home	88.97	4.52	567	0.88
Meaningful Participation at Home	65.80	5.09	562	0.89
Total External Assets in Community	73.37	5.53	584	0.93
Caring Relationships in Community	76.94	5.48	565	0.80
High Expectations in Community	81.61	4.92	565	0.94
Total External Assets from Peers	74.43	4.19	577	0.78
Caring Relationships with Peers	75.35	4.98	571	0.89
High Expectations with Peers	73.48	5.30	564	0.74
INTERNAL RESILIENCE ASSETS				
Total Internal Resilience Assets	77.89	3.75	636	0.95

Notes: [A]Measure applicable to High School students only. :
[B]Average number of days per week.
[C]Average number of servings per day.
[D]Alcohol, Tobacco, and Marijuana (ATM).

Source: Calculations based on the 1999-2001 California Healthy Kids Survey. School-level analysis.

Table 3. *Descriptive Statistics for Socio-demographic Control Variables*

	Mean	SD
Male	46.03%	5.68
Female	53.98%	5.68
American Indian	1.00%	1.86
Asian	8.52%	11.83
African American	7.01%	10.34
Filipino	2.48%	4.53
Hispanic	34.95%	26.02
Pacific Island	0.61%	1.09
White	44.28%	28.08
Parental Education[A]	2.91	0.66
Subsidized Meals	37.47%	25.83
English Language Learners	17.26%	16.40
Middle School	56.76%	49.56
Mixed School	13.82%	34.52
High School	29.42%	45.58

Notes: [A]From the API research data files (1=less than high school, 2=high school, 3=some college, 4=college degree, and 5= graduate degree).

Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

3. PHYSICAL ACTIVITY AND NUTRITION

Physical Activity Research

Both indirect and direct evidence suggests that physical activity is linked to learning and academic performance. Studies have demonstrated that physical activity is connected to physiological aspects of cognitive functioning (Sallis, McKenzie, Kolody, Lewis, Marshall, and Rosengard 1999, Shephard 1997). Both human and animal studies suggest that learning complex movements stimulates the part of the brain used in problem solving and learning (Sallis et al. 1999). Other research suggests that physical exercise increases neural connections and cerebral blood flow (Jensen 1998). Physical activity can also increase academic performance indirectly by improving emotional health, self-esteem, and alertness—all of which are related to improved academic performance (Tremblay, Inman, & Willms 1998). It also is associated with nutrient intake, which in turn can improve student learning.

Survey data indicate that youth who engage in moderate to high levels of physical activity tend to perform better in school (Dwyer, Sallis, Blizzard, Lazarus, & Dean 2001, Field, Diego, & Sanders 2001, Pate, Heath, Dowda, & Trost, 1996). Perhaps the most rigorous investigations of this linkage come from four longitudinal studies that examined how participation in physical education programs impacts academic performance. These studies were conducted in France, Canada, Australia, and the U.S. In the French study, conducted in the 1950s, students in an experimental school were exposed to an intervention that increased physical education time to 8 hours per week, increased siesta time, and provided vitamin supplements to students (Shephard 1997). Despite a 26 percent reduction in academic instruction time, students in the experimental school performed just as well academically as students in the control schools (Tremblay, Inman, & Willms 1998).

The Canadian, Australian, and U.S. studies not only provide additional support for the notion that academic performance is not reduced when physical education time is increased concomitantly with reductions in academic instruction time, but that increases in physical education time and reductions in academic time have favorable effects on students' academic achievement (Dwyer, Coonan, & Worsley & Leich 1979, Shephard, Volle, Lavalé, laBarre, Jéguier, & Rajic 1994, Sallis et al. 1999, Shephard 1997, Tremblay, Inman, & Willms 1998). These studies suggest that schools that attempt to increase academic instructional time at the expense of physical education time may experience reductions in student learning and academic performance.

Nutrition Research

Inadequate nutrition has deleterious consequences for the cognitive development of children. Numerous studies have demonstrated that when students' basic nutritional needs are met, their motivation and attentiveness increase, and they are better able to perform in school. What is less clear is what constitutes adequate nutrition for maximum cognitive development and achievement. Much of the research on nutrition and cognitive performance has been conducted in developing countries, where undernutrition is often severe. There is no doubt that severe undernutrition—characterized by protein and calorie deficiency—has very deleterious consequences for brain function. Recent evidence suggests that even moderate undernutrition—the type of undernutrition that is common in the United States—can compromise cognitive development and school performance (Center on Hunger, Poverty and Nutrition Policy 1998). The research literature on the link between nutrition and school performance focuses on three general topics: (1) the relationship between nutrient intake and cognitive performance, (2) the effects of fasting on performance in school and on cognitive tests, and (3) the effectiveness of school breakfast programs in improving academic performance.

Nutrient Intake

The link between nutrient intake and cognitive performance has been demonstrated in several randomized, controlled trials (Benton & Roberts 1988, Schoenthaler, Amos, Doraz, Kelly, & Wakefield 1991, Schoenthaler, Bier, Young, Nichols, & Jansenns 2000). In these studies, children given low-dose vitamin/mineral supplements experienced significantly greater gains in nonverbal intelligence than children given placebos. Nutrient supplementation appears to have positive consequences after a relatively short time-period—Schoenthaler and his colleagues found substantial benefits after as little as three months. Further, gains in nonverbal intelligence were concentrated among children who were poorly nourished prior to vitamin/mineral supplementation—suggesting that a substantial minority of children would benefit immensely with an improved diet.

Less is known about which specific nutrients lead to these changes, although studies suggest that iron deficiency anemia plays an important role in reducing children's cognitive functioning (Pollitt 1993). Iron deficiency anemia affects nearly 25 percent of poor children in the United States (Center on Hunger, Poverty and Nutrition Policy 1998), and appears to be associated with shortened attention span, irritability, fatigue, and difficulty with concentration. However, because the benefits of micronutrients are cumulative and interactive (Gorman 1995), it is likely that daily intake of a wide variety of nutrients from dietary sources, rather than

exposure to specific micro-nutrients, has the most beneficial consequences for children's health and cognitive functioning.

Fasting

Morning fasting has been found to be associated with reduced cognitive performance among nutritionally at-risk children (Chandler, Walker, Connolly, & Grantham-McGregor 1995, Simeon & Grantham-McGregor 1989), and several experimental studies have shown that it reduces performance on a variety of cognitive tests among well-nourished, middle-class children as well (Pollitt, Leibel, & Greenfield 1981, Pollitt, Lewis, Garza & Schulman 1982). These studies demonstrate that cognitive performance, particularly the speed and accuracy of information retrieval from memory, is influenced by short-term variations in the availability of nutrients (Pollitt 1995).

Breakfast Consumption

Rigorous, randomized studies have shown that participation in school breakfast programs is associated with significant improvements in academic functioning—particularly among low income and/or poorly nourished children (Meyers, Sampson, Weitzman, Rogers & Kayne 1989, Murphy et al. 1998, Powell, Walker, Chang & Grantham-McGregor 1998, Simeon 1998). Two mechanisms are thought to underlie the relationship between breakfast and cognitive performance. One involves the short-term harmful effects of fasting on the immediate supply of nutrients to the brain. The other involves the sustained effects of breakfast to children's long-term health (Pollitt 1995). For a substantial minority of children, school breakfast programs add enough energy, protein, carbohydrates, and nutrients to meet daily requirements—and thus are a critical component for healthy development.

CHKS Measures

In this section, we examine the relationship of two aspects of physical health to academic performance: exercise and nutritional eating habits. Five variables were analyzed: (1) any physical activity in the 7 days prior to the CHKS, (2) physical activity level, (3) any nutritious food intake (i.e., consumption of fruits, vegetables etc.), (4) nutritious intake level, and (5) breakfast consumption on the day of the CHKS administration. *Any physical activity* was distinguished from the *level of physical activity* because the measurement analyses suggested that these two aspects of physical activity represent distinct concepts at the school-level. The same is true for nutritious intake. The physical activity measures are only applicable to high school

students, because only one physical activity item was included on the middle school survey. The constructs and items used for the analyses of physical health indicators are presented in **Table 4**.

CHKS – API Results

The research literature discussed above focuses on the relationship of physical activity and nutrition to academic performance at the individual level. The results reported here focus on a slightly different question—whether or not the composition of schools with regard to student physical activity and nutrition is related to school-level API scores. The results in **Table 5** show how physical activity and nutrition, at the school level, are related to API scores. As discussed in the Methods section, both the unadjusted and adjusted regression coefficients are presented from two different models—one model that does not account for socio-demographic differences across schools (unadjusted) and a model that does control for these factors (adjusted). We also present standardized coefficients in brackets in the table so that the relative strength of the relationships of physical activity and nutrition measures to API scores can be compared to each other.

Overall, the results in **Table 5** show that physical activity and nutrition are positively related to API scores—schools with high percentages of students who routinely engage in some physical activity and healthy eating have higher API scores than other schools. For example, the unadjusted results show that for each percentage-point increase in *any physical activity*, API scores rise by 10.649 points. However, this relationship is attenuated after accounting for socio-demographic differences across schools (adjusted results), with each percentage point increase associated with a 1.185-point increase in API scores.

The adjusted results in **Table 5** indicate that API scores increase as the percentage of students who engage in any physical activity, any nutritious intake, and who routinely eat breakfast increases, even after accounting for demographic differences across schools. However, among students who engage in any physical activity, the *frequency* of physical activity is unrelated to API scores. The same is true for the *level* of nutritious intake, perhaps because nutritious intake levels capture both the frequency with which students eat healthy food *and* overeating. Note also that socio-demographic differences across schools account for much of the relationship between physical activity and nutrition to API scores.

Figures 1, **2**, and **3** illustrate differences in physical activity and nutrition by API quintile. **Figure 1** shows that the lowest performing schools have the lowest percentage of students who engage in any physical activity. Physical activity goes up as API scores go up, although

differences across the top three performance quintiles are small. These results suggest that physical activity programs may have especially beneficial consequences in low performing schools.

The results for nutrition are even more striking. **Figure 2** shows that the lowest two API quintiles have the lowest percentage of students who report eating any of the nutritious food items asked about during the seven days prior to the survey, and the highest performing quintile has particularly high levels of any nutritious intake. The pattern for breakfast shown in **Figure 3** is similar. The percentage of students who report that they ate breakfast on the day of the survey is relatively low for the two lowest performance quintiles, and relatively high for the highest performing quintile. These results for nutrition suggest that it is under-nutrition, rather than the general level of nutrition, that is responsible for school-level differences in API scores. Implementation of programs that ensure that *all* students meet minimum nutrition standards may efficiently and effectively bring about increases in API scores.

Summary and Discussion

There is a great deal of room for improvement in the fitness and dietary behaviors of students in California. According to the 2001 California Student Survey, 31% of 11th graders engage in physical exercise less than 3 times per week — the recommended minimum according to the Centers for Disease Control — and 11% did not engage in *any* sustained physical exercise during the week prior to the survey. Only 31% of 11th graders had 5 or more portions of fruits and vegetables a day, and half reported that they did not eat breakfast on the day of the survey.

And the link between physical activity, adequate nutrition, and academic performance is clear. Prior research has shown that physical activity is connected to physiological aspects of cognitive functioning, that youth who engage in moderate levels of exercise perform better in school, and that participation in physical education programs often enhances academic performance. The linkage between adequate nutrition and academic performance is even more clearcut. Rigorous scientific studies have demonstrated that nutrition is closely linked to cognitive performance, and that the implementation of nutrition programs can play an important role in increasing learning among undernourished children. Consistent with this prior research, California schools with high percentages of students who routinely engage in some physical activity and healthy eating have higher API scores than other schools. Although physical activity is significantly related to test scores, nutrition is more strongly associated with API scores than physical activity. Undernourishment and skipping breakfast appear to have the most deleterious consequences. Overall, the results suggest that implementation of programs that ensure that all

students meet minimum physical education and nutrition standards may bring about increases in API scores.

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Table 4. *Constructs and Items Used for Analysis of Physical Activity and Nutrition*

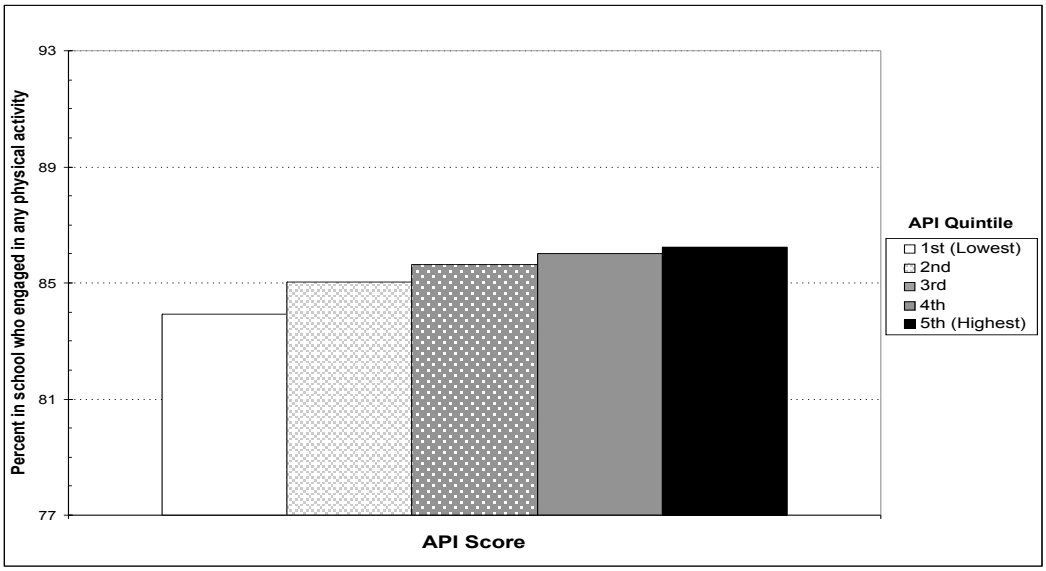
Construct	Question	Description
PHYSICAL ACTIVITY		
Any Physical *Activity* (%)		On how many of the past 7 days did you…
Average percentage reporting any physical activity	A10	▪ exercise or participate in physical activity for at least 20 minutes that made you sweat and breathe hard?
	A11	▪ participate in physical activity for at least 30 minutes that did not make you sweat and breathe hard?
	A12	▪ do exercises to strengthen or tone your muscles?
Physical Activity Level		Same as Above
Average level (days) among those reporting any physical activity		
NUTRITION		
Any Nutritious Intake (%)		During the past 7 days, how many times did you…
Average percentage reporting any intake	A14	▪ drink 100% fruit juices, such as orange, apple or grape?
	A15	▪ eat fruit?
	A16	▪ Eat green salad?
	A17	▪ Eat potatoes?
	A18	▪ Eat carrots?
	A19	▪ eat other vegetables?
Nutrition Intake Level		Same as Above
Average level (days) among those reporting any intake		
Breakfast (%)	A20	Did you eat breakfast today?
Percent reporting "yes"		

Table 5. *Relationship of Physical Activity and Nutrition to API Scores*

	Academic Performance Index	
	Unadjusted B [β]	**Adjusted[B] B [β]**
Any Physical Activity (%)[A]	10.649**	1.185**
	[0.376]	[0.042]
Physical Activity Level [A]	133.873**	-1.519
	[0.265]	[-0.003]
Any Nutritious Intake (%)	28.766**	4.280**
	[0.632]	[0.094]
Nutrition Intake Level	-608.577**	-3.610
	[-0.245]	[-0.001]
Breakfast (%)	13.826**	3.338**
	[0.597]	[0.144]

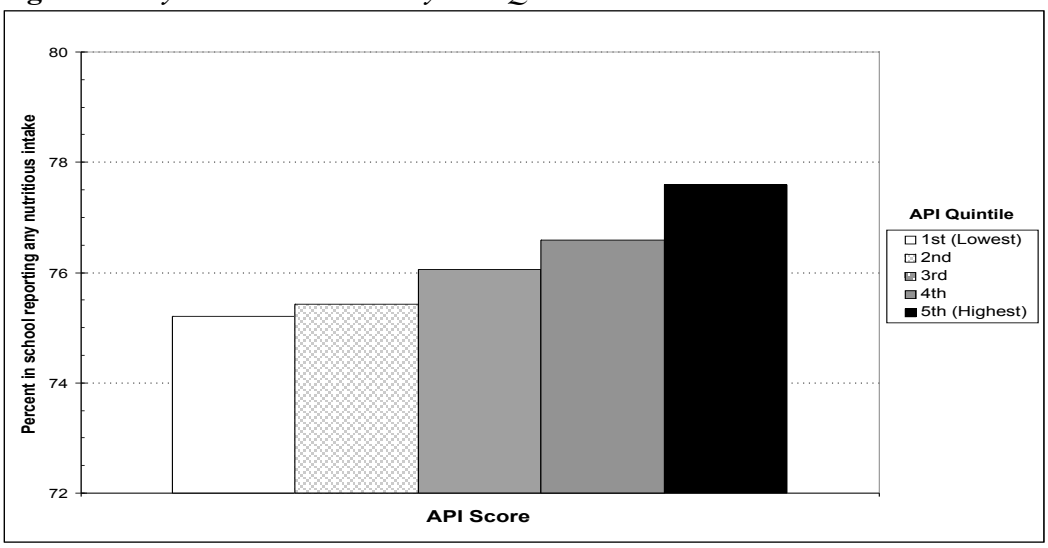
Notes: Standardized beta coefficients in brackets.
* significant at 5%; ** significant at 1%;
[A] measure applicable to High School students only;
[B] estimates come from a model that controls for the race/ethnic- and gender composition of the school, average parental education, percentage of students receiving subsidized meals, percentage of ELL students, and school grade configuration.
Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

Figure 1. *Any Physical Activity by API Quintile*



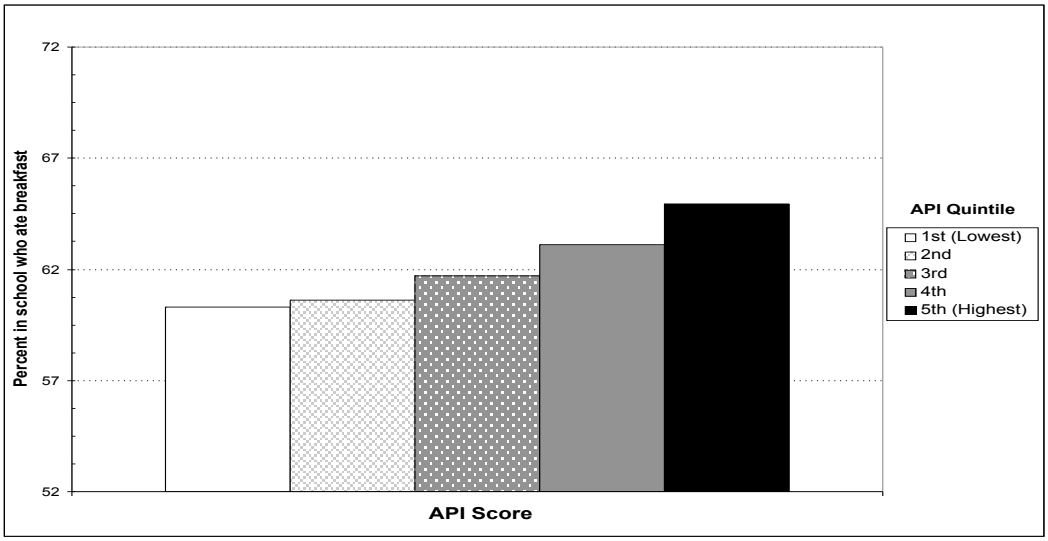
Notes: [1] School-level analysis. Analytic sample consists of 874 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Any physical activity is measured by the average percentage of students who reported that they engaged in aerobic physical activity (A10), moderate physical activity (A11), and resistance training (A12) in the 7 days prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 2. *Any Nutritious intake by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 1,692 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Any nutritious intake is measured by the average percentage of students who reported that they drank any fruit juice (A14); ate any fruit (A15), salad (A16), potatoes (A17), carrots (A18), and other vegetables (A19) in the 7 days prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 3. *Breakfast Consumption by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 1,395 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Daily breakfast is measured by the percentage of students who reported that they ate breakfast on the day of the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

4. SUBSTANCE USE

Research on Alcohol, Tobacco, and Other Drug Use

Evidence drawn from years of research has shown that adolescent substance use is closely connected with academic success (Andrews, Duncan, & Hops 1994, Beauvais, Chavez, Oetting, Deffenbacher, & Cornell 1996, Dozier & Barnes 1993, Braggio, Pishkin, Gameros, & Brooks 1993, Crum, Ensminger, Ro, & McCord 1998, Eggert & Herting 1993, Ellickson, Bui, Bell, & McGuigan 1998, Mensch & Kandel 1988, Newcomb & Bentler 1986, Schulenberg, Bachman, O'Malley, & Johnston 1994, Hu, Lin & Keeler 1998). Alcohol, tobacco, and other drug use (ATOD) is also related to several other school-related factors including reduced attention spans, lower investment in homework, more negative attitudes toward school, lower motivation, and increased absenteeism (see citations above). For example, Greenblatt (1998) determined that weekly marijuana users are twice as likely as nonusers to disobey teachers and other staff at school. One study found that 16-18% of teenage drinkers had missed school (or work) because of alcohol use (Ellickson et al. 1998). Adolescent binge drinkers have been found to be far more likely than nondrinkers to say that their school work is poor and that they cut classes or skipped school (Greenblatt 2000). In regard to test scores, even low levels of alcohol and drug use by peers in middle schools were linked to lower scores on the Washington Assessment of Student Learning (Washington Kids Count 2000).

