Contract No.: 2004-3433; 2004-3880
MPR Reference No.: 6088-300

MATHEMATICA
Policy Research, Inc.

Valuing Student Competencies: Which Ones Predict Postsecondary Educational Attainment and Earnings, and for Whom?

Final Report

September 15, 2006

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EXECUTIVE SUMMARY

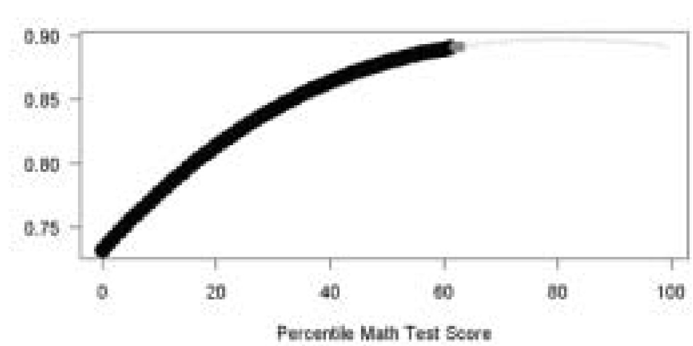
The education standards and accountability movements, spurred on by the passage of the No Child Left Behind Act (NCLB), have focused attention on math and reading test scores as the main barometer of student achievement and school performance. The growing use of test scores to measure school and student performance has heightened an old debate about which competencies public schools should help students develop. Does this focus on test scores allow schools to concentrate on helping students develop the most important skills and abilities they can gain in school? Or might it discourage teachers from helping students work on other important competencies skills, habits, and attitudes? Part of this question depends upon schools' capacity to influence students in specific ways. A more basic issue, however, concerns the relative value of various competencies—specifically, which ones have the largest effect on students' success in higher education and in the labor market.

This report examines how indicators of academic and nonacademic competencies are related to postsecondary educational and labor market outcomes. Drawing on the National Education Longitudinal Study (NELS) surveys of students and teachers, we analyze how postsecondary earnings and the likelihood of attending and completing a postsecondary education program are related to several competencies—specifically, indicators of math skills, work habits, leadership skills, teamwork and other sports-related skills, and attitudes toward whether luck or effort determine success in life ("locus of control"). While similar analyses have been done in the past (most recently, Heckman et al 2006), one of the contributions of our study is that we analyze several competencies simultaneously, using a flexible functional form to model and analyze complex interactions among competencies. Using this approach, we can estimate the effect of a competency as a function of students' other competencies. That is, we examine whether the benefit of improving a given competency depends on a student's existing strengths and weaknesses.

FINDINGS

We find that the benefit of incremental gains in a competency does depend on the mix of skills each student possesses. This variation is due to diminishing returns of some competencies, and to complementary relationships among some competencies, in their effects on postsecondary outcomes. For example, we find a diminishing effect of math test score on postsecondary enrollment, such that the benefit of improving math test score appears much greater for students who are weak in math (see figure below).

THE PROBABILITY OF EVER ENROLLING IN ANY POSTSECONDARY EDUCATION VERSUS PERCENTILE MATH TEST SCORE



Nonlinear relationships such as the one pictured above, as well as complementarities between competencies, mean that some students are most likely to benefit from improving academic competencies, while others are most likely to benefit more from improving their nonacademic competencies. For example, with respect to earnings eight years after high school, we find that increasing one of the nonacademic competencies is more valuable for most students than improvements in math ability (see table below). Similarly, for most students, improvements in one of the nonacademic competencies appear to have a larger effect than does math on their chances of enrolling and completing postsecondary programs. For most students, however, gains in math have a larger effect on their chances of completing a bachelor's degree than do the other nonacademic competencies.

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY
IS MOST PREDICTIVE OF OUTCOMES

Competencies	Enroll in Any Postsecondary Program	Complete Any Postsecondary Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Math Test Score	0.40	0.30	0.56	0.33
Nonacademic Competencies	0.60	0.70	0.44	0.77
Work Habits Composite	0.10	0.43	0.31	0.02
Sports-Related Competencies	0.21	0.09	0.05	0.20
Prosocial Behavior Composite	0.08	0.05	0.06	0.02
Leadership Roles	0.04	0.05	0.01	0.14
Locus of Control	0.17	0.09	0.01	0.30

In general, we find that, when choosing between improving math skills and various nonacademic competencies, it is better for students to improve in areas where they are weak than to focus on further developing areas where they are well above average. This suggests that the emphasis on improving the academic performance of low achievers may be well placed but that the concerns of some parents that their higher-achieving children might benefit more from developing nonacademic skills might also be well founded.

The pattern of findings presented above suggests that taking into account students' individual strengths and weaknesses when helping them decide which competencies to improve might be more effective than simply encouraging all students to improve the same competency. In other words, it suggests that an individualized approach is better than a one-size-fits-all approach. We conducted a statistical test of this hypothesis for each outcome, and find that, for enrollment, completion of any program, and earnings, the "individualized" approach is significantly more effective. For example, for earnings, we find that increasing the competency of greatest value to each individual student by 20 percentile points is associated with an increase in earnings of 9.3 percent, compared to an increase in earnings of 5.6 percent if math test score were improved by 20 percentile points for each student.

IMPLICATIONS FOR POLICY AND FUTURE RESEARCH

Our findings have two implications for educational policy and practice. First, the increasing focus on academic skills, and particularly skills captured by standardized tests, may be misplaced if it leads schools and parents to neglect the development of valuable nonacademic competencies. Second, an individualized approach to setting and pursuing competency objectives for each student could benefit students in terms of their future educational attainment and earnings. Educators are likely to face at least two challenges in developing nonacademic competencies:

- **Measuring these competencies objectively is difficult**. For many measures used in this study, we relied on student self-reports or reports from teachers. In practice, schools could not depend on this type of subjective and informal assessment, particularly if they are held accountable for students' mastery of these competencies. Furthermore, little is known about how teachers can develop most nonacademic competencies.
- **Schools may find it hard to help individual students identify and develop the competencies they need most**. Expanding the use of individualized education plans, currently required for students with special needs, is one possible strategy. The plans could help schools advise parents and students on classes and activities that could be most beneficial. This approach would require a large investment in guidance staff and professional development. Additional teacher training, curriculum changes, and reductions in class size might help teachers develop customized assignments and projects for students.

Despite the challenges and costs involved in developing a more individualized approach to schooling, the investment may be worthwhile. Future research should clarify what types of investments would be most beneficial. It should also address the value of a broader range of competencies, including ones not captured in our study, and illuminate how the benefits of specific competencies interact with students' existing skills, attitudes, and interests. Research can also play a role in helping educators develop methods for measuring competencies, particularly ones that cannot be evaluated well through standardized tests. Finally, future education experiments could help policymakers identify cost-effective ways to increase academic and nonacademic competencies.

I. INTRODUCTION

In this report, we examine how indicators of academic and nonacademic competencies are related to postsecondary educational and labor market outcomes and how the value of these competencies depends on students' existing strengths and weaknesses. Drawing on the National Education Longitudinal Study (NELS) surveys of students and teachers, we analyze how postsecondary earnings and the likelihood of attending and completing a postsecondary education program are related to several competencies—specifically, indicators of math skills, work habits, leadership skills, teamwork and other sports-related skills, and attitudes toward whether luck or effort determine success in life ("locus of control"). Other studies have examined the average effect of competencies on postsecondary outcomes. The contribution of our study is that we can estimate the effect of a competency as a function of students' other competencies. That is, we examine whether the benefit of improving a given competency depends on a student's existing strengths and weaknesses.