What is less clear is why or how substance use and school achievement are related (Flay, Allred, & Ordway 2001). One explanation is that academic difficulties are a consequence of substance use. This explanation was recently emphasized by the Center for Addiction and Substance Abuse (2001), which estimates that the adverse effects of substance abuse on truancy, special education, disciplinary problems, disruptive behavior, teacher turnover, and property damage costs America's schools at least $41 billion dollars each year. Studies demonstrating that drug use interferes with the learning process (e.g., cognitive functioning, memory, sensation, and perception) also provide support for this explanation.

While the majority of substance abuse research studies do not examine educational outcomes (Austin 1992), a number of studies show that early substance use may contribute to school difficulties (Schulenberg et al. 1994; Galambos and Silberesisen 1987). Early onset of substance use especially appears linked to a range of later school problems (Brook, Balka, & Whiteman 1999). For example, Fergusson, Lynskey, & Horwood (1996) found that students who used marijuana before the age of 15 were three times more likely than other students to have left school before age 16 and were two times more likely to report frequent truancy. Gruber,

DiClemente, Anderson & Lodico (1996) found that onset of alcohol use by age 12 is associated not only with subsequent abuse of alcohol and other drugs, but also related to problem behaviors in later adolescence, including absenteeism from school.

A second explanation posits that students become more likely to engage in unhealthy behaviors such as substance use as a consequence of the frustration and estrangement associated with poor school performance and other school difficulties (Allison 1992; Hawkins, Catalano, & Miller 1992; Lifrak et al. 1997). Cigarette smoking research has generally found that school misbehavior and poor performance predicted cigarette smoking, rather than the reverse, possibly "because smoking is a relatively common behavior relative to other factors that lead to antisocial behaviors" (Hu, Lin & Keeler 1998, see also Bryant et al. 2000). In this regard, a growing concern about the current emphasis on high stakes testing and pressures for college admission is that it will contribute to students increasingly turning to substance use as a means of relieving this stress (CASA 2001, Learning First Alliance 2001).

A third explanation is that substance use and poor academic performance are not distinct—each may represent just one aspect of a more generalized tendency toward deviance and unconventionality (Hirschi 1969, Jessor & Jessor 1977). The research literature provides empirical support for each of these three explanations (Donovan & Jessor 1985, Maguin & Loeber 1996, Newcomb & Bentler 1988). Minimally, it appears that the relationship between academic achievement and substance use is bidirectional.

One of the difficulties in evaluating the literature on the relationship between ATOD use and academic performance is that much of it is based on cross-sectional survey data. Much of the evidence is correlational. For ethical reasons, it is simply not possible to conduct randomized, controlled experiments to examine the drug use/academic performance relationship. Instead, we must rely on observational data collected with surveys or other sources. The best of these studies are based on longitudinal data, where academic performance and substance use are assessed over multiple time periods. With good quality longitudinal survey data, researchers can examine how drug use is related to *changes* in school performance over time (and *vice versa*). Although longitudinal data can be used to work out how drug use and academic performance are related to each other across time, longitudinal data cannot be used to rule out that some other unmeasured phenomenon is responsible for the relationship between the two factors—only a controlled experiment can do that.

Studies based on longitudinal data suggest that substance use and academic performance are reciprocally related to each other—substance use appears to reduce subsequent academic

performance *and* poor academic performance increases subsequent substance use (Andrews, Duncan & Hops 1994, Crum et al. 1998, Galambos & Silbereisen 1987, Newcomb & Bentler 1988). What is clear from this research is that substance use and academic performance are complementary with regards to the student practicing the behavior. As Barton (2001) notes however, to the extent that substance users bring their behavior and drugs to school, substance use can also have an impact on the school environment. Pervasive drug use among students represents a threat to a positive school climate, contributing to an erosion of self-discipline and motivation among all students, not just the students who engage in substance use (Symons et al. 1997).

CHKS Measures

We assess 3 general areas of substance use: (1) lifetime and 30-day substance use, (2) lifetime and 30-day intoxication/substance use on school property, and (3) availability of drugs. **Table 6** describes the measures of substance use used in the analyses.

Lifetime and 30-day Substance Use

Substance use in this analysis was assessed by: (1) lifetime (ever) use of alcohol, tobacco, or marijuana (ATM); (2) lifetime hard drug use; (3) lifetime intoxication from alcohol or drugs [2 items]; (4) 30-day ATM use; and (5) 30-day hard drug use. Although "alcohol, tobacco, and marijuana use" and "hard drug use" are not appropriate for describing how addictive or dangerous a particular drug is, and are certainly inappropriate for describing the social costs of specific drugs, the measurement analyses suggested that these two categories constituted distinct dimensions of drug use. Popularity, rather than dangerousness, may be a more accurate description of what distinguishes these two categories of drugs. Note that different types of use frequencies are used to measure lifetime and 30-day ATM drug use and slightly different types of drugs are used to measure lifetime and 30-day "hard" drug use. Also, the hard drug use measures are only available for high school students.

Substance Use and Intoxication at School

Two measures of substance use on school property are used: (1) any lifetime intoxication and (2) any 30-day use of alcohol, cigarettes, or marijuana.

Availability of Drugs

Availability of drugs is measured by the percentage of students in a school who report that it is "easy" or "very easy" to obtain any of the following three categories of substances. Perceived availability is assessed for (1) cigarettes or alcohol, (2) marijuana, and (3) methamphetamines. These measures are only available for high school students. Finally, we also examined how API was related to reports of ever being "offered, sold, or given an illegal drug" **on school property** one or more times.

CHKS – API Results

Results from the CHKS–API analysis are divided into three subsections: ATOD use and intoxication, ATOD use on school premises, and availability of drugs.

ATOD Use and Intoxication

The results in **Table 7** show how lifetime- and 30-day substance use are related to school API scores. The results indicate that schools with proportionately large numbers of students who use ATOD substances exhibit significantly lower API scores than other schools, even after accounting for socio-demographic differences. A comparison of the standardized coefficients in brackets indicates that these relationships are much stronger for alcohol, tobacco, and marijuana use (ATM) and lifetime intoxication than for "hard drug" use. Lifetime hard drug use was only weakly associated with API scores, and the relationship of 30-day hard drug use to API scores was not significant. Why hard drug use is more weakly associated with low API scores than the more commonly-used substances is not clear, and is inconsistent with what we know from prior research about the association between substance use and academic achievement at the student level.

Figures 4 -7 illustrate that the results for each of the four substance use measures that were significantly related to API scores are fairly consistent—schools in the highest API performance quintile have proportionately fewer students who are substance users than other schools. However, the magnitudes of the differences across API quintiles are not particularly large.

Substance Use at School

Table 7 also presents the results for substance use/intoxication on school property. These results underscore the importance of the school environment for student achievement. Both combined (any) use of alcohol, tobacco, or marijuana on school property in the past 30 days and ever being

intoxicated on alcohol or marijuana at school are inversely related to API scores. As the percentage of students who report using drugs or being intoxicated at school increases, school API scores go down. Note that the 30-day item asks simply about use on school property, without specification to time. Students could be responding to use that occurs there before or after normal school hours (such as at sports events or dances). The intoxication item captures youth who might consume a substance before entering the campus with the intent of getting high.

The relationship between lifetime intoxication on school property and API scores shown in **Figure 8** is remarkably similar to the overall lifetime intoxication relationship shown in **Figure 6**. Compared to other schools, those in the highest API performance quintile have proportionately fewer students who report being intoxicated on school grounds. The magnitude of this difference, however, is not large.

The results in **Figure 9** are also clear-cut. As API scores go up, ATM use on school property declines in a stepwise, linear fashion. The fact that this school-use indicator has an unambiguous relationship to API quintiles while the other indicators of 30-day drug use do not may suggest that drug use at school reflects particularly problematic drug use behavior, and is thus more strongly associated with academic performance.

Availability of Drugs

The use-at-school items are also indirect indicators of drug availability on campus. If some students are using drugs at school, other students may have access to them. However, the results for perceived drug availability in **Table 7** are less consistent than those for ATOD use. The percentage of students who perceive that cigarettes, alcohol, and marijuana is "easy" or "very easy" for age-peers to obtain is unrelated to API scores, while methamphetamine availability has only a weak, negative relationship to API scores. Still, as illustrated in **Figure 10**, the highest performing schools exhibit the lowest rates of methamphetamine availability.

Further insight into the school drug environment is provided in the bottom row of **Table 7**, which shows that API scores are lower in schools with a high percentage of students who report being offered, sold, or given drugs on school property, although the relationship is not as strong as might be supposed. As with many of the drug use measures described above, this measure seems to make the biggest difference in distinguishing schools in the top performance quintile from the other schools, as illustrated in **Figure 11**.

Summary and Discussion

The current API-CHKS analysis shows that California schools with proportionately high numbers of students who engage in substance use have lower API scores than other schools. With the surprising exception of hard drug use, this relationship holds true even after we control for socioeconomic differences across schools. Even more significant, drug use and intoxication on school property is more strongly associated with test scores than drug use in general, perhaps reflecting the particular problematic nature of this type of drug use for API scores. Drug use before or while attending school indicates a particularly strong affiliation with the drug-using peer culture and a high degree of estrangement from school. It reflects a level of drug involvement so pervasive that the potential repercussions for violation of school rules are being disregarded by these youths. This is behavior that threatens not only the user's learning ability but also threatens school efforts to educate non-using youth. In this regard, the latest statistics from the California Student Survey are disconcerting. By 11th grade, 27% of students reported being drunk or high at school at least once, and 13% reported using either marijuana or alcohol.

Although substance use is related to API scores, perceived drug availability is not. While ready access to drugs reflects increased *opportunities* to engage in drug use, the results suggest that opportunities to engage in drug use do not play a direct role in influencing academic performance. This may reflect the complex relationship between use and availability—one of the major challenges to research is to determine why perceptions of drug availability are often unrelated to drug use. On the one hand, easy availability of alcohol and other drugs in a community sends a message of social acceptability to youth and increases the risk that young people will use them. In schools where children think that drugs are easily available, a higher rate of use has occurred. Conversely, according to the national *Monitoring the Future Survey*, drug use trends were not related to trends in perceived availability, and abstainers and quitters ranked availability as very low on their list of reasons for not using.

Unlike the case for perceived drug availability, schools with proportionately high numbers of students who report being offered drugs *at school* exhibit lower API scores than other schools—reflecting the adverse impact of readily available substances on school property on the academic mission of schools. It has been recently reported that students who are attending secondary schools where illegal drugs are used, kept, and sold—fully 60% of high school students and 30% of middle school—appeared twice as likely to smoke, drink, or use illicit drugs as students whose schools are more substance free (CASA 2001). Much, if not virtually all, of this activity may be informal, in the sense of small-scale sharing among peers (with or without reimbursement) rather than large-scale dealing as employees of criminal organizations. But the

implications of this are clear when the overall prevalence of this is taken into consideration. According to the 2001 California Student Survey, 9% of students in grade 7, 30% in grade 9, and 42% in grade 11 were offered a drug in the past 12 months. For almost two thirds of these youth, this occurred more than one time. In the 11th grade, 15.5% reported being offered a drug four or more times.

Taken as a whole, these results point to the importance of maintaining a drug-free school in any effort to turn around low-performing schools and improve achievement. Efforts to enhance academic achievement are more likely to be successful in schools with high numbers of students who do not routinely use drugs and in which alcohol, cigarettes, and marijuana are not readily available.

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Table 6. *Constructs and Items Used in the Analysis for Substance Use*

Construct	Question	Description
ALCOHOL, TOBACCO, AND OTHER DRUG USE		
Lifetime ATM Use (%)		During your life, have you ever used or tried…
Average percentage reporting any use	A21	▪ even one or two puffs of a cigarette?
	A22	▪ a whole cigarette?
	A24	▪ at least one drink of alcohol, not just a sip?
	A26	▪ marijuana?
Lifetime Hard Drug Use (%)		During your life, have you ever used or tried…
Average percentage reporting any use	A28	▪ cocaine in any form, including powder, crack, or freebase?
	A29	▪ methamphetamines?
	A31	▪ heroin?
	A32	▪ any other illegal drug?
Lifetime Intoxication (%)		During your life, how many times have you been…
Average percentage reporting any use	A33	▪ very drunk or sick after drinking alcohol?
	A34	▪ "high" from using drugs?
30-day ATM Use (%)		During the past 30 days, on how many days did you…
Average percentage reporting any use	A36	▪ smoke cigarettes?
	A38	▪ have at least one drink of alcohol?
	A39	▪ have five or more drinks of alcohol in a row, that is, within a couple of hours?
	A40	▪ use marijuana?
Hard Drug Use (%)		During the past 30 days, on how many days did you…
Average percentage reporting any use	A42	▪ use cocaine or crack?
	A43	▪ use methamphetamines?
	A44	▪ use LSD or other psychedelics?
	A45	▪ use any other illegal drug?
SUBSTANCE USE AT SCHOOL		
Lifetime Intoxication on School Property (%)	A35	During your life, how many times have you been drunk or "high" on drugs on school property?
Percentage reporting any use		
30-day ATM Use on School Property(%)		During your life, how many times have you been drunk or "high" on drugs on school property?
Average percentage reporting any use	A46	▪ smoke cigarettes?
	A47	▪ have at least one drink of alcohol?
	A48	▪ smoke marijuana?
AVAILABILITY OF DRUGS		
Cigarette/Alcohol Availability (%)		How difficult is it for students in your grade level to get…
Average percentage reporting substance is "easy" or "very easy" to obtain	A57	▪ cigarettes if they really want them?
	A58	▪ alcohol if they really want it?
Marijuana Availability (%)		How difficult is it for students in your grade level to get…
Percentage reporting substance is "easy" or "very easy" to obtain	A59/A57	▪ marijuana if they really want it?

Table 6. *Constructs and Items Used in the Analysis for Substance Use*

Construct	Question	Description
Methamphetamine Availability (%) *Percentage reporting substance is "easy" or "very easy" to obtain*	A60	How difficult is it for students in your grade level to get… ▪ methamphetamine if they really want them?
Offered Illegal Drugs at school (%) *Percentage reporting that this happened 1 or more times*	A63	During the past 12 months, how many times on school property have you… ▪ been offered, sold, or given an illegal drug?

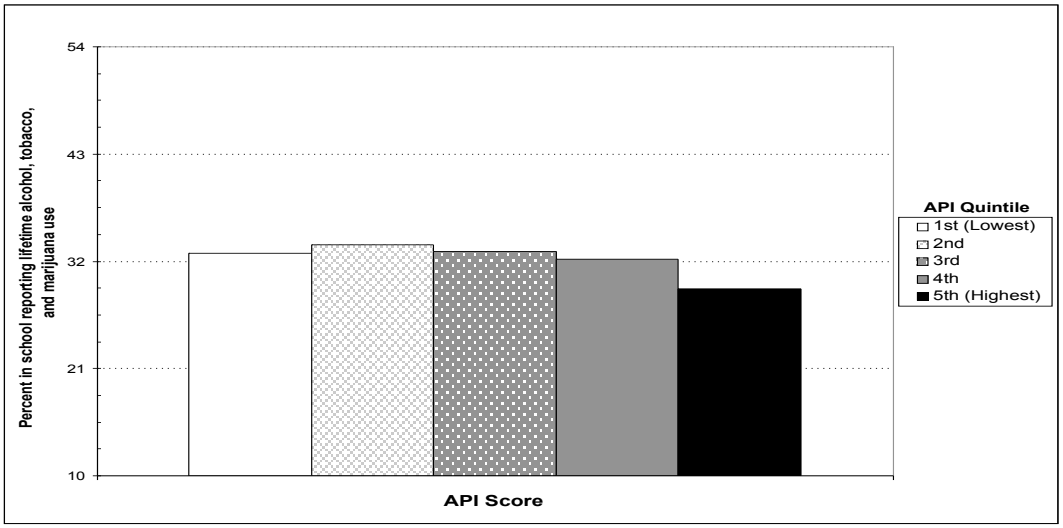
Table 7. *Relationship of Substance Use & Availability to API scores*

	Academic Performance Index (API)	
	Unadjusted B [β]	Adjusted[B] B [β]
Substance Use and Intoxication		
Lifetime ATM Drug Use (%)	-2.573** [-0.256]	-1.745** [-0.174]
Lifetime Hard Drug Use (%)[A]	-4.004* [-0.076]	-1.960* [-0.037]
Lifetime Intoxication (%)	-1.838** [-0.161]	-1.702** [-0.149]
30-day ATM Drug Use (%)	-4.074** [-0.215]	-2.470** [-0.130]
30-day Hard Drug Use (%)[A]	-0.441 [-0.006]	-0.647 [-0.009]
Substance Use/Intoxication at School		
Ever Intoxicated on School Property (%)	-3.725** [-0.198]	-2.264** [-0.120]
Any 30-day ATM Use on School Property (%)	-0.229** [-0.384]	-5.352** [-0.090]
Availability of Drugs		
Cigarette/Alcohol Availability (% easy) [A]	7.265** [0.445]	0.417 [0.026]
Marijuana Availability (% easy) [A]	0.257 [0.020]	-0.301 [-0.024]
Methamphetamine Availability (% easy) [A]	-4.109** [-0.145]	-0.946* [-0.033]
Offered illegal drugs (%)	-3.204** [-0.263]	-1.581** [0.130]

Notes: Standardized beta coefficients in brackets. * significant at 5%; ** significant at 1%; [A]measure applicable to High School students only; [B]estimates come from a model that controls for the race/ethnic and gender composition of the school, average parental education, percentage of students receiving subsidized meals, percentage of ELL students, and school grade configuration.

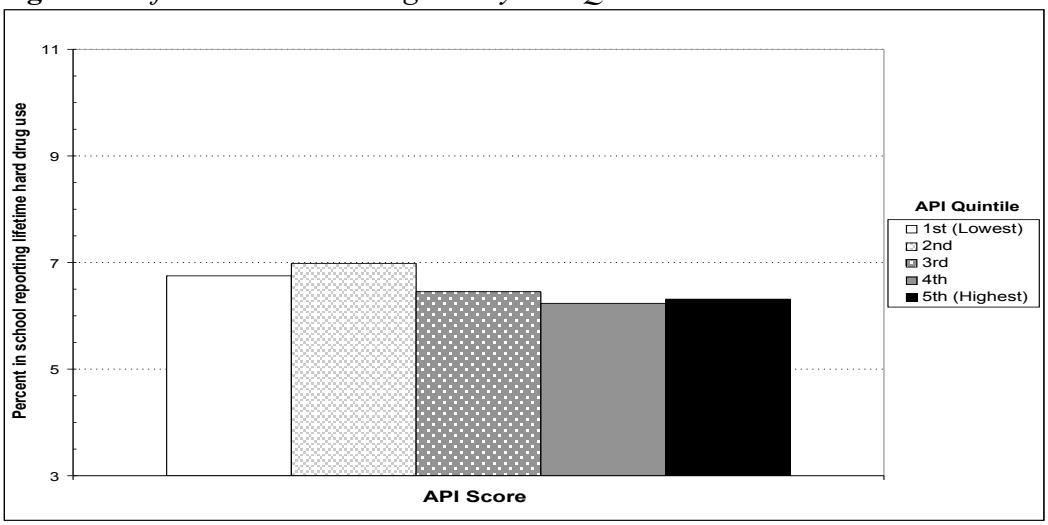
Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

Figure 4. *Lifetime Alcohol, Tobacco, & Marijuana Use by API Quintile*



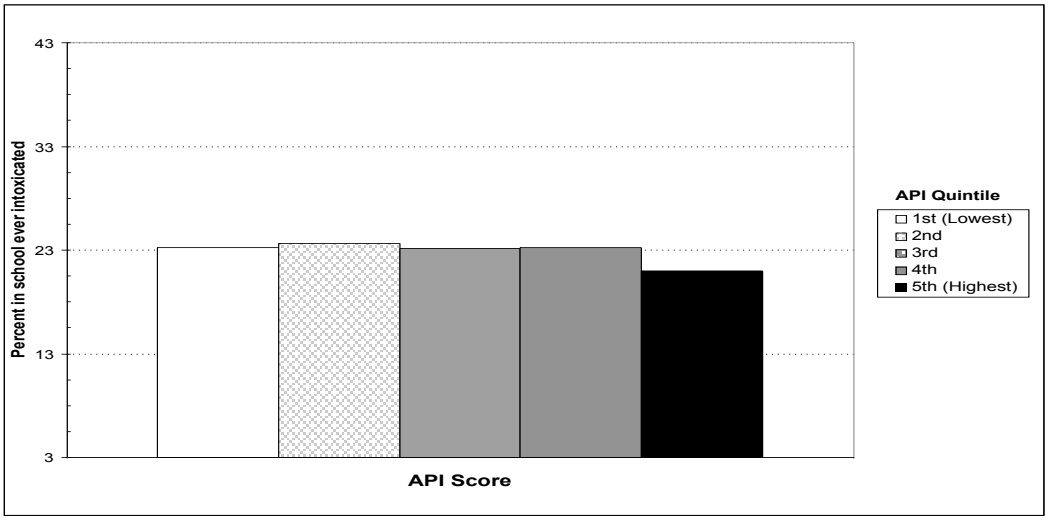
Notes: [1] School-level analysis. Analytic sample consists of 1,692 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Lifetime ATM use is measured by the average percentage of students who reported that they ever smoked one or two puffs of a cigarette (A21), smoked a whole cigarette (A22), had a whole drink of alcohol (A24), and tried marijuana (A26).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 5. *Lifetime "Hard" Drug Use by API Quintile*



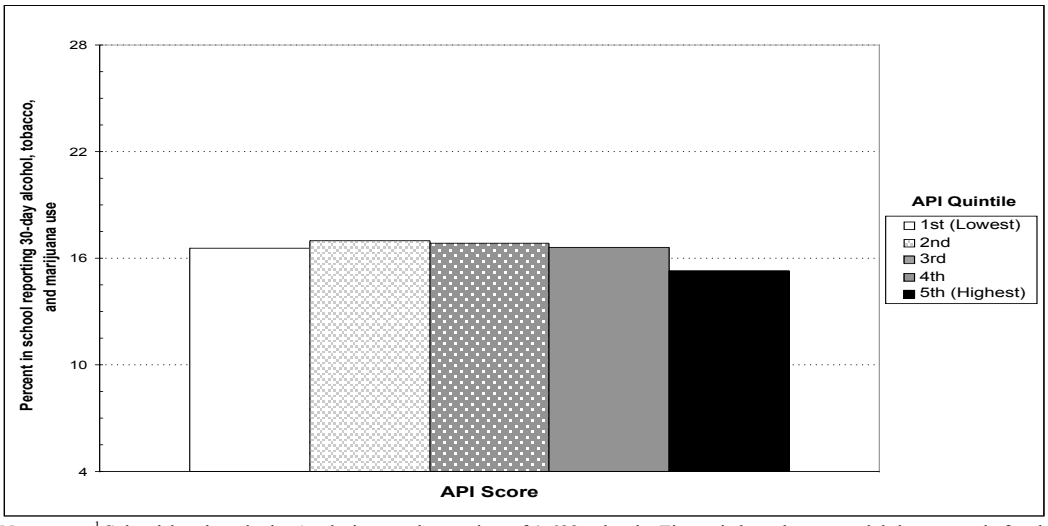
Notes: [1] School-level analysis. Analytic sample consists of 736 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Lifetime "hard" drug use is measured by the average percentage of students who reported that they ever tried cocaine (A28), methamphetamines (A29), heroin (A31), and an other illegal drug (A32).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 6. *Lifetime Intoxication by API Quintile*



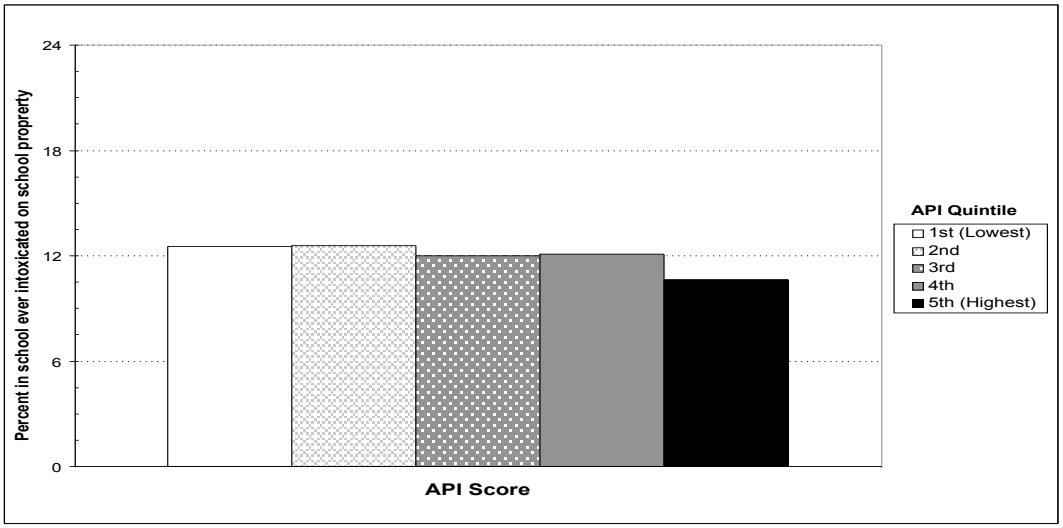
Notes: [1] School-level analysis. Analytic sample consists of 1,691 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Lifetime intoxication is measured by the average percentage of students who reported that they had ever been drunk or sick after drinking alcohol (A33) and had ever been "high" from using drugs (A34).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 7. *30-day Alcohol, Tobacco, & Marijuana Use by API Quintile*



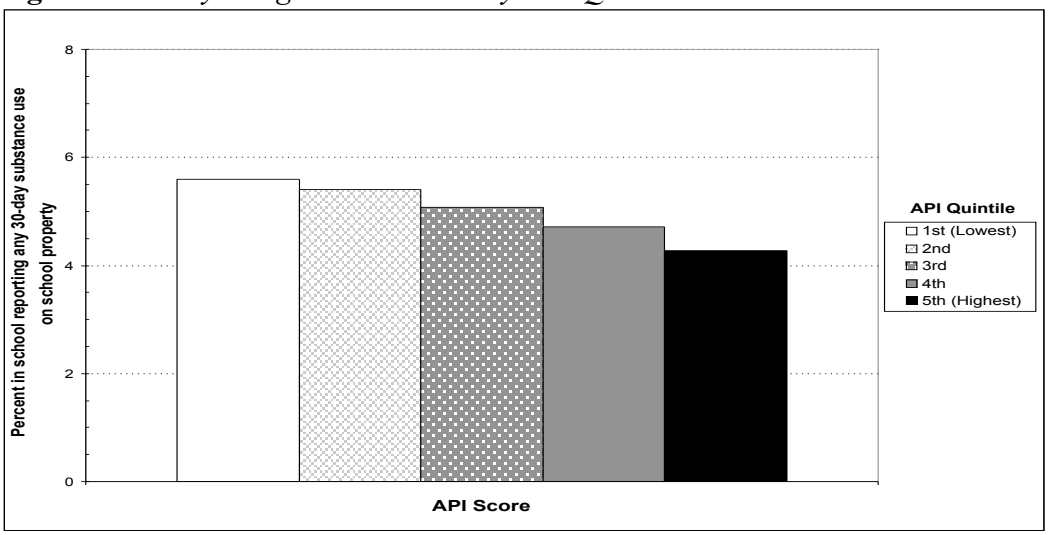
Notes: [1] School-level analysis. Analytic sample consists of 1,692 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] 30-day "soft" drug use is measured by the average percentage of students who reported that they smoked cigarettes (A36), drank alcohol (A38), binged on alcohol (A39), and smoked marijuana (A40) in the 30 days prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 8. *Lifetime Intoxication at School by API Quintile*



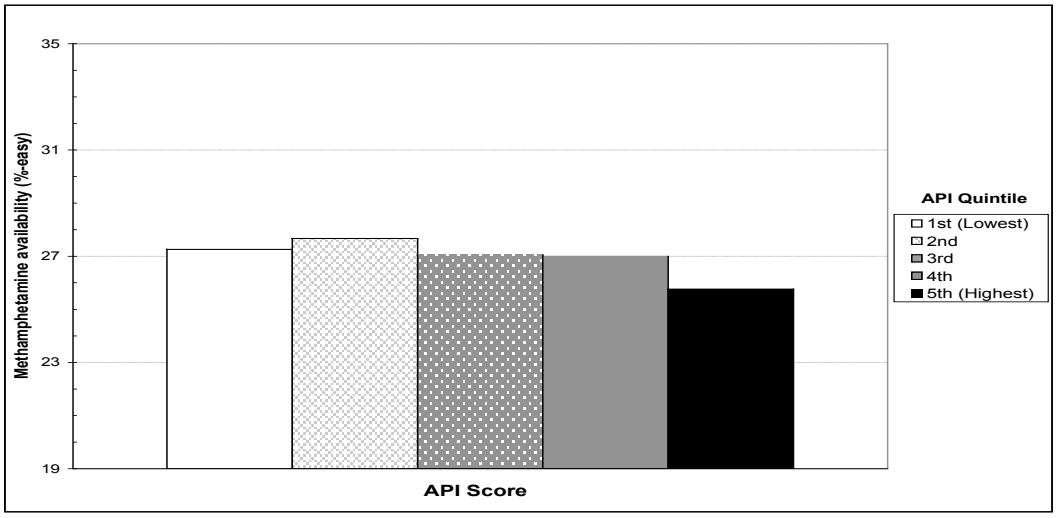
Notes: [1] School-level analysis. Analytic sample consists of 1,691 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Lifetime intoxication at school is measured by the percentage of students who reported that they were ever "drunk" or "high" on school property (A35).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 9. *30-day Drug Use at School by API Quintile*



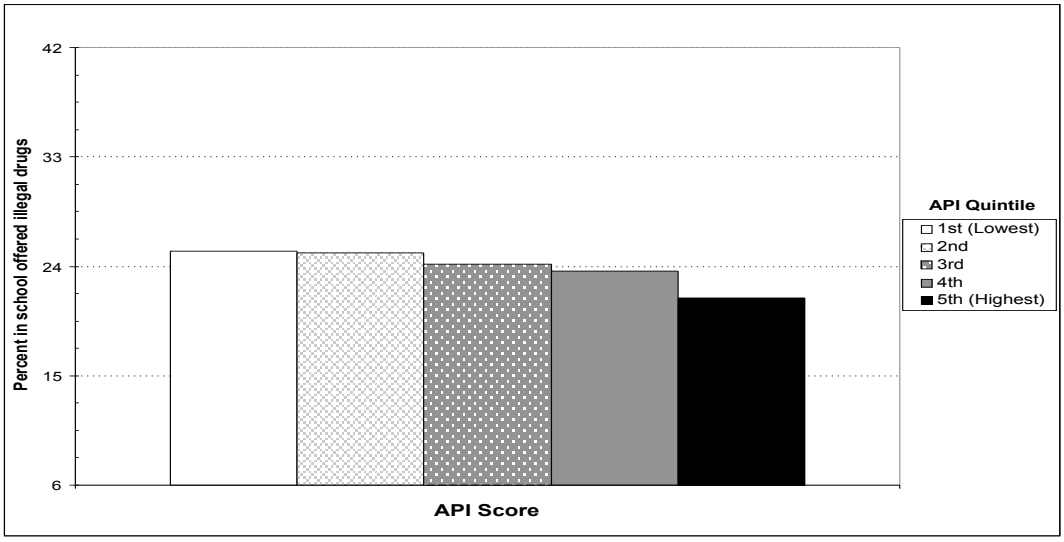
Notes: [1] School-level analysis. Analytic sample consists of 1,691 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] 30-day drug use at school is measured by the average percentage of students who reported that they smoked cigarettes (A46), drank alcohol (A47), and smoked marijuana (A48) on school property in the 30 days prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 10. *Methamphetamine Availability by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 703 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Methamphetamine availability is measured by the percentage of students who reported that methamphetamines were "easy" or "very easy" to obtain (A60).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 11. *Offered Illegal Drugs by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 1,688 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Offered illegal drugs is measured by the percentage of students who reported that they were offered, sold, or given an illegal drug (A63) during the 12 months prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

5. SCHOOL SAFETY ENVIRONMENT

Research on the School Safety Environment

It is intuitively obvious that violence, crime, antisocial behavior, and other types of social disorganization on school campus can have adverse consequences for student learning. Numerous studies demonstrate that bullying and violent actions in school settings have deleterious consequences for students (Beauvais et al. 1996, Bowen & Bowen 1999, Bowen, Richman, Brester, & Bowen 1998, Eccles, Lord, & Midgley 1991, Ellickson, Saner, & McGuigan 1997, Furlong, Chung, Bates, & Morrison 1995, Gronna & Chin-Chance 1999, Herrenkohl et al. 2000, Jenkins & Bell 1994, National Center for Educational Statistics 1995). Prothrow-Stith (1995) argues that in more violent schools, students have less time to focus on academic activities as violence diverts students' attention away from academic pursuits. Furlong et al (1995) found that students who had been victims of violence had lower grades and perceived higher levels of danger at school than their non-victim peers. They suggested that high levels of school violence may have a "generalized retarding effect on a child's development and overwhelm coping and protective factors naturally present in the student's life" (pp. 294-295).

Consistent with this, Gronna & Chin-Chance (1999) found that students in "safe schools" — schools with low numbers of suspensions for assault, weapon possession, drug usage, sexual offenses, student insubordination, and harassment — performed significantly better than students in unsafe schools in both mathematics and reading, even after controlling for background and other school characteristics. Bowen et al (1998) found that among middle and high school students at risk of school failure, perceptions of danger at school negatively influenced their psychological engagement in school and confidence in their ability to meet school-related demands.

Bowen & Bowen (1999) describe three ways in which risky school environments can adversely affect student performance and learning. First, exposure to violence, abuse, and crime on campus can increase the emotional and psychological distress experienced by students. Emotional and psychological distress, in turn, can reduce academic performance by diminishing students' capacity to concentrate and expend energy on academic-related matters. Most researchers examining the relationship between school safety and academic performance focus on this type of explanation, which might also explain why exposure to distressing events *outside of school* are related to school performance.

Second, the distress associated with exposure to crime, violence, and/or bullying and teasing may directly reduce instruction time by causing students to stay home from school or cut classes (Harris & Associates 1995). Perceptions of danger at school could also reduce students' psychological engagement with school (Bowen et al.1998).

Finally, crime, violence, and social disorganization at school may affect academic performance by influencing teaching and learning processes in the classroom. For example, Lochman, Lampron, Gemmer, & Harris (1987) found that students who were disruptive and aggressive in the classroom had a negative impact on their classmates' education by diverting teachers' attention and reducing instruction time (*c.f.* Bowen & Bowen 1999). These results suggest that social disorganization in schools has the potential to divert resources away from teaching. This conclusion is borne out with national survey data. Nationwide, 27% of teachers say that student misbehavior keeps them from teaching "a fair amount to a great deal of the time." (Gottfredson et al. 2000). In addition, the adverse effects of exposure to violence experienced by some portion of a school's students, teachers, and staff may spread to others within that setting. Lorian (1998) notes that as this "contagion" occurs, the school setting changes in ways that have a negative impact on the interactions among students within the school, which in turn interfere with the school's capacity to achieve its educational and social goals.

Although crime, violence, antisocial behavior, and safety are logically and empirically linked to student learning and performance, studies examining this linkage suffer from some of the same problems as those examining how ATOD use and academic performance are related. Much of the evidence is based on correlational data. Unlike the case for ATOD use, few studies have been conducted that disentangle the reciprocal influences of antisocial behavior and academic performance on each other across time. However, several longitudinal studies have focused on how school performance influences the subsequent manifestation of antisocial behavior, finding that poor academic performance increases antisocial behavior (Ellickson, Saner, & McGuigan 1997, Herenkohl et al. 2000).

In addition, a substantial body of work has shown that social disorganization, exposure to violence, and exposure to other forms of trauma *outside* of school settings can adversely affect cognitive, social, and emotional development (Berman, Kurtines, Silverman, & Serafini 1996, Berton & Stabb 1996, Bowen & Bowen 1999, Kuther & Fisher 1998, Simcha-Fagan & Schwartz 1986). For example, children exposed to conflict between their parents or fighting in their neighborhoods exhibit lower levels of school performance than their counterparts who are not exposed to such hostility (e.g. Hanson 1999, Lorian & Saltzman 1993). All of this work suggests

that violence, crime, harassment, and other forms of social disorganization inside and outside of schools can hinder student learning.

CHKS Measures

To measure the role of violence or lack of safety in the school environment, we analyzed data on victimization, violence perpetration, and perceptions of school safety. As shown in **Table 8**, three single-item measures are used to assess the school environment with regard to victimization: (1) being harassed because of race, ethnicity, gender, sexual orientation, or disability, (2) being threatened/injured with a weapon (i.e., gun, knit club, etc.), and (3) having property stolen or vandalized. These items are only weakly correlated with each other and appear to represent distinct concepts.

Violence-related behavior at school was assessed with two measures: (1) any physical fighting at school in the past 12 months and (2) weapon possession at school in the past 30 days. Finally, the percentage of students reporting that they felt "safe" or "very safe" at school was used to measure perceptions of overall school safety.

CHKS – API Results

The victimization-related results presented in **Table 9** and in **Figure 12** show that API scores are lower in schools with a high percentage of students who report being threatened with a weapon on school property, although the relationship is not as strong as might be supposed. As with many of the drug use measures described in the previous section, this measure seems to make the biggest difference in distinguishing schools in the top performance quintile from other schools. Reports of harassment and having property stolen or damaged were not significantly related to API scores.

Table 10 and **Figures 13** and **14** show how violence, weapon possession, and school safety are related to API scores. The results indicate that:

- Physical fighting at school is unrelated to API scores after controlling for school characteristics, a result that is inconsistent with prior research.
- Weapon possession at school is negatively related to API scores. As the percentage of students who bring weapons to school increase, API scores go down (**Figure 13**).
- Perceived safety at school (felt safe or very safe) exhibits a strong, positive, stepwise relationship with API scores (**Figure 14**).

These results provide support for the notion that school performance suffers when youth do not feel safe and secure at school. Because we controlled for differences across schools in socioeconomic and racial/ethnic characteristics, it is unlikely that this relationship is brought about because economically deprived schools, or schools that serve economically deprived student bodies, are less safe than more affluent schools. Regardless of socioeconomic makeup, schools with proportionately high numbers of students who perceive that their school is safe have higher API scores than other schools.

Summary and Discussion

Prior research has shown that crime, violence, and antisocial behavior are connected to student learning. The school-level results presented above are consistent with this research. First, California schools with high percentages of students who report being threatened with a weapon and/or possessing weapons on school property have lower API scores than other schools. Second, perceived school safety is strongly related to API scores. Regardless of their socioeconomic makeup, California schools with proportionately high numbers of students who perceive that their school is safe have markedly higher API scores than other schools.

The fact that API scores are not significantly related to general harassment, property crime, and fighting at school may be because they are measured with school-level indicators and are confounded by other factors. For example, the term "harassment" is a culturally construed term that may require a certain level of sophistication to recognize and report on a survey. Schools with proportionately large numbers of students who report being harassed may also have large numbers of students with other characteristics that are associated with higher test scores—and the presence of these students may have masked our ability to detect any negative effects of harassment on school performance. The fact that harassment, property crime, and fighting at school are not related to API scores at the school-level does not mean that these factors are not related to school performance at the individual level.