When taking into account individual strengths and weaknesses, we find that, for a majority of students, nonacademic competencies are more predictive of postsecondary educational attainment and earnings than math test score. We arrive at this finding by calculating the effect of each of the competencies listed above as a function of students' existing competencies. This yields an estimate of the effect of each competency for every student. We then group students according to the competency most predictive of each outcome. For example, for 33 percent of students, math test score is most predictive of earnings, meaning that, for 66 percent of students, a nonacademic competency is most predictive of earnings. For a majority of students, nonacademic competencies are also most predictive of postsecondary enrollment and completion of any degree. For a majority of students, however, math test score is the strongest predictor of bachelor's completion.

Furthermore, we show that a hypothetical policy intervention in which every student improves the competency of greatest value to him or her (an individualized approach) is significantly more beneficial than an intervention in which the same competency is improved for all students (a "one-size-fits-all" approach). For postsecondary enrollment, completion of any postsecondary degree, and earnings, we find that the individualized approach is significantly more effective than the one-size-fits-all approach. Only for bachelor's completion is there no difference between these approaches.

This report is organized as follows. In Chapter II, we describe the policy context and previous studies in this area. Chapter III presents our data and methods, and Chapter IV presents detailed findings. Chapter V contains a concluding discussion of implications for policy and future research.

II. POLICY CONTEXT AND PRIOR RESEARCH

Policymakers, educators, and business people have a variety of perspectives about the competencies most useful in postsecondary education and in the workplace. In some cases, researchers have attempted to test these hypotheses using secondary data. Here, we examine both the policy context and the literature on the relationship between competencies and postsecondary outcomes.

A. POLICY CONTEXT

In the early 1990s, amid growing concern about U.S. economic competitiveness, the U.S. Department of Labor assembled the Secretary's Commission on Achieving Necessary Skills (SCANS), which defined the capabilities young people need to acquire to secure good jobs and be successful at work (U.S. Department of Labor 1991). The SCANS report concluded that schools should help students develop a diverse array of competencies, including the capacity to allocate resources, obtain and use information, work productively with others, understand and use systems, select and use technologies, and maintain a positive attitude toward work.

Interest in fostering teamwork and leadership skills was heightened by the emergence of management strategies that increased the responsibilities of frontline workers. Such strategies (borrowed in part from Japanese corporations) include (1) seeking employees' input on ways to identify errors, improve products, or increase productivity; and (2) holding teams of employees responsible for key functions or tasks (Hackman 2002; Osterman 1997; Carnevale et al. 1990). These became known as "High-Performance Work" strategies, as some studies indicated that they are associated with high rates of productivity and innovation. Some analysts have argued that the success and diffusion of these innovations hinges on the extent to which students and employees develop leadership and teamwork skills (Osterman 1997; Capelli 1997).

The passage of the School-to-Work Opportunity Act (STWOA) of 1994 reflected an interest among educators in helping students develop a broad range of competencies. STWOA supported the development of state and local programs designed to expose students to alternative careers and prepare them for specific careers through career counseling, academic and technical instruction, and paid or unpaid work-based learning activities. STWOA placed a high priority on the work-based learning activities and mandated that these activities include some "instruction in general workplace competencies, including…activities related to developing positive work attitudes, and employability and participative skills." In practice, many of the programs STWOA funded developed school- and work-based activities designed to develop a variety of competencies, including problem-solving skills, teamwork, and positive work habits. For example, interested students were placed in internships or encouraged to participate in school-based businesses, where they were assessed on their performance and interactions with team members or supervisors.

By the late 1990s, policymakers' interest in diverse competencies and career-focused education strategies waned, for several reasons. Bipartisan political support grew at both the federal and state levels for policies that would hold schools accountable for student achievement. Policymakers also were concerned about the persistent gap in academic achievement between white and minority students. To gauge student achievement, policymakers and educators chose to rely increasingly on standardized tests—particularly in math and reading—which many states were already using on a large scale. These tests were viewed as a reliable and relatively inexpensive measure of students' skills. Support for school-to-work programs declined, in part because some educators and parent advocates feared that such programs might compel students to define a career goal too early, or even worse, unnecessarily pigeonhole some students into narrow vocational avenues that could limit their career options and their preparation for college.

Efforts to measure a broad range of student competencies lost momentum, as school systems struggled to satisfy federal and state demands to boost reading and math scores.

As schools faced intense pressure to boost test scores, however, some educators questioned the wisdom of measuring success largely through reading and math tests. Some voiced concerns about the growing incentives for teachers to focus exclusively on students' test-taking skills (Meier 2002). Meier has argued that these incentives have led some schools to spend too much time on test-prep activities at the expense of developing other important competencies. These concerns, in turn, have heightened interest among some educational researchers in measuring the value of specific competencies and, specifically, in gauging the value of the skills captured by standardized academic tests relative to that of other types of cognitive and noncognitive competencies.

B. LITERATURE ON THE RELATIONSHIP BETWEEN COMPETENCIES AND POSTSECONDARY OUTCOMES

Several studies have analyzed how postsecondary outcomes are related to specific competencies. Krueger (2000) examined several studies linking math and reading test scores to future earnings and concludes that an increase of one standard deviation in these scores yields a substantial (about eight percent) increase in annual earnings. The studies Krueger cites include Murnane et al. (1995) and Currie and Thomas (1999). Murnane et al. estimated the effects of gains on the math test administered in 1980 to students in the High School and Beyond (HS&B) survey. Currie and Thomas focused on the effects of gains on the math and reading tests administered by the British National Child Development study.

Several recent studies have focused on the returns to nonacademic and noncognitive skills. Heckman and Rubinstein (2001) find that people who obtain the GED tend to have lower earnings than high school dropouts with comparable academic test scores. They attribute this wage differential to differences in the two groups' noncognitive competencies and, specifically, to the relatively poor work habits and other noncognitive competencies of those who choose to earn a GED. Heckman et al (2006) use factor analysis to construct composite measures of cognitive and noncognitive skills, which they then relate to postsecondary outcomes. They find noncognitive skills strongly influence both postsecondary educational attainment and wages. Using longitudinal data from HS&B, Rosenbaum (2001) finds that participation in leadership activities, good attendance, and the absence of discipline problems are positively associated with educational attainment and earnings, after controlling for academic achievement test scores and other factors. Kuhn and Weinberger (2003) find that proxies for leadership skills appear to have a substantial effect on postsecondary earnings, controlling for test scores and other factors, and that the return to these skills is growing for successive cohorts of students. Osborne (2000) finds a connection between postsecondary success and attitudes (measured at age 11) regarding whether success in life depends on hard work or good luck ("locus of control"). Dunifon and Duncan (1998) find that locus of control and a desire for challenge are both good predictors of postsecondary earnings, controlling for test scores and background characteristics.

Our study builds on this literature by using a methodological approach that allows us to model the relationship between postsecondary outcomes and competencies as a flexible production function involving nonlinear returns to competencies and complex interactions between competencies. Using this approach, we can identify what proportion of students would benefit most from improving either academic or nonacademic competencies.

III. METHODOLOGY AND DATA

A. CONCEPTUAL FRAMEWORK AND METHODOLOGY

Our conceptual framework draws on the concept of a production function, in which we regard various competencies as inputs that increase a young person's productivity as a student or as a worker. A key component of our conceptual framework is that young people's productivity, both as students and workers, may depend on interactions among several competencies, as well as nonlinear effects. Specifically, there may be complementarities among competencies, such that the value of improving one competency is greater for students with a higher level of the complementary competency. Alternatively, some competencies might be substitutes for others, such that students who are strong in one competency would benefit little from improvements to the substitute competency. In addition, there may be diminishing (or, possibly, increasing) returns to improving competencies.

The nature of these nonlinearities and interactions can support very different conclusions. If we generally find diminishing returns to competencies and complementarities among competencies, we can conclude that students should focus on improving their weakest competencies rather than on further improving their areas of strength. On the other hand, if we find that competencies are substitutes for one another and that there are increasing returns to competencies, we can conclude that students should focus on specializing in areas where they are already strong.

To empirically identify the nature of nonlinearities and interactions among competencies, we selected a flexible model and estimation methodology. In equation form, the production function we wish to estimate is simply:

$$Y = \alpha + f\left(C_1,...,C_6\right) + \beta X + \varepsilon \quad (1)$$

where Y denotes a postsecondary outcome, $C_1 \ldots C_6$ are competencies, X is a vector of student background characteristics that might also influence postsecondary outcomes, and f is an unspecified function that allows for nonlinear effects of each competency and nonlinear six-way interactions.

To estimate equation (1), we use an approach that combines two regression methods. Specifically, we use local regression (LR) to estimate the unspecified function f, ordinary least squares (OLS) to estimate the effects of control variables X, and the backfitting algorithm described by Hastie and Tibshirani (1990) to bring those two regression methods together into the framework of generalized additive models. To calculate standard errors for all the statistics we generate from this model, we use bootstrapping, which can account for the clustered sample design of our data. Appendix A describes these methods in greater detail.

B. DATA

To estimate the relationship between competencies in high school and postsecondary education and earnings, we rely on data collected for NELS. NELS followed a cohort of students who were in eighth grade in 1988 with interviews in 1988, 1990, 1992, 1994, and 2000. The 1988, 1990, and 1992 rounds included detailed surveys of students while in high school, as well as surveys of their teachers and parents. We draw on data from these first three rounds to form competency measures, control variables, and subgroups. The 2000 wave of NELS included details on postsecondary education and earnings. Our base sample consists of the 9,977 high school graduates who have sufficient data from the 1988, 1990, 1992, and 2000 waves to be included in our analyses.[1] Next, we describe all the variables included in our analyses.

1. Competency Variables

Because students' true competencies cannot be observed directly, we analyze composite variables that we believe are indicators of these competencies. To reduce the dimensionality of the analysis and increase the reliability of our measures, we group individual NELS variables into categories based on the underlying competencies that we believe these variables represent. We then form composite measures for each competency area. Below, we describe the construction of these composites, show how the composites relate to the individual NELS variables used to construct the composites, and examine how closely related the composites are to each other.

We followed a five-step procedure to create composite competency measures. First, we identified the broad types of competencies we wanted to measure. Second, we examined NELS to identify a broad set of variables that appeared to relate qualitatively to the competency areas of interest. Third, we constructed a composite by standardizing all the individual variables we thought might be related to a competency, then averaging them into a single variable. Fourth, we calculated Cronbach's Alpha coefficient to measure the extent to which the items we subjectively grouped together are statistically related to one another and to remove variables that were weakly correlated with the composite.[2] Fifth, to aid in interpretation, we transformed all the measures

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[1] We do not analyze dropouts.

[2] Cronbach's alpha is a measure of how closely a set of variables are related to one another and, presumably, to a common underlying factor. It is a function of the number of variables included in a composite and the average correlation among the variables. (See Cronbach [1951].)

into a percentile scale.[3] Below, we summarize each competency area and the types of variables in NELS that we believe are indicators of each competency. We also provide summary information in Table III.1 for the four measures that we constructed ourselves, including the source and timing of the variables, as well as Cronbach's alpha coefficient.

1. ***Academic Achievement as Measured by Test Scores.*** A central question of this study is the extent to which academic standardized tests are the most important predictor of student success. To address this question, we used the NELS math, reading, history, and science tests that were administered in the 8th, 10th, and 12th grades. We created a percentile scale for all four tests based on the average of the 8th-, 10th-, and 12th-grade scores. We only include math test score in most of our analyses, however, because the four tests are too highly correlated to be included in the same regression. We chose math test score because it appears to be more strongly related to outcomes than the other test scores (see Appendix C).

TABLE III.1

OVERVIEW OF COMPETENCY COMPOSITES

	Competency Composites			
	Work Habits	Prosocial Behavior	Sports Participation	Leadership
Total Number of Variables	50	16	17	63
Cronbach's Alpha Coefficient	0.89	0.78	0.67[a]	0.76[a]
Number of Variables, by Year				
8th grade	19	5	3	31
10th grade	20	6	9	18
12th grade	11	5	5	14
Number of Variables, by Source				
Student	27	11	17	63
Teacher	23	5	0	0

Source: Author's calculations using data from NELS.

[a]The alpha coefficient is less meaningful for the sports and leadership composites, since participation in one activity reduces the amount of time available to participate in other activities.

[3] Converting to a percentile scale could cause misspecification bias if we were estimating the effects of competencies using OLS. Because we are using LR, however, this is not a concern.

2. ***Work Habits.*** Students' work habits may relate to their ability to succeed both in school and on the job. NELS posed, to both students and teachers, many questions relating to work habits, including questions on how much time students spend on homework, how hard they work in class, how often they come to class with their textbook and other materials, and how often they are tardy or absent. We combined these questions into a single composite and confirmed that the components are significantly related to one another.

3. ***Sports-Related Competencies.*** We use students' participation in sports activities as a proxy for multiple competencies. Sports participation is likely to be associated with competencies such as teamwork skills, competitiveness, and, perhaps, time management skills and an ability to set and work toward goals. We refer to the skills and capabilities captured by sports participation as "sports-related" competencies. An important distinction is that we are not attempting to estimate the effect of participation in sports on these competencies. Instead, we are attempting to measure the effect of competencies that are *correlated* with sports participation. Our measure of sports-related competencies is the number of sports that a student participated in during high school, transformed into a percentile.

4. ***Leadership Skills.*** An ability to take primary responsibility for a task and manage others effectively is likely to be rewarded in the labor market. NELS records leadership roles that students play in a wide range of extracurricular activities, including student government, sports, and nonathletic organizations and clubs. As with sports activities, we view this measure as an indicator of competencies students may have already possessed—we do not view our findings as indicative of the effect of taking on these particular leadership roles. Our measure is the number of leadership roles a student has during high school, transformed into a percentile.

5. ***Prosocial Behavior.*** Students' ability or willingness to follow social rules may relate to how they interact with others. It may also be an indicator of the amount of time they spend in unproductive, rather than productive, activities. Both hypotheses suggest that better behavior is associated with postsecondary success. Alternatively, an unwillingness to conform to school rules could indicate an independent attitude or propensity to take risks—traits that may be rewarded if they can be channeled productively. NELS questioned students and teachers about whether students get into trouble for being "disruptive" or for not following rules. This measure does *not* include questions related to illegal activity or expulsion from school, because those events are too rare to reliably analyze and may be substantively different from the other items in this composite. (The most extreme measure in this composite is suspension from school.)

6. ***Attitudes Toward Determinants of Success***. Students who believe that success is the result of hard work rather than of good fortune may be more likely to strive to succeed both in school and on the job. NELS includes a locus of control composite designed to measure the extent to which students believe success is the result of hard work as opposed to luck.

To confirm that variation in the composite measures we constructed is meaningful, we relate the composites back to their individual components. Table III.2 shows how two components of the work habits and sports composites relate to the overall composites. For example, 14.2 percent of students at the 25th percentile of the work habits composite reported spending seven hours or more each week on homework, compared to 35.5 percent of students at the 75th percentile of this measure. Similarly, just 0.6 percent of students at the 25th percentile of the sports composite participated in a team sport in 12th grade, compared to 51.1 percent of students at the 75th percentile of the sports composite. These examples suggest that variation in the composites is meaningful in terms of the individual components. They also provide a more intuitive sense of what variation in the composites actually means. Tables B.1–B.4 in Appendix B show the relationship between all the competency components and the overall composites.