That violence and safety are related to academic performance is not surprising. It certainly is unlikely that optimal student learning can take place in an insecure and dangerous environment. The results presented in this section suggest that efforts to improve academic performance are more likely to be successful in schools where students feel safe and secure. Efforts to reduce weapon possession and improve overall school security are not only beneficial to student safety and well-being — the most important outcome of such efforts — they could translate into improvements in test scores. The climate of the school and the quality of the relationships students have with each other are related to API scores.

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Table 8. *Constructs and Items Used in the Analysis for School Safety Environment*

Construct	Question	Description
VICTIMIZATION AND FIGHTING		During the past 12 months, how many times on school property have you…
Harassed (%) *Percentage reporting that this happened 1 or more times*	A64	▪ been harassed because of your race, ethnicity, gender, sexual orientation, or disability?
Threatened/Injured with Weapon (%) *Percentage reporting that this happened 1 or more times*	A65	▪ been threatened or injured with a weapon such as a gun, knife, or club?
Property Stolen/Damaged (%) *Percentage reporting that this happened 1 or more times*	A67	▪ had your property stolen or deliberately damaged, such as your car, clothing, or books?
Physical Fight at School (%) *Percentage reporting that this happened 1 or more times*	A66	▪ been in a physical fight?
WEAPON POSSESSION		
Weapon Possession at School (%) *Average percentage reporting that this happened 1 or more times*		During the past 30 days, on how many days did you carry…
	A68	▪ a gun on school property?
	A70	▪ a club on school property?
	A71	▪ any other weapon on school property?
SAFETY		
School Safety (%) *Percentage reporting feeling "safe" or "very safe"*	A72	How safe do you feel when you are at school?

Table 9. *Relationship of School Risk Environment to API Scores*

	Academic Performance Index (API)	
	Unadjusted	**Adjusted[A]**
	B [β]	**B [β]**
Happen at school past 12 months:		
Harassed (%)	0.900	-0.406
	[0.033]	[-0.015]
Threatened/injured with weapon (%)	-8.046**	-1.530**
	[-0.193]	[-0.037]
Property stolen/damaged (%)	0.931	0.018
	[0.036]	[0.001]

Notes: Standardized beta coefficients in brackets. * significant at 5%; ** significant at 1%; [A]Estimates come from a model that controls for the race/ethnic and gender composition of the school, average parental education, percentage of students receiving subsidized meals, percentage of ELL students, and school grade configuration.

Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

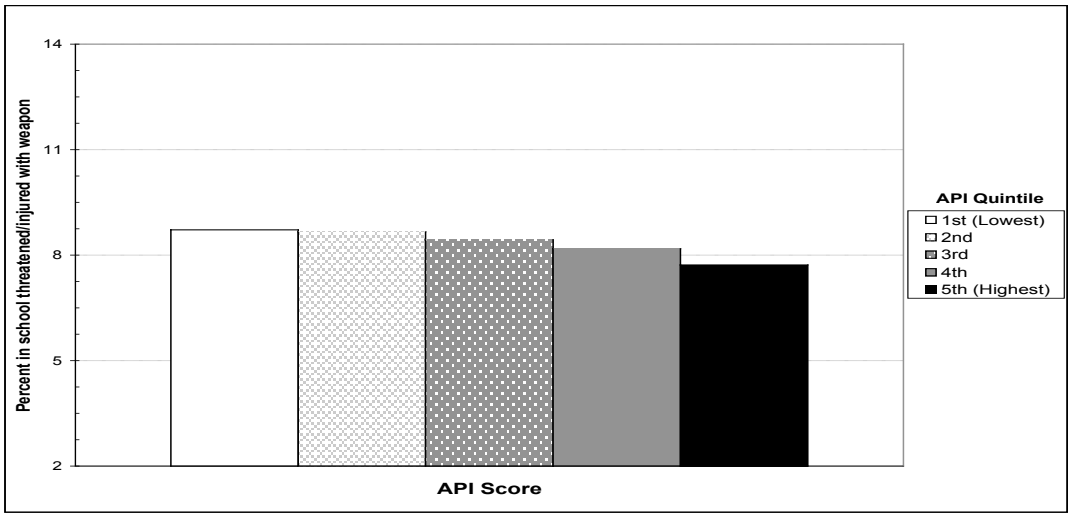
Table 10. *Relationship of Violence/Weapons Possession and School Safety to API Scores*

	Academic Performance Index (API)	
	Unadjusted	Adjusted[A]
	B [β]	B [β]
Physical fight at school (%)	-5.341**	-0.145
	[-0.223]	[-0.006]
Weapon possession at school (%)	-65.873**	-9.345**
	[-0.454]	[-0.064]
Feel safe at school (%)	11.030**	1.607**
	[0.563]	[0.082]

Notes: Standardized beta coefficients in brackets. * significant at 5%; ** significant at 1%; [A]Estimates come from a model that controls for the race/ethnic and gender composition of the school, average parental education, percentage of students receiving subsidized meals, percentage of ELL students, and school grade configuration.

Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

Figure 12. *Threatened/Injured with Weapon by API Quintile*



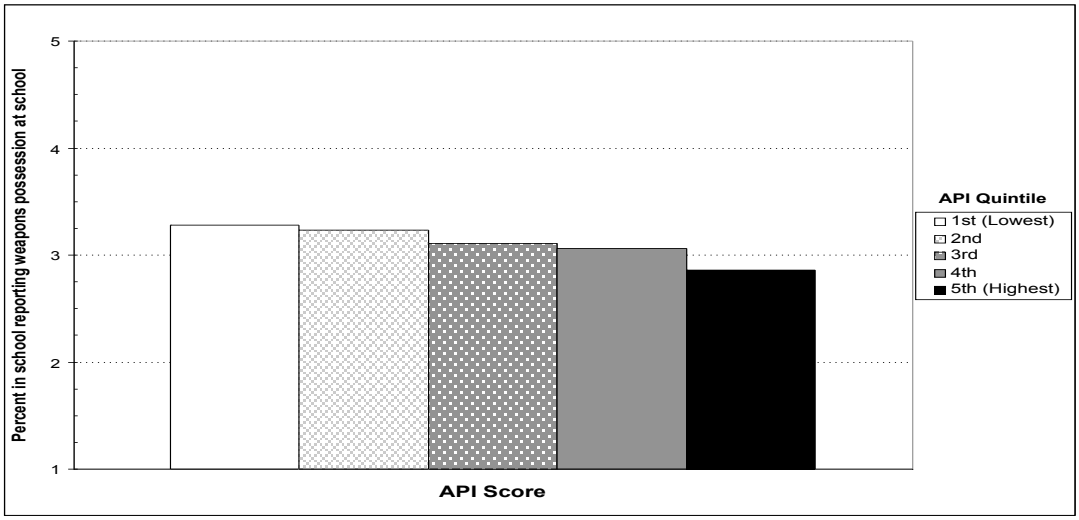
Notes: [1] School-level analysis. Analytic sample consists of 1,652 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.

[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.

[3] Threatened/Injured with weapon is measured by the percentage of students who reported that they were threatened or injured with a weapon on school property (A65) during the 12 months prior to the survey.

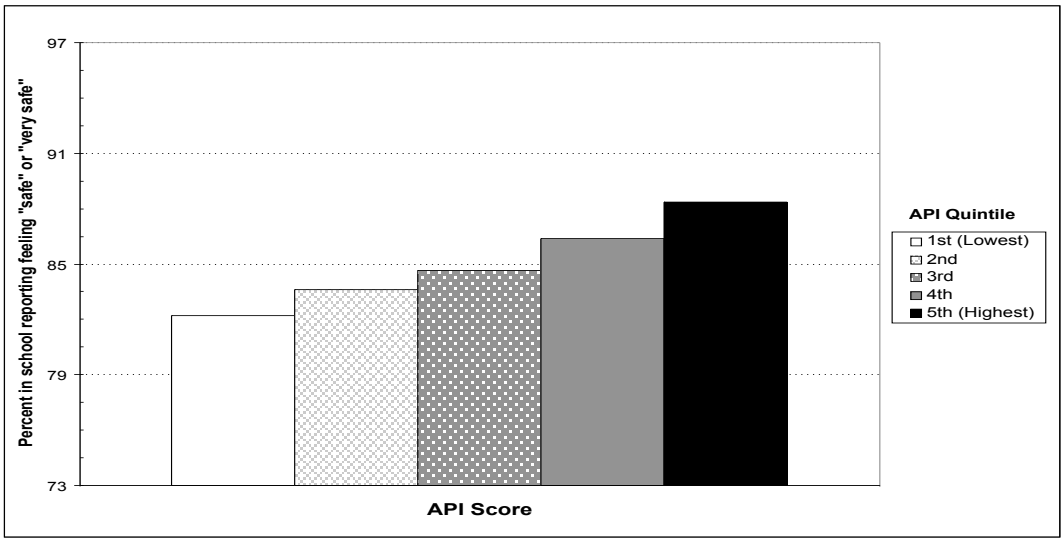
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 13. *Weapon Possession at School by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 1,674 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Any weapons possession at school is measured by the average percentage of students who reported that they carried a gun (A68), a club (A70), and any other weapon (A71) on school property in the 30 days prior to the survey.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 14. *Safety at School by API Quintile*



Notes: [1] School-level analysis. Analytic sample consists of 1,690 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Safety at school is measured by the percentage of students who reported that they felt "safe" or "very safe" at school (A72).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

6. RESILIENCE ASSETS

External Asset Research

Studies across a broad variety of fields have begun to identify a clear set of factors related to healthy outcomes for children living in risky environments. Resilience research—studies of positive youth development in the face of environmental threat, stress, and risk—identify these factors as **caring relationships**, **high expectation messages**, and **opportunities for participation and contribution** (Benard 1991). These supports and opportunities, referred to as external resilience assets or protective factors, are associated with both lack of involvement in health compromising behaviors and with academic success (Hawkins, Catalano, & Miller 1992, Masten & Coatsworth 1998, Werner & Smith 1982, 1992). To maximize opportunities for successful learning and healthy development, these three resources should be available to youth across different environments: **school**, **home**, **community**, and **peer groups**. Attention to these and other factors, which can help youth navigate adolescence in healthy ways, hold great promise for comprehensive programs addressing the developmental needs of children (Flay, Allred, & Ordway 2001; Roth, Brooks-Gunn, Murray, & Foster 1998).

Caring Relationships

Numerous studies suggest that caring relationships in school settings are positively related to student learning and academic performance. Feelings of connectedness with teachers at school are related to higher levels of school engagement, educational aspirations, achievement motivation, and academic achievement (Anderman 1999, Connel & Halpern-Felsher 1997, Murdock, Anderman, & Hodge 2000, Resnick et al. 1997, Ryan & Patrick 2001). Wentzel (1997) found that students who reported that their teachers care about them increased their work effort over the next year. Evidence of the link between caring relationships at school and academic success also can be deduced from program evaluations. Participation in the Families in Action program and the Seattle Social Development Program—both aimed at increasing teens' attachment to schools, families, and peers—is related to higher levels of school engagement (Abbey, Pilgrim, Hendrickson, & Buresh 2000, Hawkins, Catalano, Kosterman, Abbott, & Hill 1999).

Caring relationships at home are also related to academic performance and learning. Connell & Halpern-Felsher (1997) found that parental involvement in children's schooling is related to greater self-regulation in learning and greater behavioral and emotional school engagement. Increased levels of parental involvement are associated with higher student

educational aspirations, educational expectations, and academic performance (Fan & Chen 1999, Trusty 1999, Trusty & Harris 1999). *Authoritative parenting*—parenting which involves high levels of parental warmth and support in combination with high levels of demandingness, limit-setting, and monitoring—has been generally found to be related to higher school performance (Cohen & Rice 1997, Dornbusch, Ritter, Leiderman, Roberts, & Fraleigh 1987, Glasgow, Dornbusch, Troyer, Steinberg, & Ritter 1997). Adolescents with *authoritarian* parents—parents who provide high levels of control in combination with low levels of parental warmth—have been found to exhibit lower levels of performance in school. Although these results do not hold for all ethnic groups, particularly Chinese (Chao 2001, Dornbusch et al. 1987), they suggest that a combination of caring relationships and high expectations is beneficial for children's academic success.

The research evidence concerning the relationship between caring relationships in the community and academic performance is more sparse. Perhaps the best evidence comes from the link between participation in mentoring programs and academic performance. Several rigorous experimental studies have shown that participation in mentoring programs increases academic self-concept, school attendance, school bonding, and school grades (Tierney, Grossman, & Resch 1995). Few studies have examined how caring relationships with peers influence school performance. There is a potential for peer relations to have positive or negative consequences for school performance—depending on the characteristics of the peers that adolescents choose to be with. Jordan & Nettles (1999) found that adolescents who spent more time with friends had lower test scores than adolescents spending less time with friends.

High Expectations

High expectations in the school environment have been consistently linked to academic success. For example, adolescents who perceive that their teachers have high expectations for educational success subsequently try harder in school (Murdock, Anderman, & Hodge 2000). And school norms that emphasize mastery of subjects have been found to increase adolescents' intrinsic motivation to learn over time (Anderman 1999). Parental expectations are also strongly linked to various indicators of academic success (Goyette & Xie 1999, Fan & Chen 1999). We are unaware of any research that has focused directly on how high expectations in the community are related to academic performance.

Although associating with delinquent peers is one of the most consistent predictors of substance use and antisocial behavior (Carpenter, Lyons, & Miller 1985; Elliot, 1985; Matsueda and Heimer, 1987; Resnick et al., 1997; Williams et al., 1999), little work has examined the

relationship between adolescents' peer networks and academic performance. Ryan (2001), however, found that the level of achievement motivation among peers increased adolescents' achievement motivation one year later. Peer educational aspirations are also longitudinally related to adolescents' school effort and educational expectations (Murdock et al. 2000). These results suggest that association with prosocial peers may have beneficial consequences for learning and academic performance.

Meaningful Participation

There is research to support the claim that opportunities for meaningful participation at school increase academic achievement. Studies have found a link between greater autonomy-granting by teachers and learning (Chirkov & Ryan 2001). Using an experimental design, Nichols (1996) found that cooperative learning strategies—strategies in which the students themselves play an active role in learning—are associated with increases in academic motivation. It appears that cooperative learning environments have particularly beneficial consequences for low achieving and high achieving students (Slavin 1996). Children's involvement at home in relevant activities that provide opportunities for responsibility and contribution has also been linked to academic achievement. For example, family environments that encourage adolescents to be involved in decision-making are associated with more positive school adjustment, achievement motivation, satisfaction with school, and better student/teacher relations (Chirkov & Ryan 2001, Lord, Eccles, & McCarthy 1994).

Meaningful participation in the community is related to academic success. Participation in clubs, sports, and other activities away from school are positively associated with school performance. Some of the best evidence comes from evaluations of programs that increase adolescents' involvement in the community. An experimental evaluation of the *Teen Outreach Program*, a volunteer community service program, showed that participation in community service activities increases academic success and reduced school behavior problems (Allen, Philliber, Herrling & Kuperminc 1997). Similarly, both the national evaluation of the *Learn and Serve* programs and the *CalServe* evaluation found positive student impacts in terms of engagement in school, grades, core subject GPA, and educational aspirations (Melchior 1996, 1998, RPP International 1998).

Internal Asset Research

As conceived of the youth development framework, internal resilience assets — such as self-efficacy, problem solving, and empathy — are developed both naturally and in response to

exposure to external resilience assets, and these assets help spur healthy development. Numerous studies have found a link between internal assets and academic performance. For example, students who have positive conceptions of themselves are more likely to do well in school (Bandura, Barbaranelli, Caprara, & Pastorelli 1996, Hamachek 1995). Other psychological factors related to academic success include socioemotional adjustment, self-efficacy, responsibility, and depression (Teo, Carlson, Mathieu, Egeland, & Sroufe 1996, Ekstrom, Goertz, Pollack, & Rock 1986, Sewell, Palmo, & Manni 1981). These internal resilience assets may act as buffers to environmental risk.

CHKS Measures

The CHKS Resilience and Youth Development Module (RYDM) asks students about the level of fundamental environmental (external) and individual (internal) resilience assets that have been found to promote resilience and protect a young person from involvement in health-risk behaviors. **Table 11** details the constructs and items from the RYDM used for this analysis.

External Resilience Assets

The measures of external resilience assets, or protective factors, consist of caring relationships, high expectations, and meaningful participation. The three dimensions of external resilience assets are further distinguished by the source of support (school, home, community, and peers). These constructs are based on the conceptualizations grounded in the youth development model. **Caring relationships** are defined as supportive connections to others in the student's life who serve as models and support healthy development and well-being. **High expectation messages** are defined as consistent communication of direct and indirect messages that the student can and *will* succeed responsibly. They are at the core of caring relationships and reflect an adult's and friend's belief in the youth's innate resilience and ability. The RYDM asks students their perceptions of the messages they receive concerning their ability to follow rules, be a success, do their best, try to do what is right, and do well in school. **Meaningful participation** represents the involvement of the student in relevant, engaging, and interesting activities with opportunities for responsibility and contribution. The RYDM asks students about their opportunities to make decisions in their families and schools, to do fun and interesting things, and to participate in a way that makes a difference in their families, schools, and communities. Meaningful participation is not assessed for the peer environment.

For each external asset area, three-item scales were developed for each of the four environments, with the exception of the peer group, as delineated in **Table 11**. For each

environmental source of support the items are similar with only slight contextual adaptations. The average percentage of students reporting "pretty much true" or "very true" is used to measure each dimension of external resilience assets.

Internal Resilience Assets

Internal resilience assets measure students' healthy development and well-being. The CHKS contains 16 items that measurement analyses suggested measure one dimension of internal resilience assets at the school-level. At the student-level, these items were intended to measure distinct dimensions of cooperation and communication, self-efficacy, empathy, problem solving, self-awareness, and goals & aspirations. As with external resilience assets, the average percentage of students reporting "pretty much true" or "very true" is used to measure internal resilience assets.

CHKS – API Results

As youth-development theory predicts, practically every measure of external resilience assets is positively related to API scores. As external resilience assets provided by schools, homes, communities, and peers go up, API scores also go up (**Table 12**). The only exception to this is caring relationships with peers, which is unrelated to school API scores. Internal resilience assets are also positively related to API scores.

School Environment

Figures 15-18 show how external resilience assets provided by schools are related to API scores. The graphs for total school external assets, caring relationships, and high expectations all show a similar pattern—as API scores go up, assets go up, but the level of school assets does not distinguish between the two lowest performance quintiles (**Figures 15-17**). The results for meaningful participation at school (**Figure 18**) are less clear, but generally show that schools in the highest API performance quintile have higher percentages of students who engage in relevant, engaging, and interesting activities at school. Overall, the results for school assets are consistent with prior research that has shown that school bonding is fundamental for school achievement.

Home Environment

Figures 19-22 show how assets provided by families are related to API scores. The results for home or family assets were even more clear than those for school assets. As the percentage of

students from families who provide caring relationships, high expectations, and meaningful participation increases, API scores increase in a positive, stepwise manner. Like the results for school assets, however, opportunities for meaningful participation at home did not distinguish between the two lowest performance quintiles. Overall, home assets were more strongly associated with API scores than school assets.

Community Environment

The results for community assets presented in **Figures 23-26** are very similar to those for home assets. Total community external assets as well as caring relationships, high expectations, and opportunities for meaningful participation from community sources were positively related to API scores.

Peer Environment

Figure 27 shows that total peer assets is positively associated with test scores, and **Figure 28** shows that schools with high percentages of students who reported that they have prosocial peers exhibited higher API scores than other schools. The percentage of students with prosocial peers rises dramatically and consistently as API scores go up. These results are consistent with prior research showing that peer relations play an important role in influencing school performance and general well-being. However, caring relations with peers, specifically, was not significantly related to test scores.

Internal Resilience Assets

Finally, the results for internal resilience assets presented in **Figure 29** show that the psychological well-being of the student body is strongly related to API scores. As internal resilience assets go up, API scores go up.