We examine how closely related the composites are to one another to ensure that the composites are clearly measuring six separate competencies. This is important both conceptually and because, if the composites are highly correlated with one another, interpreting results of regression analysis will be complicated by the problem of multicolinearity. In Table III.3, we show the correlations among competency measures. The academic competencies (math, science, reading, and history test scores) are all highly correlated, suggesting that they are essentially measuring the same underlying competency and cannot be analyzed together in the same regression. The other composites are not as highly correlated, suggesting that they are measuring distinct competencies and can be analyzed jointly.[4]

[4] The highest correlation among the nonacademic competencies is between work habits and prosocial behavior (correlation of 0.59). However, we found that analyzing those two composites separately does not change our regression findings.

TABLE III.2

EXAMPLE OF VARIATION IN THE COMPONENTS OF COMPETENCY COMPOSITES

Select Components of the Composites	Percentile of Competency Composite: 25th Percentile	50th Percentile	75th Percentile
Work Habits Composite			
Percentage of Students Who Spent the Specified Number of Hours on Homework Each Week in 10th Grade, Asked of Students			
None	7.0	5.1	1.3
One hour or less	29.4	24.8	15.0
Two to three hours	37.5	31.6	28.7
Four to six hours	12.0	16.8	19.6
Seven hours or more	14.2	21.8	35.5
Percentage of Students Who Completed Homework with the Specified Frequency in 10th Grade, Asked of Teachers			
Never or rarely	6.3	2.2	1.1
Some of the time	30.5	15.4	4.9
Most of the time	51.5	47.8	40.6
All of the time	11.8	34.5	53.5
Sports Participation Composite			
Percentage of Students Who Participated in a Team Sport in 12th Grade, Asked of Students			
School does not offer	5.4	1.7	1.8
Did not participate	94.0	85.9	47.1
Participated	0.6	12.4	51.1
Percentage of Students Who Participated in an Individual Sport in 12th Grade, Asked of Students			
School does not offer	6.2	4.5	6.1
Did not participate	93.5	81.5	65.4
Participated	0.4	14.1	28.5

Source: Authors' tabulation of data from NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the percentile value of the composites. Higher values of the work habits composite corresponds to better work habits, and higher values of the sports participation composite correspond to more sports participation. The values presented in this table are calculated by finding the proportion of students with the specified characteristic within +/– 2 percentile points of the stated competency percentile (approximately 400 students). For example, among students between the 23rd and 27th percentile of the work habits composite, 14.2 percent report working on homework for at least seven hours per week. See Appendix B for similar tables corresponding to all variables in the work habits, prosocial behavior, sports participation, and leadership composites.

TABLE III.3

CORRELATIONS BETWEEN COMPETENCIES

	Math	Reading	History
Reading	0.78		
History	0.77	0.83	
Science	0.83	0.80	0.84

	Math	Work Habits	Sports Participation	Prosocial Behavior	Leadership
Work Habits	0.38				
Sports Participation	0.12	0.08			
Prosocial Behavior	0.26	0.59	–0.11		
Leadership	0.20	0.18	0.35	0.07	
Locus of Control	0.31	0.34	0.12	0.22	0.19

Source: Authors' tabulation of data from NELS.

Note: This table shows the unadjusted correlations between competencies. Including highly correlated competencies in the same regression may lead to estimates that are difficult to interpret. Due to the high correlations among academic competencies, we do not generally include multiple academic competencies in the same regression. The correlation between work habits and prosocial behavior is somewhat high; however, we have not observed any substantial difference in findings when only one is included in regression analyses compared to when both are included, so we include both in most analyses. These correlations also are suggestive of the support that exists for examining complementarities between competencies. The fact that most correlations are low suggests that the data do support analysis of how the effect of one competency varies with the level of another competency.

2. Postsecondary Education and Earnings

NELS 2000 asked respondents about the forms of postsecondary education they had enrolled in and completed, as well as their earnings for 1999. The survey also asked respondents whether they were currently enrolled in an education program and how many hours per week they worked. We use this information to construct four outcome variables that are the focus of this study:

1. A binary indicator of whether the respondent enrolled in any postsecondary education programs. Among the people in our sample, 85 percent had enrolled in some form of postsecondary education as of the 2000 followup.

2. A binary indicator of whether the respondent completed any form of postsecondary education. Among the people in our sample, 50 percent completed some form of postsecondary education as of the 2000 followup.

3. A binary indicator of whether the respondent completed a bachelor's degree. Among the people in our sample, 35 percent had completed a bachelor's degree as of the 2000 followup.

4. The log of 1999 earnings, with the analysis sample restricted to those who were not currently enrolled in postsecondary education, who worked more than 35 hours per week in 1999, and who worked more than 40 weeks in 1999.[5] We also removed a handful of outliers from the data. The base sample for analyses of earnings has 5,645 observations (57 percent of the sample used to analyze enrollment in postsecondary education). Of those who were working full-time, the average income (in 2000 dollars) was just over $30,000.[6]

Our regression analysis in the next section focuses on the relationship between these postsecondary outcomes and the composite competency measures, taking into account all the

[5] The select nature of this sample has the potential to bias estimates of the effect of competencies on earnings. Specifically, the effect of postsecondary education on earnings is likely understated in this sample, because respondents with less postsecondary education probably had more work experience. Therefore, the "full effect" on earnings of competencies that have a strong effect on postsecondary education will be understated, because the effect of postsecondary education on earnings is understated. In Appendix C, we examine the sensitivity of our findings to this issue by assuming that the effect of postsecondary education on earnings is much higher than what we actually find in our data.

[6] All these statistics are weighted.

competency measures and control variables. However, it is also useful to demonstrate that the individual components of the composites are related to postsecondary outcomes before regression adjustment. Table III.4 shows how two components of the work habits and sports composites relate to all four outcomes. (Appendix B provides similar tables for all components.) For work habits, we see a strong relationship between time spent on homework and all outcomes, both when the question is asked of students and when it is asked of teachers. For example, 39.1 percent of students who spent one hour a week on homework completed some form of postsecondary education program, compared to 65.2 percent of those who spent seven or more hours a week on homework. The appendix tables demonstrate that similar relationships exist for most of the other individual variables that make up the competency composites. That is, most of the components are positively associated with postsecondary outcomes.

A limitation of NELS is that no additional follow-up data are available beyond the year 2000, when respondents were about 26 years old. While this may be late enough to yield a reliable measure of bachelor's completion, we do not know whether earnings at this age are strongly related to lifetime earnings. Of particular concern is the fact that competencies that are easy for employers to observe through school transcripts and resumes (for example, test scores and leadership roles) might have a greater bearing on initial earnings than competencies that can best be observed through on-the-job experience with the employee (for example, work habits and behavior). A study of how competencies relate to persistence in a job or lifetime earnings might have findings different from those of the present study.

3. Subgroups

A goal among some policymakers is to reduce the gap in postsecondary educational attainment and earnings between advantaged and disadvantaged students. We analyze subgroups based on two factors related to postsecondary success: (1) students' parents' education, and

TABLE III.4

EXAMPLE OF THE RELATIONSHIP BETWEEN COMPONENTS OF COMPETENCY COMPOSITES AND OUTCOMES

Select Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Education Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-Time Workers
Work Habits					
Percentage of Students Who Spent the Specified Number of Hours on Homework Each Week in 10th Grade, Asked of Students					
None	7.2	58.5	25.7	8.2	$28,434
One hour or less	24.3	76.2	39.1	21.7	$29,795
Two to three hours	28.6	81.2	47.9	30.5	$29,823
Four to six hours	16.6	82.6	49.6	36.0	$30,657
Seven hours or more	23.3	91.7	65.2	53.2	$33,105
Percentage of Students Who Completed Homework with the Specified Frequency in 10th Grade, Asked of Teachers					
Never or rarely	8.7	58.3	24.7	8.5	$28,269
Some of the time	20.1	72.0	31.8	14.8	$28,769
Most of the time	37.8	81.9	47.7	30.7	$30,178
All of the time	33.4	92.5	69.8	57.6	$33,128
Sports Participation					
Percentage of Students Who Participated in a Team Sport in 12th Grade, Asked of Students					
Did not participate	70.3	82.1	48.8	32.0	$29,481
Participated	29.7	89.1	57.2	44.2	$33,815
Percentage of Students Who Participated in an Individual Sport in 12th Grade, Asked of Students					
Did not participate	80.0	82.2	48.5	32.1	$29,839
Participated	20.0	91.6	62.9	50.6	$34,883

Source: Authors' tabulation of data from NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the outcome variables. Full-time workers are the 5,645 respondents who were not currently enrolled in a postsecondary education program, who worked more than 35 hours per week in 1999, and who worked more than 40 weeks in 1999. The remaining columns are based on a sample of 9,970 respondents. These values are not weighted.

(2) students' educational aspirations while in high school. Appendix C presents these subgroup findings. We have grouped educational aspirations into three categories: (1) less than a bachelor's degree (34 percent), (2) a bachelor's degree (44 percent), and (3) more than a bachelor's degree (22 percent). We have grouped parents' education into three categories: (1) high school (39 percent), (2) some college (39 percent), and (3) bachelor's degree or more (21 percent). We also attempted to analyze racial subgroups; however, sample sizes were too small to detect any competency effects.

4. Control Variables

The control variables we use include student characteristics, household characteristics, and school characteristics drawn from the NELS student, parent, and school staff surveys. The student control variables are sex, race, disability status, and an indicator of whether the student was ever held back a grade. The household control variables consist of a socio-economic status (SES) composite and household structure variables. The school controls are the proportion of students at a school who receive a free lunch, the proportion of students at each school who are following a college-prep curriculum, the number of extracurricular activities offered at each school, and a set of variables that measure the discipline policies at each school. These last two school characteristics are particularly important control variables. The number of extracurricular activities is an important control variable when interpreting findings related to sports participation and leadership roles, because it helps ensure that variation in these variables is not driven by variation in the number of activities offered at a school. Including the discipline policy variables helps ensure that variation in the behavior composite is driven by variation in student behavior, not by variation in school policies.

IV. FINDINGS

In this section, we first report the average effects of competencies for students overall. Second, we calculate the proportion of students who benefit most from each competency and contrast these findings with those based on the average effect of competencies for all students. Third, we examine some of the implications of these findings by comparing two hypothetical interventions—one using an individualized approach, in which individual students work to improve the competency of greatest value to them, and one using a one-size-fits-all approach, in which all students work to improve the same competency.[1] Finally, we conclude this section by examining the specific nonlinearities and interactions among competencies that underlie the variation in competency effects among students with different strengths and weaknesses (the extent to which there appear to be increasing or decreasing returns to particular competencies, and which competencies appear to be complements to, or substitutes for, other competencies).

A. AVERAGE EFFECTS OF COMPETENCIES

The average effect of competencies is one simple way to gauge their relative value. By "average effect," we mean the extent to which increases in a competency appears to affect a particular postsecondary outcome for students overall. This type of comparison is useful when the only available policy choices involve efforts to improve the same competency for all students. For example, if we are only able to choose between improving math ability and improving work habits for all students, then comparing the average effects of these two competencies is sufficient to inform that decision. However, comparing average effects might be

[1] For example, staff of an after-school program could focus either on helping all students improve their math ability or on trying to identify the area of improvement that would be of greatest benefit to each student.

insufficient to inform more nuanced policy choices. For example, if it is possible to help individual students focus on improving the competency of greatest value to them, then comparisons of average effects are less useful.

Table IV.1 reports the average effects of each competency on each outcome. This table shows the mean marginal effect of a 10 percentile point increase in each competency, controlling for the other competencies shown in the table, as well as the control variables described in Chapter III. To calculate the average effect of a given competency, we first calculate the effect of an increase in that competency for each student in our data. We then average those effects.[2]

The primary finding in this table is that, if policymakers are only able to focus on improving a single competency for all students, then that competency should be math ability.[3] Math test score has a greater effect on postsecondary enrollment, completion of a bachelor's degree, and earnings than any other competency (although the difference between the effect of math and the second most effective competency is not statistically significant). The only outcome for which math is not the most effective competency is completion of any postsecondary program, where work habits have a higher average effect. Appendix C provides a more detailed description of the average effects of each competency.

[2] Reporting average effects is analogous to reporting the parameter estimates from a linear regression model, except that our estimates are less likely to be affected by misspecification bias due to our use of nonparametric methods.

[3] In Appendix C, we also calculate the effect of reading, history, and science test scores on postsecondary outcomes. We find that the effects of these other measures on postsecondary education are nearly identical to that of math. However, math test score has noticeably larger effects on earnings than the other test scores.

TABLE IV.1

MEAN MARGINAL EFFECT OF A 10 PERCENTILE POINT INCREASE IN EACH COMPETENCY

	Outcome			
Competencies	Enroll in Any Postsecondary Program	Complete Any Postsecondary Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Math Test Score	0.015**	0.017**	0.037**	0.029**
Work Habits Composite	0.011**	0.024**	0.029**	0.004
Sports-Related Competencies	0.005	0.012**	0.015**	0.018**
Prosocial Behavior Composite	0.003	0.003	0.007	–0.011
Leadership Roles	0.001	0.002	0.008	0.017**
Locus of Control	0.010**	0.008	0.002	0.024**

Source: Author's calculations using data from NELS.

Note: The mean marginal effects presented in this table are regression adjusted for student, household, and school characteristics.

There are 9,977 high school graduates included in the "enroll in any postsecondary program" regression. The 8,506 students who did enroll in any program were included in the "complete any postsecondary program" and "complete a bachelor's degree" regressions. The 5,645 respondents who were employed full-time and not enrolled in any education program were included in the "log of 1999 earnings" regression.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

B. THE PROPORTION OF STUDENTS WHO BENEFIT MOST FROM EACH COMPETENCY

Although policymakers and researchers often debate the value of competencies in terms of average benefits for students overall, educators and parents often stress that individual students have distinct educational needs. If the relative value of competencies does vary among students, then the potential exists to improve students' postsecondary outcomes by improving different competencies for different students.[4] For example, the fact that the average effect of math test score on earnings is greater than the average effect of sports participation does not mean that the effect of math is greater than the effect of sports for every student—some students might benefit more from math, and some might benefit more from sports.

In this section, we find that the benefit of improving competencies does appear to depend on students' individual strengths and weaknesses. Using the flexible functional form described in Chapter III, we calculate the effect of each competency for each student in our data, taking into account each student's individual strengths and weaknesses. We then group students according to the competency most valuable to them. Thus, we can identify the proportion of students for whom each competency is most predictive of each outcome.

Table IV.2 presents the proportion of students for whom each competency is most predictive of each outcome, the mean marginal effect of the most predictive competency, the mean marginal effect of the second most predictive competency, and whether there is a statistically significant difference in the marginal effects of the first and second most predictive competencies. For example, for 30 percent of students, the mean marginal effect of locus of

[4] In Appendix C, we calculate average effects of competencies for subgroups defined by students' educational aspirations and parents' education. We find some significant differences in competency effects between subgroups defined by these factors, and at least part of these differences appear to be explained by the different competency levels between these groups.