Summary and Discussion

Prior research has demonstrated that external and internal resilience assets are related to academic performance. Furthermore, these assets may be responsible for much of the relationship between health risk and academic performance, as external and internal assets are associated with both lack of involvement in health compromising behavior and with academic success. The CHKS results reported above are consistent with prior research—caring relationships, high expectations, and opportunities for meaningful involvement in schools, homes, communities, and among peers are strongly related to API scores. These relationships

held for all but one of the external asset measures used in the analysis. Caring relationships with peers was not related to API scores, while exposure to prosocial peers was strongly related to test scores. Perhaps caring relationship with prosocial peers, rather than caring relations with peers in general, has the most beneficial consequences for academic performance. The results for internal resilience assets indicate that the general psychological well-being of the student body is strongly related to API scores.

These CHKS-API findings, along with those from prior research, suggest that broad-based, multifaceted, comprehensive programs that focus on the whole child not only hold great promise for prevention of health risk behavior, but also hold great promise for improving academic performance. They suggest that the school "context" is important and cannot be ignored. Some schools face significant challenges to address the pressing development needs of their pupils. However, the encouraging finding is that schools that can provide caring, supportive, and challenging environments that enhance assets can potentially help students and increase their academic performance.

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Table 11. *Constructs and Items Used in the Analysis for External and Internal Resilience Assets*

Construct	Question	Description
EXTERNAL RESILIENCE ASSETS		
School Assets		
Caring Relationships at School (%)		At my school, there is a teacher or some other adult who…
Average percentage reporting "pretty much true" or "very true"	F32	▪ really cares about me.
	F34	▪ notices when I'm not there.
	F37	▪ listens to me when I have something to say.
High Expectations at School (%)		At my school, there is a teacher or some other adult who…
Average percentage reporting "pretty much true" or "very true"	F33	▪ tells me when I do a good job.
	F36	▪ always wants me to do my best.
	F38	▪ believes that I will be a success.
Meaningful Participation at School (%)	F19	I do interesting activities at school.
Average percentage reporting "pretty much true" or "very true"	F24	At school, I help decide things like class activities or rules.
	F25	I do things at my school that make a difference.
Home Environment		
Caring Relationships as Home (%)		In my home, there is a parent or some other adult who is…
Average percentage reporting "pretty much true" or "very true"	F6	▪ interested in my schoolwork.
	F9	▪ talks with me about my problems.
	F32	▪ really cares about me.
	F11	▪ listens to me when I have something to say.
High Expectations at Home (%)		In my home, there is a parent or some other adult who is…
Average percentage reporting "pretty much true" or "very true"	F5	▪ expects me to follow the rules.
	F7	▪ believes that I will be a success.
	F10	▪ always wants me to do my best.
Meaningful Participation at Home (%)	F13	I do fun things or go fun places with my parents or other adults.
Average percentage reporting "pretty much true" or "very True"	F21	I do things at home that make a difference.
	F23	I help make decisions with my family.
Community Assets		
Caring Relationships in Community (%)		Outside of my home and school, there is an adult who…
Average percentage reporting "pretty much true" or "very true"	F26	▪ really cares about me.
	F28	▪ notices when I am upset about something.
	F31	▪ I trust.
High Expectations in Community (%)		Outside of my home and school, there is an adult who…
Average percentage reporting "pretty much true" or "very true"	F27	▪ tells me when I do a good job.
	F29	▪ believes that I will be a success.
	F30	▪ always wants me to do my best.

Table 11. *Constructs and Items Used in the Analysis for External and Internal Resilience Assets*

Construct	Question	Description
Meaningful Participation in Community (%)	F50	▪ Outside of my home and school, I help other people.
Average percentage reporting "pretty much true" or "very true"	F51	▪ I am part of clubs, sports teams, church groups or other extra activities away from school.
	F52	▪ Outside of my home and school, I take lessons in music, art, sports or a hobby.
Peer Assets		
Caring Relationships with Peers (%)		I have a friend about my own age who…
Average percentage reporting "pretty much true" or "very true"	F1	▪ really cares about me.
	F2	▪ talks with me about my problems.
	F4	▪ helps me when I'm having a hard time.
High Expectations with Peers (%)		My friends…
Average percentage reporting "pretty much true" or "very true"	F18	▪ get into a lot of trouble.
	F20	▪ try to do what is right.
	F22	▪ my friends do well in school.
INTERNAL RESILIENCE ASSETS		
Internal resilience assets (%)	F12	I feel bad when someone gets their feelings hurt.
Average percentage reporting "pretty much true" or "very true"	F14	I try to understand what other people go through.
	F15	When I need help, I find someone to talk with.
	F16	I know where to go for help with a problem.
	F17	I try to work out problems by talking about them.
	F39	I can work out my problems.
	F40	I can do most things if I try.
	F41	I can work with someone who has different opinions than mine.
	F42	There are many things that I do well.
	F43	I enjoy working together with other students my age.
	F44	I stand up for myself without putting others down.
	F45	I try to understand how other people feel.
	F47	There is a purpose to my life.
	F48	I understand my moods and feelings.
	F49	I understand why I do what I do.
	F54	I have goals and plans for the future.

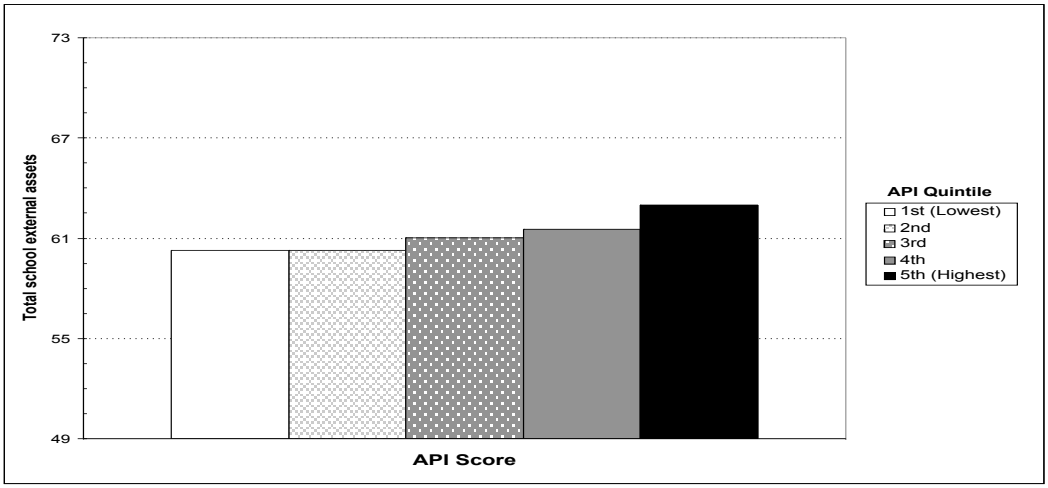
Table 12. *Relationship of External Resilience Assets and Internal Resilience Assets to API Scores*

	Academic Performance Index (API)	
	Unadjusted	Adjusted[A]
	B [β]	B [β]
School		
Total external Assets (%)	5.154**	1.534**
	[0.264]	[0.078]
Caring relationships (%)	4.833**	1.575**
	[0.244]	[0.080]
High expectations (%)	3.488**	1.350**
	[0.206]	[0.080]
Meaningful participation (%)	3.011**	0.734**
	[0.204]	[0.050]
Home		
Total external Assets (%)	12.894**	2.638**
	[0.501]	[0.103]
Caring relationships (%)	12.739**	2.775**
	[0.513]	[0.112]
High expectations (%)	12.159**	1.994**
	[0.495]	[0.081]
Meaningful participation (%)	8.762**	1.691**
	[0.400]	[0.077]
Community		
Total external Assets (%)	10.614**	1.412**
	[0.531]	[0.071]
Caring relationships (%)	7.892**	1.296**
	[0.390]	[0.064]
High expectations (%)	10.995**	2.117**
	[0.486]	[0.094]
Meaningful participation (%)	10.761**	1.820**
	[0.650]	[0.110]
Peers		
Total external Assets (%)	14.113**	1.450**
	[0.532]	[0.055]
Caring relationships (%)	9.123**	0.177
	[0.407]	[0.008]
High expectations (%)	9.824**	1.364**
	[0.470]	[0.065]
Internal Assets		
Internal resilience assets (%)	13.698**	1.785**
	[0.463]	[0.060]

Notes: Standardized beta coefficients in brackets. * significant at 5%; ** significant at 1%; [A]Estimates come from a model that controls for the race/ethnic and gender composition of the school, average parental education, percentage of students receiving subsidized meals, percentage of ELL students, and school grade configuration.

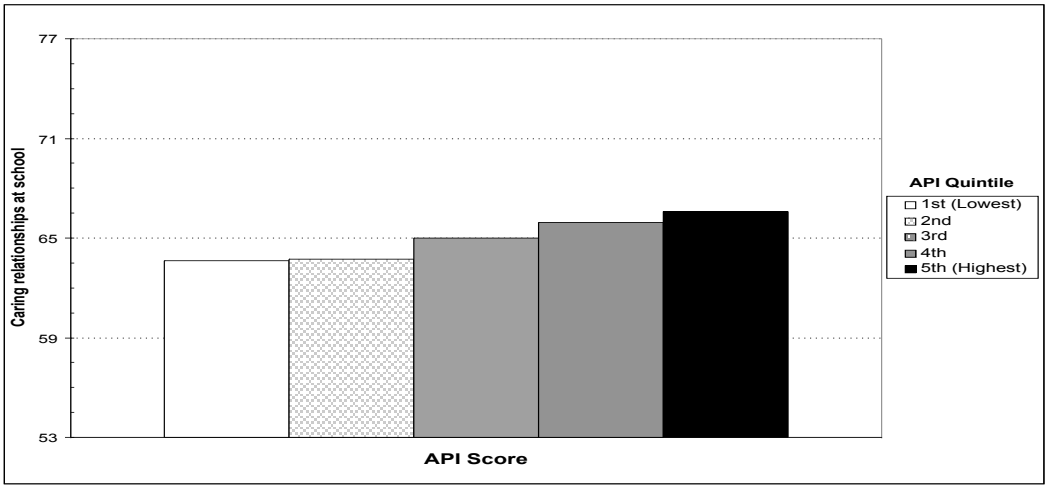
Source: Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

Figure 15. *Total School External Assets by API Quintile*



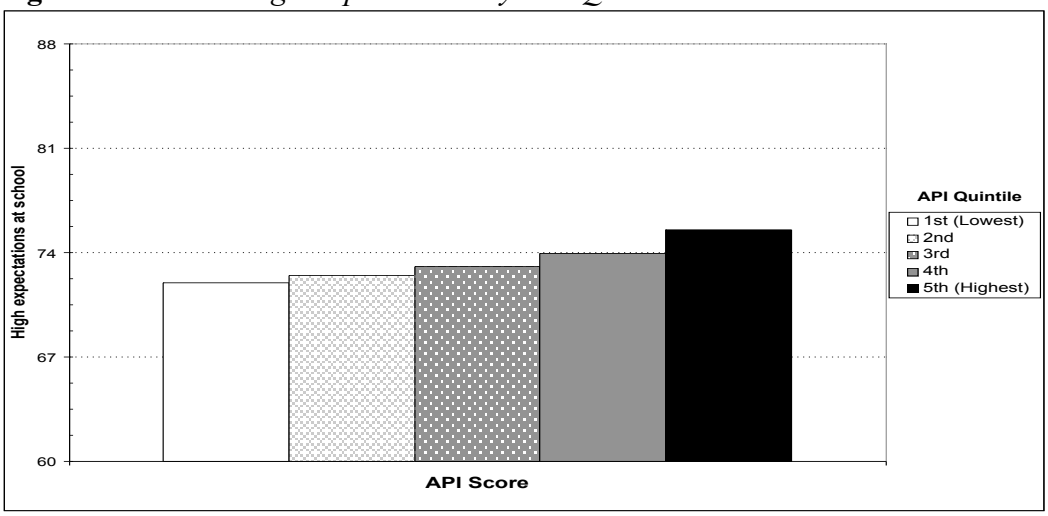
Notes: [1] School-level analysis. Analytic sample consists of 586 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Total school external assets is measured by the average percentage of students who reported "pretty much true" or "very true" that a teacher or some other adult at school cared about them (F32), noticed them when they were not there (F34), and listened to them when they had something to say (F37), told them when they did a good job (F33), always wanted them to do their best (F36), believed that they would be a success (F38), that they did interesting activities at school (F19), helped decide things at school (F24), and did things that make a difference at school (F25).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 16. *School Caring Relationships by API Quintile*



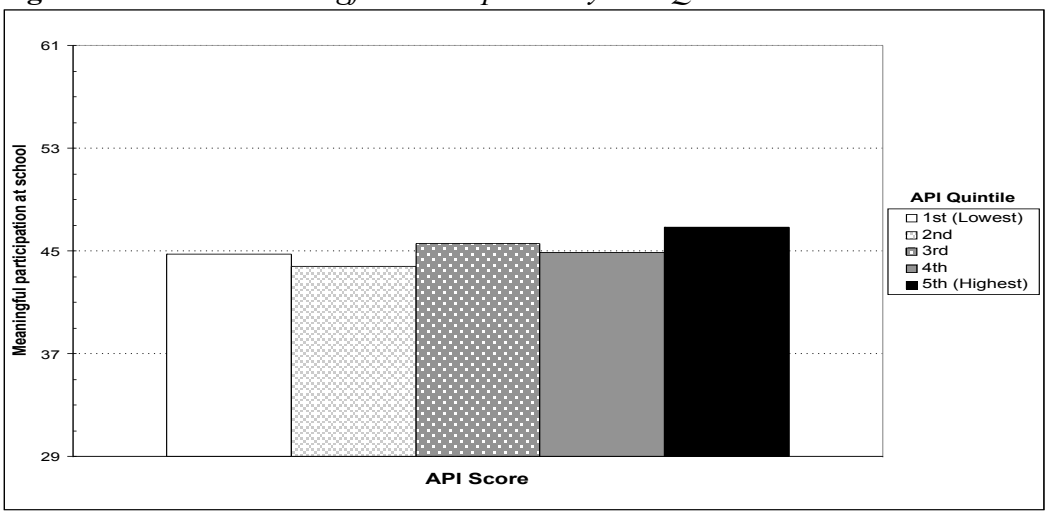
Notes: [1] School-level analysis. Analytic sample consists of 581 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] School caring relationships is measured by the average percentage of students who reported "pretty much true" or "very true" that a teacher or some other adult at school cared about them (F32), noticed them when they were not there (F34), and listened to them when they had something to say (F37).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 17. *School High Expectations by API Quintile*



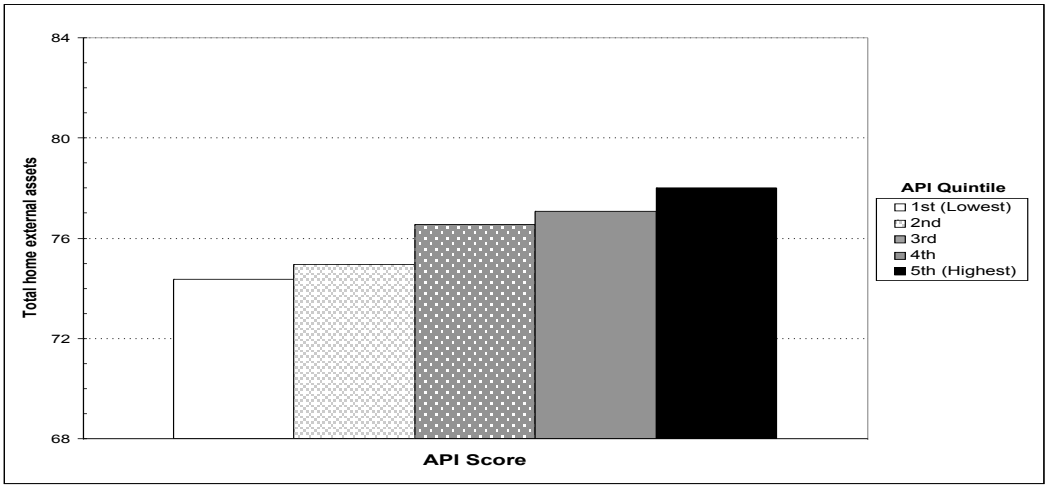
Notes: [1] School-level analysis. Analytic sample consists of 582 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] School high expectations is measured by the average percentage of students who reported "pretty much true" or "very true" that a teacher or some other adult at school told them when they did a good job (F33), always wanted them to do their best (F36), and believed that they would be a success (F38).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 18. *School Meaningful Participation by API Quintile*



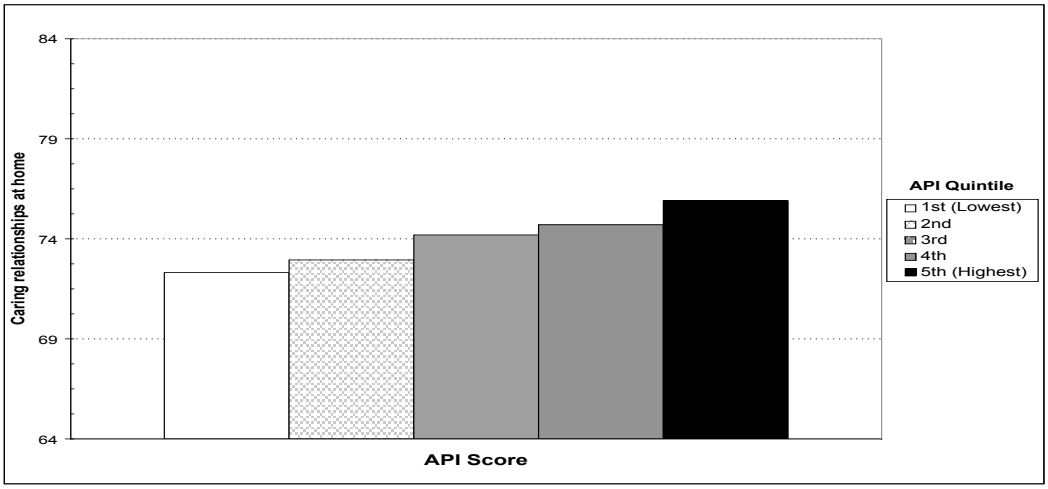
Notes: [1] School-level analysis. Analytic sample consists of 577 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] School meaningful participation is measured by the average percentage of students who reported "pretty much true" or "very true" that they did interesting activities (F19), helped decide things (F24), and did things that make a difference (F25) at school.
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 19. *Total Home External Assets by API Quintile*



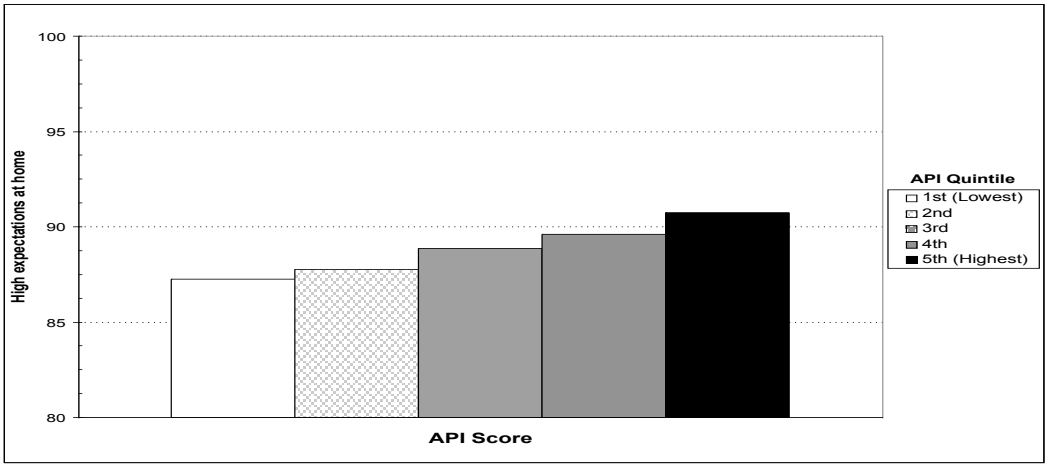
Notes: [1] School-level analysis. Analytic sample consists of 574 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Total home external assets is measured by the average percentage of students who reported "pretty much true" or "very true" that a parent or some other adult at home was interested in their school work (F6), talked with them about their problems (F9), listened to them when they had something to say (F11), expected them to follow the rules (F5), believed that they would be a success (F7), always wanted them to do their best (F10), that they did fun things or went fun places with their parents or other adults (F13), did things at home that make a difference (F21), and helped make decisions with their family (F23).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 20. *Home Caring Relationships by API Quintile*