TABLE IV.2

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY IS MOST PREDICTIVE OF OUTCOMES

	Outcome			
	Enroll in Any Postsecondary Program	Complete Any Postsecondary Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Math Test Score				
Proportion for Whom Most Predictive	0.40	0.30	0.56	0.33
Mean Marginal Effect	0.033**	0.037**	0.050**	0.057**
Second Most Predictive Competency	Habits	Habits	Habits	Locus
Mean Marginal Effect	0.016	0.017 ↓	0.023 ↓↓	0.022 ↓↓
Work Habits				
Proportion For Whom Most Predictive	0.10	0.43	0.31	0.02
Mean Marginal Effect	0.018**	0.036**	0.045**	0.042**
Second Most Predictive Competency	Math	Math	Math	Leadership
Mean Marginal Effect	0.005 ↓	0.013 ↓↓	0.026 ↓	0.022
Sports-Related Competencies				
Proportion For Whom Most Predictive	0.21	0.09	0.05	0.20
Mean Marginal Effect	0.011**	0.031**	0.037**	0.049**
Second Most Predictive Competency	Habits	Habits	Habits	Math
Mean Marginal Effect	0.005 ↓	0.020	0.023	0.018 ↓
Behavior				
Proportion For Whom Most Predictive	0.08	0.05	0.06	0.02
Mean Marginal Effect	0.013**	0.026**	0.028**	0.025
Second Most Predictive Competency	Math	Sports	Habits	Sports
Mean Marginal Effect	0.008	0.009	0.012	0.013
Leadership				
Proportion For Whom Most Predictive	0.04	0.05	0.01	0.14
Mean Marginal Effect	0.010**	0.027**	0.040	0.033**
Second Most Predictive Competency	Locus	Sports	Habits	Locus
Mean Marginal Effect	0.003	0.008	0.030	0.015
Locus Of Control				
Proportion For Whom Most Predictive	0.17	0.09	0.01	0.30
Mean Marginal Effect	0.022**	0.036**	0.026*	0.040**
Second Most Predictive Competency	Habits	Habits	Habits	Math
Mean Marginal Effect	0.007 ↓	0.012	0.015	0.015 ↓↓

Source: Author's calculations using data from NELS.

↓ The mean marginal effect of the second most predictive competency is significantly less than that of the most predictive competency, at the .10 level.

↓↓ The mean marginal effect of the second most predictive competency is significantly less than that of the most predictive competency, at the .05 level.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

control on earnings is higher than the mean marginal effect of any other competency.[5] Specifically, the mean marginal effect of locus of control is 4 percent, while the mean marginal effect of math test score (the second most predictive competency for this subgroup) is 1.5 percent.

The findings presented in Table IV.2 support very different conclusions from those presented in Table IV.1. Table IV.1 shows that the average effect of math test score is greater than the average effect of all other competencies. In Table IV.2, however, we see that, for three out of four outcomes, nonacademic competencies as a group are more effective than math test score for a majority of students. Furthermore, we see in several cases that, among students for whom nonacademic competencies are most predictive, there is a significant difference in the average effect of the most effective competency and the second most effective competency. For example, among the 30 percent of students for whom locus of control is most predictive of earnings, the effect of locus of control is significantly greater (at the 5 percent level) than the effect of math test score.

C. ONE SIZE DOES NOT FIT ALL

The pattern of findings presented above suggests that taking into account students' individual strengths and weaknesses when helping them decide which competencies to improve might be more effective than simply encouraging all students to improve the same competency. Put another way, these findings suggest that a more flexible functional form provides a better fit to the data. In this section, we describe the results of a statistical test of this hypothesis for each of our four outcomes.

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[5] Appendix C contains a sensitivity analysis of how the effects of competencies on earnings change with different assumptions about the effect of postsecondary education on earnings.

To test whether an individualized approach to helping students choose which competencies to improve is more beneficial than a one-size-fits-all approach, we compare two hypothetical policies. The one-size-fits-all policy consists of improving the competency with the highest average effect by 20 percentile points for every student, regardless of individual strengths and weaknesses. For example, for earnings, every student's math test score would be improved by 20 percentile points because math test score has the highest average effect (see Table IV.1). The "individualized" policy consists of allocating 20 percentile points to the competencies of greatest value to individual students, given their existing strengths and weaknesses and taking into account nonlinear returns to, and interactions between, the competencies. For example, one particular student in the data is at the 70th percentile in math ability and the 86th percentile in sports participation. The best strategy for this individual is to improve math ability by 12 percentile points and sports participation by 8 percentile points, which reflects a complementarity between math ability and sports participation (see Section D for more details on nonlinearities and interactions).

Table IV.3 shows the difference in overall effects of these two policies for each of the four outcomes examined in this report. In every case except bachelor's completion, the effect of the individualized policy is significantly larger than the effect of the one-size-fits-all policy. Specifically, the individualized policy increases the probability of enrolling in any postsecondary program by 2 percentage points more than the one-size-fits-all policy; it increases the probability of completion by 1.9 percent more; and it increases earnings by 3.7 percent more.[6]

[6] This difference is robust to varying assumptions regarding the effect of postsecondary education on earnings (see Appendix C).

TABLE IV.3

THE PROJECTED DIFFERENCE BETWEEN AN INDIVIDUALIZED POLICY AND A "ONE-SIZE-FITS-ALL" POLICY

Outcome	Average Projected Benefit of Two Policies: "One-Size-Fits-All" Policy	Average Projected Benefit of Two Policies: Individualized Policy	Difference in the Effects of These Two Policies
Enroll on a Postsecondary Program	0.020	0.040	0.020**
Complete a Postsecondary Program	0.049	0.068	0.019**
Complete a Bachelor's Degree	0.075	0.089	0.014
Log of 1999 Earnings	0.056	0.093	0.037**

Source: Author's calculations using data from NELS.

Note: The "one-size-fits-all" policy consists of improving the competency with the highest average effect by 20 percentile points for every student, regardless of individual strengths and weaknesses. The individualized policy consists of allocating 20 percentile points to the competencies of greatest value to individual students, given their existing strengths and weaknesses and taking into account nonlinear returns to, and interactions between, the competencies.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

While this comparison highlights the importance of taking into account individual strengths and weaknesses when considering the relative *benefit* of improving student competencies, it does not take into account the relative *costs* of improving different competencies or whether improvements of this magnitude are even feasible. The comparison is only meant to highlight the fact that individual strengths and weaknesses do significantly (both statistically and substantively) affect which competencies are most predictive of outcomes for individual students. It seems likely, however, that an individualized approach would make sense, unless the costs of improving each competency are exactly inversely proportional to the benefits. In sum, the finding of this analysis suggests that one size probably does not fit all.

D. THE PATTERN OF NONLINEARITIES AND INTERACTIONS

We have seen that the value of competencies depends on existing strengths and weaknesses, and that there is potentially a large benefit in taking these differences into account when helping students decide which competencies to improve. In this section, we describe in more detail exactly *how* the value of competencies depends on students' strengths and weaknesses. In particular, we examine whether some competencies are complements or substitutes and whether we observe diminishing or increasing returns.

We explore the nonlinear aspects of the relationship between competencies and postsecondary outcomes using both figures and a continuation of the subgroup analysis in Section B, where subgroups are defined according to the relative effectiveness of competencies for each student. We first explain how to interpret the figures and tables. Second, we describe our findings by outcome.

1. Interpreting Tables and Figures

As described in Section B, Table IV.2 shows the proportion of students who benefit most from each competency. In Tables IV.4–IV.7, we also show the average competency levels for students in each of those subgroups. For example, in Table IV.4, we show the average competency levels of the 40 percent of students for whom math test score is most predictive of enrolling in a postsecondary education program. The table indicates that math ability is most effective for students whose math ability is low. As Figure D.1 shows, this is consistent with what appears to be a diminishing effect of math test score on enrollment.

Appendix D contains 17 figures that illustrate the relationship between competencies and outcomes. These figures show two types of relationships. In Figures D.1—D.4, we see the relationship between each outcome and each competency, holding all other competencies and control variables constant. In Figures D.5—D.17, we show how the relationship between a given

TABLE IV.4

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY IS MOST PREDICTIVE OF ENROLLING IN A POSTSECONDARY EDUCATION PROGRAM AND THE AVERAGE COMPETENCY LEVELS FOR STUDENTS IN EACH SUBGROUP

	Subgroup					
	Students for Whom Each of These Competencies Is Most Predictive of Earnings					
	Math Ability	Work Habits	Sports-Related Competencies	Behavior	Leadership	Locus of Control
Proportion of Students in Subgroup	0.40	0.10	0.21	0.08	0.04	0.17
Average Competency Levels:						
Math ability	31	60	61	67	79	64
Work habits	39	69	57	55	58	51
Sports-related competencies	41	57	67	37	42	52
Behavior	42	63	50	53	47	57
Leadership	43	60	62	35	77	42
Locus of control	46	62	63	68	60	31

Source: Author's calculations using data from NELS.

Note: The subgroups in this table are identified by calculating the marginal effect of each competency for each student in our sample. For each student, we identify the competency that has the highest marginal effect. The student is then assigned to a subgroup corresponding to that competency. For example, 40 percent of students in our sample would benefit more from an increase in math test scores than from an increase in any other competency. Every student has a different marginal effect of each competency because the marginal effect is a function of students' existing competencies.

TABLE IV.5

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY IS MOST PREDICTIVE OF COMPLETING ANY POSTSECONDARY EDUCATION PROGRAM AND THE AVERAGE COMPETENCY LEVELS FOR STUDENTS IN EACH SUBGROUP

	Subgroup					
	Students for Whom Each of These Competencies Is Most Predictive of Earnings					
	Math Ability	Work Habits	Sports-Related Competencies	Behavior	Leadership	Locus of Control
Proportion of Students in Subgroup	0.30	0.43	0.09	0.05	0.05	0.09
Average Competency Levels:						
Math ability	44	60	78	68	37	34
Work habits	60	52	50	71	19	31
Sports-related competencies	66	42	68	53	53	32
Behavior	59	54	43	70	32	24
Leadership	61	44	61	66	58	27
Locus of control	54	53	57	70	18	58

Source: Author's calculations using data from NELS.

Note: The subgroups in this table are identified by calculating the marginal effect of each competency for each student in our sample. For each student, we identify the competency that has the highest marginal effect. The student is then assigned to a subgroup corresponding to that competency. For example, 30 percent of students in our sample would benefit more from an increase in math test scores than from an increase in any other competency. Every student has a different marginal effect of each competency because the marginal effect is a function of students' existing competencies.

TABLE IV.6

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY IS MOST PREDICTIVE OF COMPLETING A BACHELOR'S DEGREE AND THE AVERAGE COMPETENCY LEVELS FOR STUDENTS IN EACH SUBGROUP

	Subgroup					
	Students for Whom Each of These Competencies Is Most Predictive of Earnings					
	Math Ability	Work Habits	Sports-Related Competencies	Behavior	Leadership	Locus of Control
Proportion of Students in Subgroup	0.56	0.31	0.05	0.06	0.01	0.01
Average Competency Levels:						
Math ability	50	62	66	43	81	19
Work habits	58	41	45	51	74	34
Sports-related competencies	61	37	52	38	19	19
Behavior	54	52	35	32	76	21
Leadership	56	41	50	54	20	31
Locus of control	51	57	54	43	73	77

Source: Author's calculations using data from NELS.

Note: The subgroups in this table are identified by calculating the marginal effect of each competency for each student in our sample. For each student, we identify the competency that has the highest marginal effect. The student is then assigned to a subgroup corresponding to that competency. For example, 56 percent of students in our sample would benefit more from an increase in math test scores than from an increase in any other competency. Every student has a different marginal effect of each competency because the marginal effect is a function of students' existing competencies.

TABLE IV.7

PROPORTION OF STUDENTS FOR WHOM EACH COMPETENCY IS MOST PREDICTIVE OF EARNINGS AND THE AVERAGE COMPETENCY LEVELS FOR STUDENTS IN EACH SUBGROUP

	Subgroup					
	Students for Whom Each of These Competencies Is Most Predictive of Earnings					
	Math Ability	Work Habits	Sports-Related Competencies	Behavior	Leadership	Locus of Control
Proportion of Students in Subgroup	0.33	0.02	0.20	0.02	0.14	0.30
Average Competency Levels:						
Math ability	44	61	65	76	45	50
Work habits	49	44	57	83	49	44
Sports-related competencies	51	53	59	28	40	46
Behavior	48	77	47	64	60	43
Leadership	37	57	65	63	55	48
Locus of control	48	56	57	61	55	49

Source: Author’s calculations using data from NELS.

Note: The subgroups in this table are identified by calculating the marginal effect of each competency for each student in our sample. For each student, we identify the competency that has the highest marginal effect. The student is then assigned to a subgroup corresponding to that competency. For example, 33 percent of students in our sample would benefit more from an increase in math test scores than from an increase in any other competency. Every student has a different marginal effect of each competency because the marginal effect is a function of students’ existing competencies.

competency and an outcome varies between three levels of another competency. For example, in Figure D.16, we show the relationship between earnings and math test score, holding sports participation constant at the 25th, 50th, and 75th percentiles. This particular figure suggests that a complementarity exists between math and sports participation, because the effect of math is greater when sports participation is high. Appendix D includes a detailed description of how the figures are constructed.

2. Summary of Findings, by Outcome

In the results that follow, we observe two key findings. First, there appear to be several noteworthy nonlinear effects of competencies and interactions between competencies that support the hypothesis that the relative value of competencies does vary by individual strengths and weaknesses. Second, we see some evidence to support the well-rounded education model over the specialist model, at least in the choice between academic and nonacademic competencies. That is, when students are particularly strong in one area and weak in another, we see more evidence that they should focus on improving in the area where they are weak rather than continuing to build on an existing strength.

a. Enroll in Any Postsecondary Program

Enrollment in postsecondary education is a function, not only of students' competencies, but also of their goals, enjoyment of the educational process, and confidence that they will succeed in postsecondary programs. High math test scores, strong teacher recommendations, or achievement in extracurricular activities (like sports) might all increase the likelihood that a student applies to, and is accepted by, a postsecondary program. Because our measure of postsecondary enrollment also includes two-year schools and certificate programs, even students who lack these skills might be able to enter some form of postsecondary education. In those cases, simply having the motivation and belief that they can succeed may be enough to enroll in postsecondary education. However, completing a postsecondary program may require a different mix of competencies.

The competency measure most predictive of enrollment is math test score (Table IV.2), perhaps because of the weight admissions committees place on test scores. If students have high math ability, then their probability of enrollment is very high. There is little room left for gains in work habits or sports participation to boost this probability further (Figures D.5 and D.6). However, gains in locus of control, if locus of control is low, do matter (Figure D.7). It may be that students with a low locus of control are less likely to take the initiative to enroll, even if they are fully capable of succeeding.

For students with low math ability, there are a variety of ways to increase the probability of enrolling in postsecondary education. Both work habits and sports participation are predictive of enrollment when math ability is low (Figures D.5 and D.6).[7] Neither of these is quite as effective as math ability when math ability is low, but in cases where students have difficulty improving their math ability, these could be effective alternatives. For sports participation, this could be due to sports scholarships, not just the effect of competencies associated with sports. Students with good work habits might be more likely to receive recommendations from teachers, or good work habits might be an indicator that they have already decided to enroll in postsecondary education.