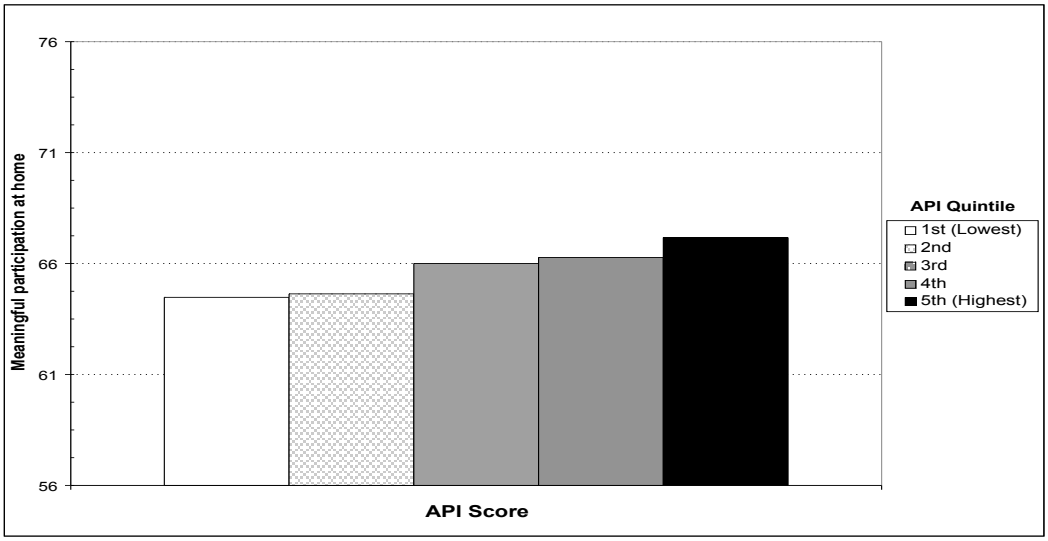
Notes: [1] School-level analysis. Analytic sample consists of 568 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Home caring relationships is measured by the average percentage of students who reported "pretty much true" or "very true" that a parent or some other adult at home was interested in their school work (F6), talked with them about their problems (F9), and listened to them when they had something to say (F11).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 21. *Home High Expectations by API Quintile*



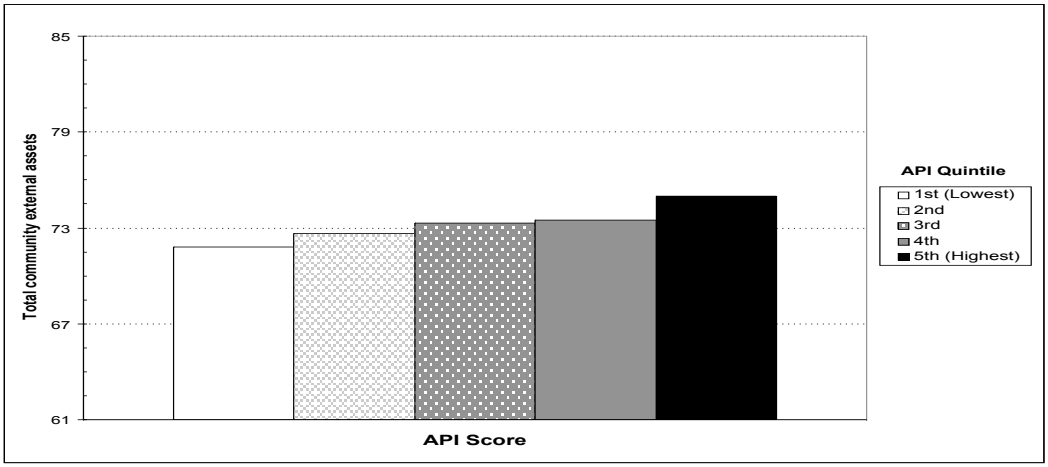
Notes: [1] School-level analysis. Analytic sample consists of 566 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Home high expectations is measured by the average percentage of students who reported "pretty much true" or "very true" that a parent or some other adult at home expected them to follow the rules (F5), believed that they would be a success (F7), and always wanted them to do their best (F10).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 22. *Home Meaningful Participation by API Quintile*



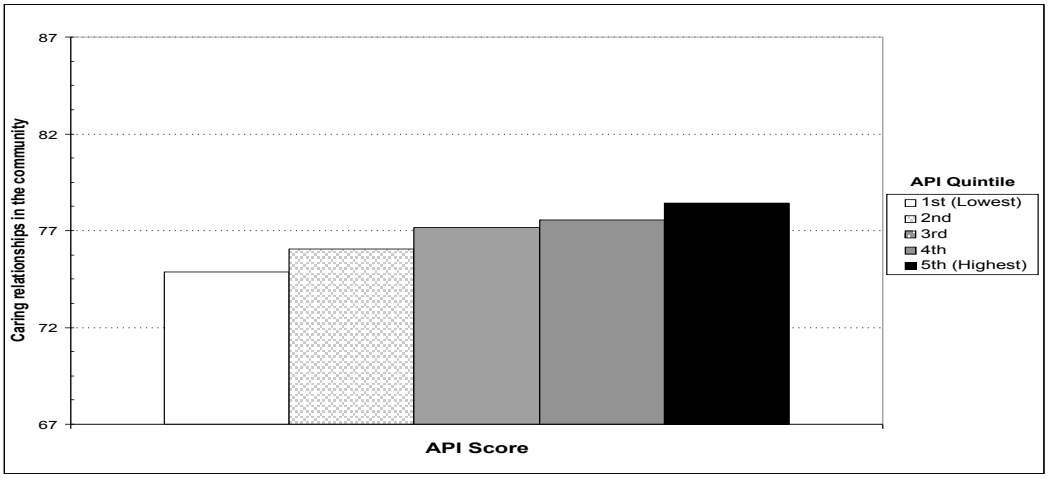
Notes: [1] School-level analysis. Analytic sample consists of 561 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Home meaningful expectations is measured by the average percentage of students who reported "pretty much true" or "very true" that they did fun things or went fun places with their parents or other adults (F13), did things at home that make a difference (F21), and helped make decisions with their family (F23).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 23. *Total Community External Assets by API Quintile*



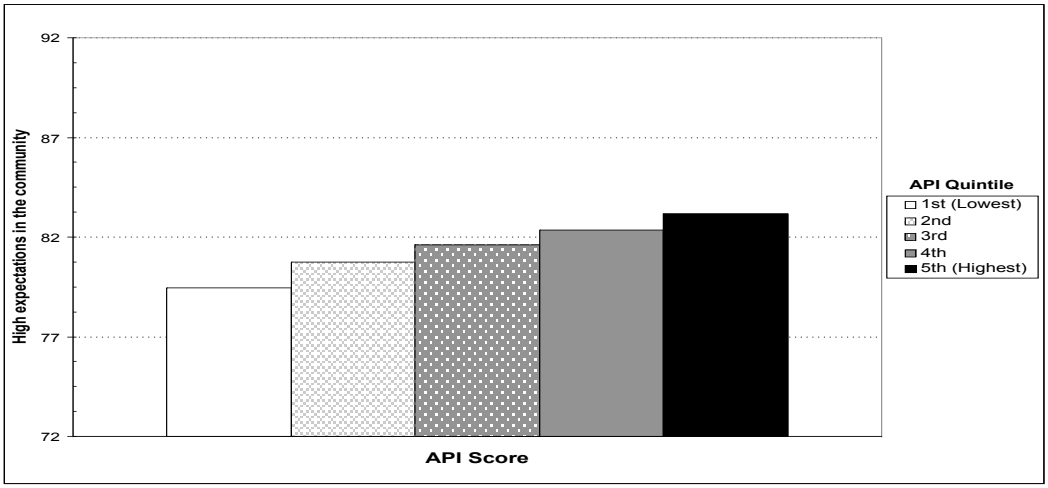
Notes: [1] School-level analysis. Analytic sample consists of 584 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Total community external assets is measured by the average percentage of students who reported "pretty much true" or "very true" that there was an adult outside of home and school who cared about them (F26), who noticed when they were upset (F28), whom they trusted (F31), who told them when they did a good job (F27), who always wanted them to do their best (F30), who believed that they would be a success (F29), that they were part of clubs, sports teams, church groups or other extra activities away from school (F50), that they took lessons in music, art, sports or a hobby (F51), and that they helped other people away from home and school (F52)
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 24. *Community Caring Relationships by API Quintile*



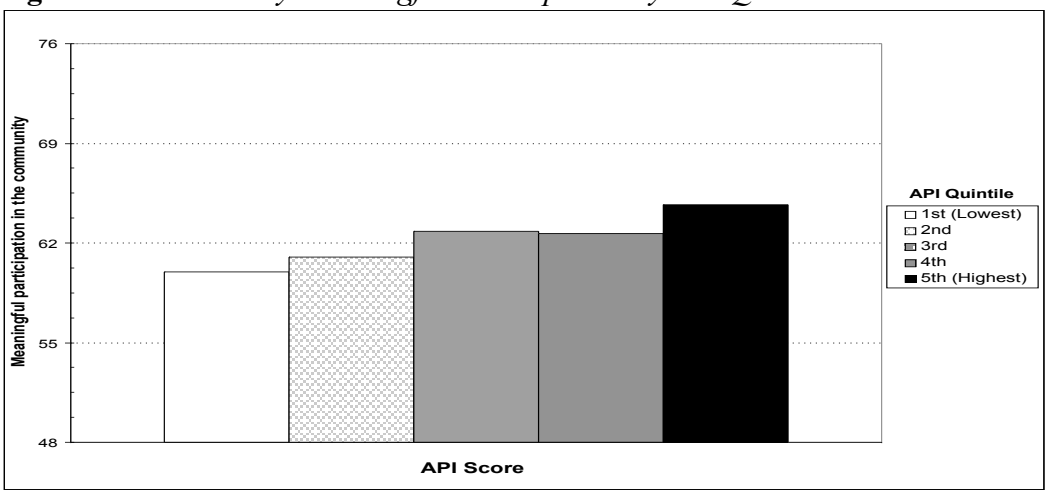
Notes: [1] School-level analysis. Analytic sample consists of 564 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Community caring relationships is measured by the average percentage of students who reported "pretty much true" or "very true" that there was an adult outside of home and school who cared about them (F26), who noticed when they were upset (F28), and whom they trusted (F31).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 25. *Community High Expectations by API Quintile*



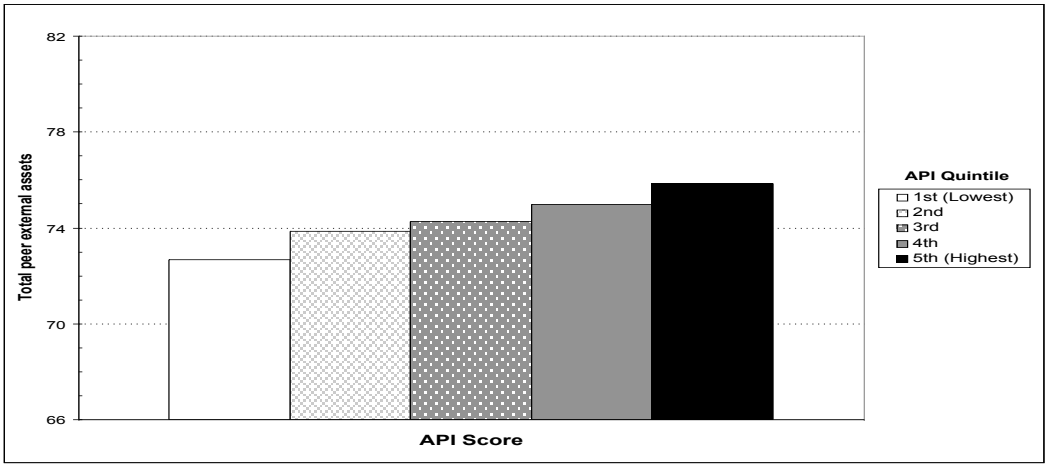
Notes: [1] School-level analysis. Analytic sample consists of 564 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Community high expectations is measured by the average percentage of students who reported "pretty much true" or "very true" that there was an adult outside of home and school who told them when they did a good job (F27), who always wanted them to do their best (F30), and who believed that they would be a success (F29).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 26. *Community Meaningful Participation by API Quintile*



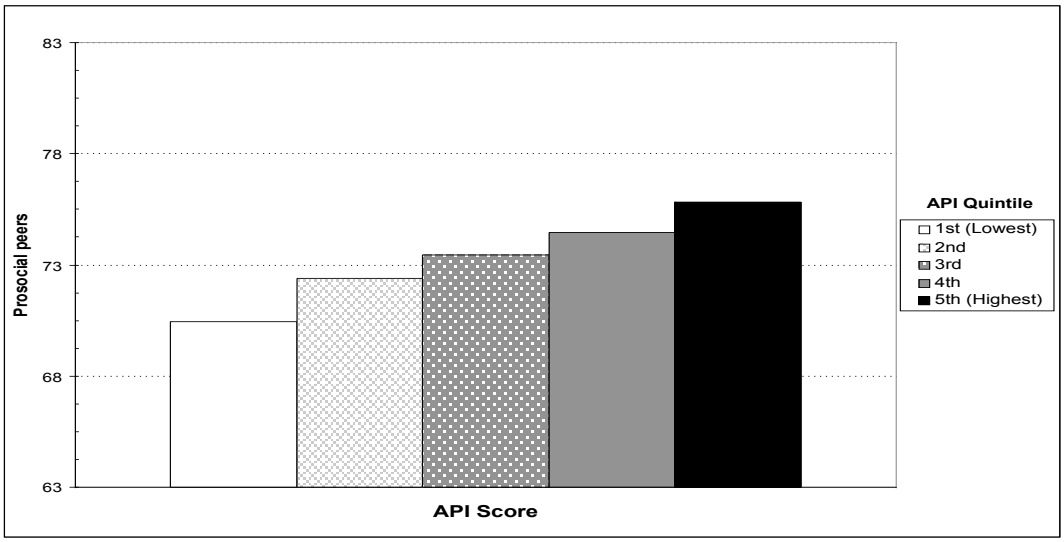
Notes: [1] School-level analysis. Analytic sample consists of 573 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Community meaningful participation is measured by the average percentage of students who reported "pretty much true" or "very true" that they were part of clubs, sports teams, church groups or other extra activities away from school (F50), that they took lessons in music, art, sports or a hobby (F51), and that they helped other people away from home and school (F52).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 27. *Total Peer External Assets by API Quintile*



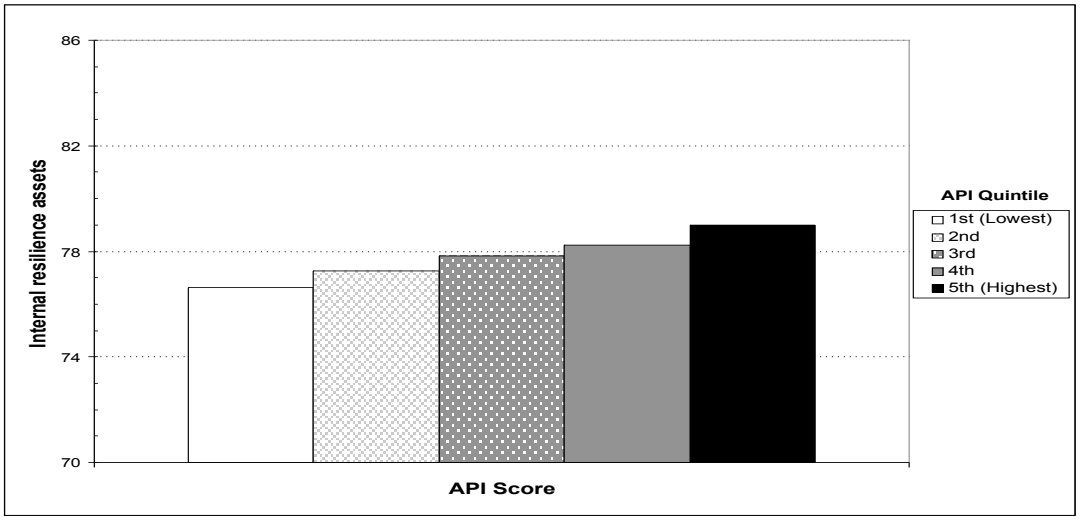
Notes: [1] School-level analysis. Analytic sample consists of 577 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Total peer external assets is measured by the average percentage of students who reported "pretty much true" or "very true" they have a friend who really cared about them (F1), who talked with them about their problems (F2), who helped them when they were having a hard time, that their friends got into a lot of trouble (F18-reverse coded), tried to do what is right (F20), and did well in school (F22).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 28. *Prosocial Peers by API Quintile*



Notes: School-level analysis. Analytic sample consists of 563 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size. Prosocial peers is measured by the average percentage of students who reported "pretty much true" or "very true" that their friends got into a lot of trouble (F18-reverse coded), tried to do what is right (F20), and did well in school (F22).
Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

Figure 29. *Internal resilience assets by API Quintile*



Notes: [1] School-Level analysis. Analytic sample consists of 635 schools. Figure is based on a model that controls for the race/ethnic composition of the school, average parental education, percent of students receiving subsidized meals, percent of ELL students, and school grade configuration.
[2] The vertical area between each gridline in the figure (each horizontal dotted line) represents one standard deviation. A difference in bar heights of a standard deviation indicates a "large" difference in terms of effect size.
[3] Internal resilience assets is measured by the average percentage of students who reported "pretty much true" or "very true" on internal asset items (See Table 11).

Source: Calculations based on the California Department of Education's Healthy Kids Survey and API databases (1999-2001).

7. CONCLUSION

Context and Results

Throughout the nation, states are implementing accountability systems to hold students, teachers, and educational administrators responsible for ensuring that students demonstrate acceptable levels of achievement. This practice has recently been codified into federal law though the passage of *The No Child Left Behind Act of 2001*. "High stakes" testing — student achievement testing in which students, teachers, and/or schools receive rewards or sanctions based on test scores — is often the centerpiece of state accountability systems.

California has been in the forefront of this national accountability movement. The *Public Schools Accountability Act (PSAA) of 1999* created a new educational accountability system for California focused on improving students' academic performance. The PSAA requires that CDE annually calculate academic performance test results for public schools and publish school rankings based on these test scores. The Academic Performance Index is the cornerstone of this new accountability system. The purpose of the API is to measure the academic performance and progress of schools. From API results, schools are held accountable for improving students' academic performance.

These increased requirements for student performance and accountability have had a far-reaching impact on public education in California. In an effort to increase test scores, many schools are cutting back on programs and courses that address the comprehensive health needs of children, and are reallocating resources to programs that are believed to be more directly related to improving test scores. Such changes in school policies and practices may be shortsighted and counterproductive. Growing numbers of children come to school with a variety of health-related problems that make learning difficult, if not impossible, and also serve as barriers to healthy cognitive, social, and emotional development. Years of research exploring healthy development and successful learning from various social science disciplines has found a strong relationship between healthy behavior and resilience and academic success. The implication for schools is that reallocation of resources away from health-related programs and activities that support learning may actually undermine children's school performance in the long-term.

To shed light on the connections between promoting resilience, reducing health risk behaviors, and improving academic achievement — connections that have been largely ignored in the current school reform movement — this report examines the relationship between school API scores to health risk, external resilience assets, and internal resilience assets. Overall, the

results of this report indicate that schools with large percentages of students who engage in risky behavior, are exposed to health risks, or show little evidence of school connectedness or of possessing other assets in their lives have *lower* API scores than other schools. These results held for three quarters of the health risk/resilience measures that we examined. More specifically, schools with lower API scores were characterized by large proportions of students who reported high levels of substance use, who used substances or had been offered/sold drugs on school property, who had been threatened or injured with weapons, and who attended schools with high levels of weapons possession. Those schools that have high percentages of students who engage in moderate physical activity, eat nutritious food and eat breakfast daily, feel safe and secure at school, and have high levels of external and internal assets have higher API score than other schools.

Do these findings imply that schools can increase academic performance by implementing programs that reduce students' health risk and increase resilience? Perhaps, but not necessarily. The results presented above are correlational — they do not tell us *why* school test scores and health risk/resilience are related. It could be that health risk, external resilience assets, and internal resilience assets are causally related to student test scores. It is also possible, however, that students become more likely to engage in unhealthy behavior and to disengage from pro-social sources of social support as a consequence of the frustration and estrangement associated with poor school performance. In addition, academic performance, health risk, and resilience may not be distinct — each may represent just one aspect of a more generalized concept of well-being. The research literature provides empirical support for each of these explanations — although less support is provided for the notion that school performance causally influences health risk. What we can reasonably infer from the research is that school performance, health risk, and assets are complementary. It is likely that efforts to improve school performance will be more successful among students who have low levels of health risk and high levels of external and internal assets. Our results provide one piece of evidence that supports this conclusion.

The analysis focused on how the characteristics of schools are related to each other, not on how the characteristics of individual students are related to each other. These school-level relationships should not be generalized to individual students within schools. However, because there is far more variation in health risk behavior and resilience within schools than across schools, the fact that healthy behavior and resilience are positively associated with API scores at the school level suggests it is likely that they are associated at the student level. In addition, there has been a good deal of prior research at the individual level that has found that health risk, resilience, and academic performance are intimately related. Longitudinal assessment of changes over time are needed to better determine *how and why* school test scores and health

risk/resilience are related. Increasing research attention needs to be paid to understanding if and how specific programs designed to meet the health, developmental, and prevention needs of youth result in longitudinal improvements in both student health and academic performance.

The results of this study add to the burgeoning body of research demonstrating that comprehensively addressing the health and developmental needs of youth is a challenge that, indeed, schools must meet if they truly seek to meet the accountability demands for improved academic performance. Efforts to improve schools must go beyond the current emphasis on standards and accountability measured by test scores. Confirming the concerns of the Learning First Alliance (2001) and Barton (2001), the implication of the findings of this report for schools is that reallocation of resources away from health-related programs and activities that support learning may actually undermine student school performance in the long-term. Policies and practices focusing exclusively on increasing test scores while ignoring the comprehensive health needs of students are almost certain to leave many children behind. As the National Governor's Association, Center for Best Practices (2000) observed:

> For many students, test performance will improve over time with the implementation of new standards, assessments, and curriculum and the introduction of better-trained teachers and new teaching techniques. For other students, performance may be lower than expected because they are not prepared to learn when they arrive at school. Policymakers need to focus on eliminating the barriers that affect these low-performing students' readiness to learn. Among these barriers are physical and mental health conditions that impact students' school attendance and their ability to pay attention in class, control their anger, and restrain self-destructive impulses.

Perhaps if we had to summarize the implications of this study in one statement it would be that all schools, particularly low performing schools, need to strive to create school environments that are caring, supportive, and nurturing of both mind and body if they seek to enable *all* students to reach their full academic potential.

There is one other aspect of the relationship between health risk, resilience, and achievement that needs to be kept in mind. An over-emphasis on test scores detached from consideration of youth well-being may be counterproductive. High-stakes testing and increasing requirements for college admission can potentially have deleterious consequences for the health of our nation's youth. The Center for Addiction and Substance Abuse (2001) raises this question in *Malignant Neglect: Substance Abuse and America's Schools*. In student focus groups conducted by CASA, students expressed "enormous pressure to succeed in school" and many described substance use as a means of relieving that stress. It is certainly possible that high

stakes testing may have deleterious consequences for significant numbers of youth in terms of health risk behavior.

The Importance of Behavioral Assessment

This research further suggests that any comprehensive accountability system to support school improvement should include health and behavioral assessment, such as that provided by the California Healthy Kids Survey, along with academic assessment. A step in that direction has now been legislated by *No Child Left Behind,* which requires regular assessment, reporting, and evaluating of student substance use and violence as a condition for receiving federal Safe and Drug-Free Schools funds. Standards and measures of both achievement and behavior to support continuous improvement based on data is one of the four core elements recommended by the Learning First Alliance (2001) to ensure that every child learns. As the Alliance (2001:22-23) wrote:

> Maintaining a safe and supportive school requires a solid sense of the current school climate and a continuous improvement process for measuring progress and making appropriate corrections. At the school level, information about school atmosphere and safety issues should be collected periodically, ensuring that the perspectives of various community members are represented. To track whether a safe, supportive learning community is being provided to all students all of the time (in the classroom, the hallways, the cafeterias, etc.), key indicators should assess strengths…as well as deficits.

But it is not enough just to monitor health risks and resilience, however. It is also essential that health risk and resilience assessments be used to guide program decisions and that schools be held accountable for creating health-promoting, safe, and supportive school climates by making the information public. In addition to standardized test score results, school climate indicators should also be presented on school report cards (Barton 2001).

Clearly, there is much that schools can do by themselves to improve academic achievement by providing more nutritional food and exercise for students that lack it, by striving to create drug free and safe environments, by creating school environments that are caring and meaningful, and that communicate high expectations and provide the support to meet those expectations. But it is equally true that efforts to improve health, well-being, positive development, and success cannot stop just at the school door. It is critically important as well that families understand the importance of good nutrition, exercise, and a safe and drug free, asset-rich environment in the home and neighborhood.

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APPENDICES

CALIFORNIA healthy kids SURVEY

High School Questionnaire

1999-2000

- This is a survey about health-related behaviors and attitudes. It includes questions about diet and physical activity, use of alcohol, tobacco, and other drugs, and safety and violence. Whether or not you have ever done any of these things, please answer all the questions**. You will be able to answer that you have not done them.**

- You do not have to answer all of the questions in this survey, but we hope that you will.

- Please do not write your name on this form or on the answer sheet. Do not identify yourself in any other way.

- Please mark all of your answers on the answer sheet. Do not write on the survey questionnaire. Mark only one answer unless told to "Mark All That Apply."

- This survey asks about things you may have done during different periods of time, such as during your **lifetime** (for example, did you ever drink alcohol?), the **past year,** or the **past 30 days**. Each is asked for a specific reason and provides needed information. Please pay careful attention to these time periods.

California Healthy Kids Survey

◆ Section A ◆

The first questions ask for some background information about you

At the top of the answer sheet, write in the name of your school.

A1. Fill in the bubble for the letter "H."

A2. Fill in the bubble for the number "1."

A3. How old are you?

A) 10 years old or younger
B) 11 years old
C) 12 years old
D) 13 years old
E) 14 years old
F) 15 years old
G) 16 years old
H) 17 years old
I) 18 years old or older

A4. What is your sex?

A) Female
B) Male

A5. In what grade are you?

A) 6th grade
B) 7th grade
C) 8th grade
D) 9th grade
E) 10th grade
F) 11th grade
G) 12th grade
H) Other grade
I) Ungraded

A6. How do you describe yourself? (Mark all that apply.)

A) American Indian or Alaska Native
B) Native Hawaiian or Pacific Islander
C) Asian American
D) Black or African American (non-Hispanic)
E) Hispanic or Latino/Latina
F) White (Caucasian/non-Hispanic)
G) Other

A7. If you are Asian American or Pacific Islander, who groups best describe you? (Mark all that apply. If you are not of Asian/PI background, mark "Does not apply.")

A) Does not apply, I am not an Asian American or Pacific Islander
B) Asian Indian
C) Cambodian
D) Chinese
E) Filipino
F) Japanese
G) Korean
H) Laotian
I) Vietnamese
J) Native Hawaiian, Guamanian, Samoan or other Pacific Islander
K) Other Asian American

A8. If you are Hispanic American or Latino/Latina, which groups best describe you? (Mark all that apply. If you are not of Hispanic background, mark "Does not apply.")

A) Does not apply, I am not Hispanic or Latino/Latina
B) Central American
C) South American
D) Cuban American
E) Mexican American
F) Puerto Rican American
G) Other Hispanic American

A9. How many times have you moved (changed where you live) during the **past year**?

A) 0 times
B) 1 time
C) 2 or more times

Next are some questions about diet and exercise

*On how many of the past 7 **days** did you...*

		Number of days							
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
A10.	exercise or participate in physical activity for **at least 20 minutes** that made you **sweat and breathe hard?** (For example, basketball, soccer, running, swimming laps, fast bicycling, fast dancing or similar aerobic activities.)	A	B	C	D	E	F	G	H
A11.	participate in physical activity for at least 30 minutes that did **not** make you sweat and breathe hard? (For example, fast walking, slow bicycling, shooting baskets, skating, raking leaves, and mopping floors.)	A	B	C	D	E	F	G	H
A12.	do exercises to **strengthen or tone your muscles?** (For example, push-ups, sit-ups, or weight lifting.)	A	B	C	D	E	F	G	H

*During the past 7 **days**, how many times did you...*

		Number of times in past 7 days					
		0 times	**1 to 3 times**	**4 to 6 times**	**1 time *a day***	**2 times *a day***	**3 or more times *a day***
A13.	drink a glass of milk (in any form, including with cereal)	A	B	C	D	E	F
A14.	drink 100% fruit juices, such as orange, apple or grape? (Do **not** count punch, Kool-Aid, sports drinks and other fruit-flavored drinks.)	A	B	C	D	E	F
A15.	eat fruit? (Do **not** count fruit juice.)	A	B	C	D	E	F
A16.	eat green salad?	A	B	C	D	E	F
A17.	eat potatoes? (Do **not** count french fries, fried potatoes, or potato chips.)	A	B	C	D	E	F
A18.	eat carrots?	A	B	C	D	E	F
A19.	eat other vegetables? (Do **not** count green salad, potatoes, or carrots.)	A	B	C	D	E	F

A20. Did you eat breakfast today?

A) No

B) Yes

The next questions deal with alcohol, tobacco, and other drug use

*During your **life**, have you ever used or tried...*

		No	Yes
A21.	even one or two **puffs of a cigarette**?	A	B
A22.	a **whole cigarette**?	A	B
A23.	**smokeless tobacco** (chew or snuff such as Redman, Skoal, or Beechnut)?	A	B
A24.	at least **one drink of alcohol**, not just a sip (such as a can of beer, glass of wine, wine cooler, liquor)?	A	B
A25.	**inhalants** to get high ("sniffed," "huffed," or breathed glue, paint fumes, aerosol spray cans, gasoline, rush, poppers, or laughing gas)?	A	B
A26.	**marijuana** (grass, pot, weed, sins, buds, or hash)?	A	B
A27.	**derbisol** (DB, derbs, or dirt)?	A	B
A28.	**cocaine** in any form, including powder, crack, or freebase (coke, rock, base, snort, or snow)?	A	B
A29.	**methamphetamines** (meth, speed, crank, crystal, or ice)?	A	B
A30.	**LSD** or other psychedelics (such as acid, mescaline, MDMA, or ecstasy)?	A	B
A31.	**heroin** (smack, junk or China White)?	A	B
A32.	any other **illegal** drug (such as PCP, downers, pills not prescribed by a doctor)?	A	B

*During your **life**, how many times have you been...*

		0 times	1 to 2 times	3 or more times
A33.	very drunk or sick after drinking **alcohol**?	A	B	C
A34.	"high" from using **drugs** (loaded, stoned or wasted)?	A	B	C
A35.	drunk or "high" on drugs **on school property**?	A	B	C

*During the past **30 days**, on how many days did you...*

		0 days	1 to 2 days	3 to 9 days	10 to 19 days	20 or more days
A36.	smoke cigarettes?	A	B	C	D	E
A37.	use smokeless tobacco or snuff?	A	B	C	D	E
A38.	have at least one drink of alcohol?	A	B	C	D	E
A39.	have five or more drinks of alcohol in a row, that is, within a couple of hours?	A	B	C	D	E
A40.	use marijuana?	A	B	C	D	E
A41.	use inhalants?	A	B	C	D	E
A42.	use cocaine or crack?	A	B	C	D	E
A43.	use methamphetamines?	A	B	C	D	E
A44.	use LSD or other psychedelics?	A	B	C	D	E
A45.	use any other illegal drug?	A	B	C	D	E

*During the past **30 days**, on how many days on **school property** did you....*

		0 days	1 to 2 days	3 to 9 days	10 to 19 days	20 or more days
A46.	smoke cigarettes?	A	B	C	D	E
A47.	have at least one drink of alcohol?	A	B	C	D	E
A48.	smoke marijuana?	A	B	C	D	E

*How harmful do you think it is to use the following substances **occasionally** (once in a while)?*

		Extremely harmful	Somewhat harmful	Not too harmful	Not harmful at all
A49.	Cigarettes	A	B	C	D
A50.	Alcohol	A	B	C	D
A51.	Marijuana	A	B	C	D
A52.	Methamphetamine	A	B	C	D

*How harmful do you think it is to use the following substances **frequently** (every day or almost every day)?*

		Extremely harmful	Somewhat harmful	Not too harmful	Not harmful at all
A53.	Cigarettes	A	B	C	D
A54.	Alcohol	A	B	C	D
A55.	Marijuana	A	B	C	D
A56.	Methamphetamine	A	B	C	D

How difficult is it for students in your grade level to get any of the following substances if they really want them?

		Very difficult	Difficult	Easy	Very easy	Don't know
A57.	Cigarettes	A	B	C	D	E
A58.	Alcohol	A	B	C	D	E
A59.	Marijuana	A	B	C	D	E
A60.	Methamphetamines	A	B	C	D	E

A61. During **your life,** how many times have you ever driven a car when you had been drinking alcohol, *or* have you been driven by a friend when he or she had been drinking?

A) Never
B) 1 time
C) 2 times
D) 3 to 6 times
E) 7 or more times

Now here are some questions about other things that you may have done or may have happened to you

A62. During the past **12 months,** did your boyfriend or girlfriend ever hit, slap, or physically hurt you on purpose?

A) Does not apply; I didn't have a boyfriend or girlfriend during the past 12 months.
B) No
C) Yes

*During the past **12 months**, how many times on **school property** have you...*

	Happened on School Property	**0 times**	**1 time**	**2 or 3 times**	**4 or more times**
A63.	been offered, sold, or given an illegal drug?	A	B	C	D
A64.	been harassed because of your race, ethnicity, gender, sexual orientation, or disability?	A	B	C	D
A65.	been threatened or injured with a weapon such as a gun, knife, or club?	A	B	C	D
A66.	been in a physical fight?	A	B	C	D
A67.	had your property stolen or deliberately damaged, such as your car, clothing, or books?	A	B	C	D

*During the past **30 days**, on how many days did you carry on **school property**...*

Carried on School Property	0 days	1 day	2 or more days
A68. a gun?	A	B	C
A69. a knife?	A	B	C
A70. a club ?	A	B	C
A71. any other weapon?	A	B	C

A72. How safe do you feel when you are at **school**?

A) Very safe
B) Safe
C) Unsafe
D) Very unsafe

A73. How safe do you feel in **your neighborhood?**

A) Very safe
B) Safe
C) Unsafe
D) Very unsafe

A74. Have you **ever** belonged to a gang?

A) No
B) Yes

A75. During the past **12 months,** did you ever feel so sad and hopeless almost everyday for **two weeks or more** that you stopped doing some usual activities?

A) No

B) Yes

Next, tell us how you answered the other questions.

		All questions	**Most questions**	**Only some questions**	**Hardly any questions**
A76.	I understood the questions on this survey.	A	B	C	D
A77.	I answered the questions on this survey carefully.	A	B	C	D
A78.	I answered the questions on this survey honestly.	A	B	C	D

Section F: Resilience Assessment Module

For each of the statements below, please mark your answer sheet to show whether you feel that it is not at all true, a little true, pretty much true, or very much true.

I have a friend about my own age…

		Not at All True	A Little True	Pretty Much True	Very Much True
F1.	Who really cares about me.	A	B	C	D
F2.	Who talks with me about my problems.	A	B	C	D
F3.	Who teases me too much.	A	B	C	D
F4.	Who helps me when I'm having a hard time.	A	B	C	D

In my home, there is a parent or some other adult…

		Not at All True	A Little True	Pretty Much True	Very Much True
F5.	Who expects me to follow the rules.	A	B	C	D
F6.	Who is interested in my school work.	A	B	C	D
F7.	Who believes that I will be a success.	A	B	C	D
F8.	Who is too busy to pay much attention to me.	A	B	C	D
F9.	Who talks with me about my problems.	A	B	C	D
F10.	Who always wants me to do my best.	A	B	C	D
F11.	Who listens to me when I have something to say.	A	B	C	D

For each of the statements below, please mark your answer sheet to show whether you feel that it is not at all true, a little true, pretty much true, or very much true.

		Not at All True	A Little True	Pretty Much True	Very Much True
F12.	I feel bad when someone gets their feelings hurt.	A	B	C	D
F13.	I do fun things or go fun places with my parents or other adults.	A	B	C	D
F14.	I try to understand what other people go through.	A	B	C	D
F15.	When I need help, I find someone to talk with.	A	B	C	D
F16.	I know where to go for help with a problem.	A	B	C	D
F17.	I try to work out problems by talking about them.	A	B	C	D
F18.	My friends get into a lot of trouble.	A	B	C	D
F19.	I do interesting activities at school.	A	B	C	D
F20.	My friends try to do what is right.	A	B	C	D
F21.	I do things at home that make a difference.	A	B	C	D
F22.	My friends do well in school.	A	B	C	D
F23.	I help make decisions with my family.	A	B	C	D
F24.	At school, I help decide things like class activities or rules.	A	B	C	D
F25.	I do things at my school that make a difference.	A	B	C	D

For each of the statements below, please mark your answer sheet to show whether you feel that it is not at all true, a little true, pretty much true, or very much true.

Outside of my home and school, there is an adult…

		Not at All True	A Little True	Pretty Much True	Very Much True
F26.	Who really cares about me.	A	B	C	D
F27.	Who tells me when I do a good job.	A	B	C	D
F28.	Who notices when I am upset about something.	A	B	C	D
F29.	Who believes that I will be a success.	A	B	C	D
F30.	Who always wants me to do my best.	A	B	C	D
F31.	Who I trust.	A	B	C	D

At my school, there is a teacher or some other adult…

		Not at All True	A Little True	Pretty Much True	Very Much True
F32.	Who really cares about me.	A	B	C	D
F33.	Who tells me when I do a good job.	A	B	C	D
F34.	Who notices when I'm not there.	A	B	C	D
F35.	Who is mean to me.	A	B	C	D
F36.	Who always wants me to do my best.	A	B	C	D
F37.	Who listens to me when I have something to say.	A	B	C	D
F38.	Who believes that I will be a success.	A	B	C	D

For each of the statements below, please mark your answer sheet to show whether you feel that it is not at all true, a little true, pretty much true, or very much true.

		Not at All True	A Little True	Pretty Much True	Very Much True
F39.	I can work out my problems.	A	B	C	D
F40.	I can do most things if I try.	A	B	C	D
F41.	I can work with someone who has different opinions than mine.	A	B	C	D
F42.	There are many things that I do well.	A	B	C	D
F43.	I enjoy working together with other students my age.	A	B	C	D
F44.	I stand up for myself without putting others down.	A	B	C	D
F45.	I try to understand how other people feel.	A	B	C	D
F46.	I feel like I am all alone in the world.	A	B	C	D
F47.	There is a purpose to my life.	A	B	C	D
F48.	I understand my moods and feelings.	A	B	C	D
F49.	I understand why I do what I do.	A	B	C	D
F50.	I am part of clubs, sports teams, church groups or other extra activities away from school.	A	B	C	D
F51.	Outside of my home and school, I take lessons in music, art, sports or a hobby.	A	B	C	D
F52.	Outside of my home and school, I help other people.	A	B	C	D
F53.	I am confused about what I want out of life.	A	B	C	D
F54.	I have goals and plans for the future.	A	B	C	D
F55.	I plan to graduate from high school.	A	B	C	D
F56.	I plan to go to college or some other school after high school.	A	B	C	D

Appendix Table 1. *Relationship of Physical Activity, Nutrition, and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API	API
Any Physical Activity (%)[A]	1.185**				
	[0.042]				
Physical Activity Level [A]		-1.519			
		[-0.003]			
Any Nutritious Intake (%)			4.280**		
			[0.094]		
Nutrition Intake Level				-3.610	
				[-0.001]	
Breakfast (%)					3.338**
					[0.144]
Male	32.902	36.507	11.263	15.542	0.810
	[0.016]	[0.018]	[0.006]	[0.008]	[0.000]
American Indian (%)	-3.117**	-3.165**	-3.846**	-4.039**	-3.570**
	[-0.052]	[-0.053]	[-0.063]	[-0.066]	[-0.058]
Asian (%)	1.225**	1.137**	1.202**	1.049**	1.079**
	[0.132]	[0.123]	[0.125]	[0.109]	[0.118]
African American (%)	-2.703**	-2.778**	-2.566**	-2.772**	-2.491**
	[-0.247]	[-0.254]	[-0.233]	[-0.251]	[-0.225]
Filipino (%)	-0.639*	-0.731*	-0.084	-0.346	-0.036
	[-0.029]	[-0.034]	[-0.003]	[-0.014]	[-0.001]
Latino (%)	-0.710**	-0.767**	-0.707**	-0.864**	-0.698**
	[-0.163]	[-0.176]	[-0.162]	[-0.198]	[-0.160]
Pacific Islander (%)	-3.080*	-3.178*	-2.550**	-2.727**	-1.442
	[-0.029]	[-0.030]	[-0.024]	[-0.026]	[-0.014]
Parental Education	77.221**	78.803**	61.725**	69.898**	66.579**
	[0.454]	[0.464]	[0.356]	[0.403]	[0.389]
Subsidized Meals (%)	-0.596**	-0.586**	-0.843**	-0.858**	-0.650**
	[-0.130]	[-0.128]	[-0.191]	[-0.195]	[-0.148]
English Language Learners (%)	-1.237**	-1.212**	-1.195**	-1.009**	-1.176**
	[-0.170]	[-0.167]	[-0.172]	[-0.145]	[-0.168]
Mixed School (%)	-30.417**	-32.470**	-40.864**	-41.624**	-28.908**
	[-0.118]	[-0.126]	[-0.124]	[-0.126]	[-0.093]
High School (%)	-35.661**	-37.565**	-55.214**	-56.493**	-39.155**
	[-0.165]	[-0.174]	[-0.221]	[-0.226]	[-0.155]
Constant	401.633**	506.981**	256.913**	567.448**	354.423**
	[3.755]	[4.741]	[2.258]	[4.987]	[3.119]
Observations	874	873	1692	1692	1395
R-squared	0.87	0.87	0.87	0.87	0.88

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets.
[A] measure applicable to High School students only;
* significant at 5%; ** significant at 1%.

Appendix Table 2. *Relationship of Substance Use, Intoxication, and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API	API
Lifetime ATM Drug Use (%)	-1.745**				
	[-0.174]				
Lifetime Hard Drug Use (%)[A]		-1.960*			
		[-0.037]			
Lifetime Intoxication (%)			-1.702**		
			[-0.149]		
30-day ATM Drug Use (%)				-2.470**	
				[-0.130]	
30-day Hard Drug Use (%)[A]					-0.647
					[-0.009]
Male	17.285	33.372	15.769	19.735	32.239
	[0.009]	[0.017]	[0.008]	[0.010]	[0.016]
American Indian (%)	-3.287**	-2.733**	-3.396**	-3.577**	-2.851**
	[-0.054]	[-0.044]	[-0.056]	[-0.059]	[-0.046]
Asian (%)	0.781**	0.965**	0.807**	0.804**	1.002**
	[0.081]	[0.112]	[0.084]	[0.084]	[0.116]
African American (%)	-2.821**	-2.896**	-2.832**	-2.865**	-2.810**
	[-0.256]	[-0.283]	[-0.257]	[-0.260]	[-0.275]
Filipino (%)	-0.260	-0.740**	-0.391	-0.461	-0.683*
	[-0.010]	[-0.036]	[-0.016]	[-0.018]	[-0.033]
Latino (%)	-0.934**	-0.589**	-0.939**	-0.923**	-0.610**
	[-0.214]	[-0.134]	[-0.215]	[-0.211]	[-0.138]
Pacific Islander (%)	-2.192*	-2.558	-2.316*	-2.339*	-2.743*
	[-0.021]	[-0.025]	[-0.022]	[-0.022]	[-0.027]
Parental Education	65.768**	98.026**	70.399**	67.536**	99.118**
	[0.379]	[0.576]	[0.405]	[0.389]	[0.583]
Subsidized Meals (%)	-0.760**	-0.269*	-0.772**	-0.792**	-0.265*
	[-0.173]	[-0.056]	[-0.175]	[-0.180]	[-0.055]
English Language Learners (%)	-1.085**	-0.989**	-0.995**	-1.042**	-0.935**
	[-0.156]	[-0.127]	[-0.143]	[-0.150]	[-0.120]
Mixed School (%)	-16.147**	-21.616**	-19.858**	-23.934**	-25.695**
	[-0.049]	[-0.091]	[-0.060]	[-0.073]	[-0.108]
High School (%)	-20.307**	-26.149**	-25.259**	-30.897**	-29.849**
	[-0.081]	[-0.117]	[-0.101]	[-0.124]	[-0.134]
Constant	618.980**	430.373**	590.448**	602.448**	419.501**
	[5.440]	[4.114]	[5.189]	[5.295]	[4.008]
Observations	1692	736	1691	1692	735
R-squared	0.88	0.89	0.87	0.87	0.89

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.

Notes: Standardized beta coefficients in brackets;
[A]measure applicable to High School students only
* significant at 5%; ** significant at 1%.

Appendix Table 3. *Relationship of Substance Use/Intoxication at School, Substance Availability, and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API	API	API
Ever Intoxicated on School Property (%)	-2.264**					
	[-0.120]					
Any 30-day ATM Use on School Property (%)		-5.352**				
		[-0.090]				
Cigarette/Alcohol Availability (% easy) [A]			0.417			
			[0.026]			
Marijuana Availability (% easy) [A]				-0.301		
				[-0.024]		
Methamphetamine Availability (% easy) [A]					-0.946*	
					[-0.033]	
Offered Illegal Drugs at school (%)						-1.581**
						[-0.130]
Male	13.700	21.412	37.555	31.296	27.964	15.705
	[0.007]	[0.011]	[0.018]	[0.015]	[0.013]	[0.008]
American Indian (%)	-3.288**	-3.606**	-2.710**	-2.852**	-2.935**	-3.550**
	[-0.054]	[-0.059]	[-0.043]	[-0.045]	[-0.047]	[-0.058]
Asian (%)	0.894**	0.955**	1.082**	0.975**	1.068**	0.943**
	[0.093]	[0.099]	[0.125]	[0.113]	[0.124]	[0.098]
African American (%)	-2.737**	-2.703**	-2.785**	-2.828**	-2.893**	-2.664**
	[-0.248]	[-0.245]	[-0.269]	[-0.273]	[-0.275]	[-0.242]
Filipino (%)	-0.269	-0.234	-0.704*	-0.689*	-0.665*	-0.108
	[-0.011]	[-0.009]	[-0.032]	[-0.032]	[-0.031]	[-0.004]
Latino (%)	-0.893**	-0.840**	-0.649**	-0.683**	-0.613**	-0.831**
	[-0.204]	[-0.192]	[-0.147]	[-0.155]	[-0.139]	[-0.190]
Pacific Islander (%)	-2.362*	-2.221*	-2.622	-2.589	-2.203	-2.262*
	[-0.023]	[-0.021]	[-0.025]	[-0.025]	[-0.021]	[-0.022]
Parental Education	70.667**	66.261**	98.555**	98.551**	97.891**	67.342**
	[0.406]	[0.382]	[0.580]	[0.580]	[0.578]	[0.389]
Subsidized Meals (%)	-0.804**	-0.848**	-0.163	-0.213	-0.226	-0.864**
	[-0.182]	[-0.192]	[-0.034]	[-0.044]	[-0.047]	[-0.196]
English Language Learners (%)	-0.978**	-1.034**	-0.913**	-0.940**	-0.973**	-1.049**
	[-0.141]	[-0.149]	[-0.117]	[-0.120]	[-0.125]	[-0.151]
Mixed School (%)	-26.039**	-30.936**	-46.125**	-33.776**	-35.430**	-23.393**
	[-0.079]	[-0.094]	[-0.194]	[-0.142]	[-0.149]	[-0.071]
High School (%)	-32.604**	-43.171**	-50.640**	-37.874**	-40.921**	-31.419**
	[-0.131]	[-0.173]	[-0.221]	[-0.165]	[-0.177]	[-0.126]
Constant	579.326**	592.132**	403.394**	447.646**	458.333**	598.089**
	[5.091]	[5.202]	[3.827]	[4.247]	[4.343]	[5.257]
Observations	1691	1691	713	713	703	1688
R-squared	0.87	0.87	0.89	0.89	0.89	0.87

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%;
[A]measure applicable to High School students only.

Appendix Table 4. *Relationship of School Risk Environment, Violence/Weapons Possession, and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API	API	API
Harassed (%)	-0.406					
	[-0.015]					
Threatened/Injured with Weapon (%)		-1.530**				
		[-0.037]				
Property Stolen/Damaged (%)			0.018			
			[0.001]			
Physical fight at school (%)				-0.145		
				[-0.006]		
Weapon possession at school (%)					-9.345**	
					[-0.064]	
Feel safe at school (%)						1.607**
						[0.082]
Male	14.539	18.600	15.239	17.011	28.344	9.679
	[0.007]	[0.009]	[0.008]	[0.009]	[0.014]	[0.005]
American Indian (%)	-4.012**	-4.027**	-4.044**	-4.019**	-3.785**	-3.856**
	[-0.066]	[-0.066]	[-0.066]	[-0.066]	[-0.062]	[-0.063]
Asian (%)	1.055**	1.026**	1.049**	1.045**	1.023**	1.045**
	[0.110]	[0.107]	[0.109]	[0.109]	[0.106]	[0.109]
African American (%)	-2.749**	-2.739**	-2.775**	-2.762**	-2.658**	-2.497**
	[-0.249]	[-0.247]	[-0.252]	[-0.251]	[-0.240]	[-0.226]
Filipino (%)	-0.288	-0.315	-0.333	-0.331	-0.330	-0.197
	[-0.011]	[-0.012]	[-0.013]	[-0.013]	[-0.013]	[-0.008]
Latino (%)	-0.865**	-0.910**	-0.864**	-0.861**	-0.822**	-0.829**
	[-0.198]	[-0.209]	[-0.198]	[-0.197]	[-0.188]	[-0.189]
Pacific Islander (%)	-2.598**	-2.290*	-2.746**	-2.721**	-2.685**	-2.610**
	[-0.025]	[-0.021]	[-0.026]	[-0.026]	[-0.026]	[-0.025]
Parental Education	69.845**	69.219**	69.857**	69.827**	67.370**	65.623**
	[0.403]	[0.400]	[0.403]	[0.403]	[0.389]	[0.378]
Subsidized Meals (%)	-0.859**	-0.793**	-0.860**	-0.853**	-0.834**	-0.808**
	[-0.195]	[-0.180]	[-0.195]	[-0.194]	[-0.190]	[-0.183]
English Language Learners (%)	-1.024**	-1.034**	-1.011**	-1.014**	-1.026**	-1.042**
	[-0.148]	[-0.149]	[-0.146]	[-0.146]	[-0.148]	[-0.150]
Mixed School (%)	-40.924**	-41.609**	-41.395**	-42.193**	-40.705**	-39.415**
	[-0.124]	[-0.126]	[-0.125]	[-0.128]	[-0.123]	[-0.119]
High School (%)	-55.820**	-56.510**	-56.342**	-57.136**	-53.939**	-55.668**
	[-0.224]	[-0.226]	[-0.226]	[-0.229]	[-0.216]	[-0.223]
Constant	574.639**	577.640**	564.162**	567.313**	590.939**	437.057**
	[5.051]	[5.059]	[4.957]	[4.987]	[5.189]	[3.839]
Observations	1689	1652	1691	1689	1674	1690
R-squared	0.87	0.87	0.87	0.87	0.87	0.87

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%.

Appendix Table 5. *Relationship of School Assets and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API
Total School Assets (%)	1.534**			
	[0.078]			
Caring Relationships at School (%)		1.575**		
		[0.080]		
High Expectations at School (%)			1.350**	
			[0.080]	
Meaningful Participation at School (%)				0.734**
				[0.050]
Male	-12.995	-8.942	-11.218	-9.943
	[-0.007]	[-0.005]	[-0.006]	[-0.005]
American Indian (%)	-4.240**	-4.217**	-4.258**	-4.220**
	[-0.077]	[-0.077]	[-0.078]	[-0.077]
Asian (%)	1.223**	1.288**	1.214**	1.217**
	[0.141]	[0.146]	[0.140]	[0.137]
African American (%)	-3.124**	-3.101**	-3.418**	-3.214**
	[-0.238]	[-0.237]	[-0.258]	[-0.245]
Filipino (%)	-0.482	-0.455	-0.308	-0.492
	[-0.021]	[-0.020]	[-0.014]	[-0.022]
Latino (%)	-0.824**	-0.800**	-0.836**	-0.853**
	[-0.184]	[-0.178]	[-0.186]	[-0.191]
Pacific Islander (%)	-2.402	-3.333	-0.270	-2.971
	[-0.021]	[-0.029]	[-0.002]	[-0.026]
Parental Education	68.669**	71.073**	71.499**	71.823**
	[0.387]	[0.398]	[0.402]	[0.401]
Subsidized Meals (%)	-0.591**	-0.568**	-0.575**	-0.580**
	[-0.132]	[-0.127]	[-0.128]	[-0.130]
English Language Learners (%)	-1.719**	-1.706**	-1.626**	-1.639**
	[-0.220]	[-0.219]	[-0.208]	[-0.211]
Mixed School (%)	-33.243**	-32.553**	-33.932**	-37.553**
	[-0.114]	[-0.111]	[-0.115]	[-0.127]
High School (%)	-48.276**	-48.863**	-49.111**	-52.754**
	[-0.198]	[-0.200]	[-0.201]	[-0.217]
Constant	487.198**	467.855**	471.760**	539.788**
	[4.390]	[4.211]	[4.242]	[4.875]
Observations	586	581	582	577
R-squared	0.86	0.86	0.86	0.86

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%.

Appendix Table 6. *Relationship of Home Assets and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API
Total Home Assets (%)	2.638**			
	[0.103]			
Caring Relationships as Home (%)		2.775**		
		[0.112]		
High Expectations at Home (%)			1.994**	
			[0.081]	
Meaningful Participation at Home (%)				1.691**
				[0.077]
Male	-15.542	-4.473	-4.720	-9.808
	[-0.008]	[-0.002]	[-0.002]	[-0.005]
American Indian (%)	-4.016**	-4.121**	-4.122**	-3.888**
	[-0.073]	[-0.075]	[-0.076]	[-0.072]
Asian (%)	1.252**	1.299**	1.204**	1.305**
	[0.144]	[0.149]	[0.137]	[0.147]
African American (%)	-3.500**	-3.492**	-3.580**	-3.453**
	[-0.251]	[-0.251]	[-0.259]	[-0.250]
Filipino (%)	-0.224	-0.063	-0.389	-0.302
	[-0.010]	[-0.003]	[-0.017]	[-0.013]
Latino (%)	-0.848**	-0.877**	-0.817**	-0.849**
	[-0.190]	[-0.196]	[-0.184]	[-0.190]
Pacific Islander (%)	-1.662	-0.860	-1.672	-1.831
	[-0.014]	[-0.007]	[-0.014]	[-0.016]
Parental Education	64.415**	65.418**	64.834**	67.024**
	[0.365]	[0.367]	[0.365]	[0.374]
Subsidized Meals (%)	-0.632**	-0.520**	-0.676**	-0.630**
	[-0.141]	[-0.116]	[-0.151]	[-0.141]
English Language Learners (%)	-1.460**	-1.559**	-1.453**	-1.552**
	[-0.188]	[-0.200]	[-0.187]	[-0.199]
Mixed School (%)	-36.514**	-34.324**	-41.630**	-35.305**
	[-0.123]	[-0.116]	[-0.140]	[-0.119]
High School (%)	-50.210**	-47.481**	-57.659**	-48.721**
	[-0.204]	[-0.192]	[-0.235]	[-0.198]
Constant	393.848**	377.066**	416.767**	473.648**
	[3.522]	[3.369]	[3.748]	[4.246]
Observations	574	568	566	561
R-squared	0.87	0.87	0.86	0.86

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%.

Appendix Table 7. *Relationship of Community Assets and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API
Total Community Assets (%)	1.412**			
	[0.071]			
Caring Relationships in Community (%)		1.296**		
		[0.064]		
High Expectations in Community (%)			2.117**	
			[0.094]	
Meaningful Participation in Community (%)				1.820**
				[0.110]
Male	-10.363	-6.699	0.289	-8.268
	[-0.005]	[-0.003]	[0.000]	[-0.004]
American Indian (%)	-4.035**	-4.011**	-4.006**	-3.743**
	[-0.074]	[-0.074]	[-0.074]	[-0.069]
Asian (%)	1.264**	1.270**	1.349**	1.367**
	[0.149]	[0.143]	[0.154]	[0.156]
African American (%)	-3.381**	-3.529**	-3.503**	-3.240**
	[-0.247]	[-0.256]	[-0.253]	[-0.237]
Filipino (%)	-0.275	-0.197	-0.134	-0.169
	[-0.012]	[-0.009]	[-0.006]	[-0.008]
Latino (%)	-0.870**	-0.880**	-0.820**	-0.781**
	[-0.194]	[-0.197]	[-0.184]	[-0.175]
Pacific Islander (%)	-2.173	-0.996	-0.982	-2.472
	[-0.019]	[-0.009]	[-0.008]	[-0.021]
Parental Education	66.960**	68.863**	66.793**	64.208**
	[0.379]	[0.387]	[0.375]	[0.362]
Subsidized Meals (%)	-0.603**	-0.594**	-0.595**	-0.563**
	[-0.137]	[-0.133]	[-0.133]	[-0.127]
English Language Learners (%)	-1.415**	-1.473**	-1.493**	-1.530**
	[-0.184]	[-0.189]	[-0.191]	[-0.200]
Mixed School (%)	-38.389**	-38.217**	-36.544**	-36.731**
	[-0.132]	[-0.129]	[-0.124]	[-0.125]
High School (%)	-53.361**	-53.469**	-50.787**	-51.336**
	[-0.219]	[-0.219]	[-0.207]	[-0.210]
Constant	481.402**	478.615**	404.691**	473.253**
	[4.356]	[4.309]	[3.633]	[4.270]
Observations	584	564	564	573
R-squared	0.86	0.86	0.87	0.86

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%.

Appendix Table 8. *Relationship of Peer Assets, Internal Assets, and Sociodemographic Characteristics to API Scores*

Variable	API	API	API	API
Total Peer Assets (%)	1.450**			
	[0.055]			
Caring Relationships with Peers (%)		0.177		
		[0.008]		
High Expectations with Peers (%)			1.364**	
			[0.065]	
Internal resilience assets (%)				1.785**
				[0.060]
Male	0.554	-8.104	-3.305	-3.396
	[0.000]	[-0.004]	[-0.002]	[-0.002]
American Indian (%)	-4.138**	-4.235**	-3.961**	-4.036**
	[-0.076]	[-0.078]	[-0.074]	[-0.072]
Asian (%)	1.116**	1.104**	1.037**	1.192**
	[0.125]	[0.124]	[0.116]	[0.144]
African American (%)	-3.449**	-3.509**	-3.467**	-3.186**
	[-0.249]	[-0.254]	[-0.252]	[-0.251]
Filipino (%)	-0.414	-0.459	-0.409	-0.452
	[-0.018]	[-0.020]	[-0.018]	[-0.020]
Latino (%)	-0.871**	-0.922**	-0.879**	-0.856**
	[-0.195]	[-0.206]	[-0.198]	[-0.190]
Pacific Islander (%)	-0.838	-0.932	-1.550	-2.351
	[-0.008]	[-0.008]	[-0.014]	[-0.020]
Parental Education	66.609**	68.292**	66.933**	71.755**
	[0.374]	[0.383]	[0.374]	[0.406]
Subsidized Meals (%)	-0.610**	-0.681**	-0.599**	-0.517**
	[-0.136]	[-0.152]	[-0.135]	[-0.116]
English Language Learners (%)	-1.531**	-1.483**	-1.546**	-1.491**
	[-0.197]	[-0.191]	[-0.200]	[-0.194]
Mixed School (%)	-43.032**	-43.052**	-40.729**	-39.776**
	[-0.146]	[-0.145]	[-0.138]	[-0.133]
High School (%)	-60.592**	-60.561**	-55.807**	-55.491**
	[-0.247]	[-0.246]	[-0.230]	[-0.227]
Constant	479.609**	577.608**	487.047**	427.037**
	[4.312]	[5.177]	[4.399]	[3.845]
Observations	577	570	563	635
R-squared	0.86	0.86	0.86	0.86

Source Calculations based on the 1999-2001 California Healthy Kids Survey and CDE's API database (1999-2001). School-level analysis.
Notes: Standardized beta coefficients in brackets;
* significant at 5%; ** significant at 1%.