[7] A surprising difference between this interpretation of findings and that presented in Section A is the difference in the apparent importance of sports participation and work habits. Specifically, work habits appear more predictive when examining average effects, while sports participation appears more predictive when examining the proportion of students who benefit most from each competency. This difference is an example of the effect that nonlinearities can have on interpretation. Appendix C provides a detailed explanation of this apparent contradiction.

On balance, our findings provide more support to the hypothesis that students should be well rounded than to the hypothesis that students should focus on building a single strength. Figure D.1 shows that both locus of control and math test score exhibit diminishing returns and that none of the competencies exhibit increasing returns. This relationship is also evident in Table IV.4, where we see that the students for whom math is the most effective competency have below-average math test scores and that the students for whom locus of control is the most effective competency have below-average locus of control.

b. Complete Any Postsecondary Program

Completion of a postsecondary program appears to be driven by a somewhat different set of competencies than enrollment. Academic ability still matters, but work habits appear to be more predictive of success than any other competency. Locus of control and sports participation still have positive effects, but they are not nearly as important as academic ability and hard work, nor are they as important with respect to completion as they were with respect to enrollment. This seems to suggest that, while participating in sports might look good on a college application, it is not as strong of a predictor of success in college. Similarly, believing in one's ability to succeed (locus of control) might increase the probability of enrolling but does not necessarily guarantee completion.

Specifically, math is most predictive for 30 percent of students, and work habits are most predictive for 43 percent (Table IV.2). This difference is driven by complementary relationships between math and work habits (Figure D.8), math and sports participation (Figure D.9), and math and leadership (Figure D.12). Furthermore, work habits appear to be a substitute for sports participation (Figure D.10) and leadership (Figure D.11). Consequently, the students who appear to benefit most from improving their math test score are those with high levels of work habits, sports participation, and leadership (Table IV.5, column 1). Those who appear to benefit most from work habits have high math test scores but lower levels of sports participation and leadership (Table IV.5, column 2). Finally, the complementarities between math and nonacademic competencies imply that, when choosing between academic and nonacademic competencies, it is better to improve the area of weakness rather than the area of strength, further supporting the well-rounded model rather than the specialist model.

c. Complete a Bachelor's Degree

The relationship between completion of a bachelor's degree and competencies is similar to the relationship between completion of any degree and competencies, except that math test score, rather than work habits, is the most predictive competency. Specifically, math is most predictive for 56 percent of students, and work habits are most predictive for 31 percent (Table IV.2). This finding is consistent with the average effects of work habits and math test scores discussed in Section A (Table IV.1). This difference might be due to more math or science requirements in bachelor's programs than in associate's or certificate programs. To the extent that our math test scores are picking up broader academic skills, this may simply reflect the fact that bachelors' programs are academically more challenging. The effects of each competency are mostly linear (Figure D.3). The nature of the interactions between competencies is similar to the interactions observed for completion of any postsecondary program (for example, see Figure D.13 for the complementarity between work habits and math test score, and Table IV.6, which shows patterns similar to those in Table IV.5).[8]

[8] These interactions are similar to those shown in Figures D.7–D.11.

d. Earnings

The relationship between competencies and earnings is more similar to the relationship between competencies and postsecondary enrollment than between competencies and postsecondary completion. Specifically, locus of control and sports participation are much more predictive of both enrollment and earnings than they are of postsecondary completion, while work habits are much more predictive of postsecondary completion than either postsecondary enrollment or earnings (Table IV.2). One possible explanation is that these earnings are observed relatively early in respondents' careers and, hence, may be more reflective of respondents' initial job offers than their ultimate productivity on the job. In other words, both enrollment and this early measure of earnings may be indications of which competency measures are rewarded on an application, on a resume, or in an interview.

For two-thirds of students, nonacademic competencies are more predictive of earnings than math test score. Specifically, math test score is most predictive for 33 percent of students, locus of control is most predictive for 30 percent, sports participation is most predictive for 20 percent, and leadership is most predictive for 14 percent (Table IV.2).

The variation among students in the most predictive competency is driven by a diminishing return to math, a constant return to locus of control, and interactions between math and leadership and between math and sports participation. The nonlinear effect of math and the interactions between math and other competencies determines when those competencies are most effective. The constant, fairly high, return of locus of control means that it is the most effective competency when the nonlinearities and interactions among the other competencies render them less effective. Figure D.4 illustrates the diminishing return to math and the fairly constant return to locus of control. Math is clearly most effective when existing math ability is low. Figures D.14—D.17 illustrate the interactions between math and leadership and between math and sports participation. Math and sports participation appear to be complements—the effect of math increases when sports participation is high, and the effect of sports participation increases when math test score is high. Math and leadership appear to be substitutes—the effect of math is higher when leadership is low, and the effect of leadership is higher when math test scores are low.

As with the other outcomes, we see more evidence to support the well-rounded model than the specialist model. As with enrollment, we see in Figure D.4 that there are diminishing returns to math ability, constant returns to other competencies, and no evidence of increasing returns to any competency. Furthermore, the complementarity described above between math and sports participation suggests students would generally be better off improving in the area of weakness rather than areas of strength.[9]

[9] One finding that weakly supports the specialist theory is that math and leadership appear to be substitutes. However, closer inspection of Figures D.12 and D.13 indicates that, if leadership were high and math were low, the effect of math would still actually be higher than the effect of leadership, due to the high marginal effect of math when math is low.

V. CONCLUSION

Our findings have two implications for educational policy and practice. First, the increasing focus on academic skills, and particularly skills captured by standardized tests, may be misplaced if it leads schools and parents to neglect the development of valuable nonacademic competencies. Second, an individualized approach to setting and pursuing competency objectives for each student could benefit students in terms of their future educational attainment and earnings, although there may be challenges to developing and implementing an individualized approach.

In general, we find that, when choosing between improving academic and nonacademic competencies, it is better for students to improve in areas where they are weak than to focus on further developing areas where they are well above average. This suggests that the NCLB emphasis on improving the academic performance of low achievers may be appropriate for many low-achieving students but that the concerns of some parents that their higher-achieving children might benefit more from developing nonacademic skills also might be correct in many cases.

However, educators are likely to face at least two challenges in developing nonacademic competencies:

- **Measuring these competencies objectively is difficult**. For many measures used in this study, we relied on student self-reports or reports from teachers. In practice, schools could not depend on this type of subjective and informal assessment, particularly if they are held accountable for students' mastery of these competencies. Furthermore, little is known about how teachers can develop most nonacademic competencies.

- **Schools may find it hard to help individual students identify and develop the competencies they need most**. Expanding the use of individualized education plans, currently required for students with special needs, is one possible strategy. The plans could help schools advise parents and students on classes and activities that could be most beneficial. This approach would require a large investment in guidance staff and professional development. Additional teacher training, curriculum changes, and reductions in class size might help teachers develop customized assignments and projects for students.

Despite the challenges and costs involved in developing a more individualized approach to schooling, the investment may be worthwhile. Future research should clarify what types of investments would be most beneficial. It should also address the value of a broader range of competencies, including ones not captured in our study, and illuminate how the benefits of specific competencies interact with students' existing skills, attitudes, and interests. Research can also play a role in helping educators develop methods for measuring competencies, particularly ones that cannot be evaluated well through standardized tests. Finally, future education experiments could help policymakers identify cost-effective ways to increase academic and nonacademic competencies.

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APPENDIX A

STATISTICAL METHODS

For all regression analyses in this report, we use the backfitting algorithm (Hastie and Tibshirani 1990) to estimate the generalized additive model (GAM) $Y = \alpha + f\left(C_1,...,C_6\right) + \beta X + \varepsilon$, where *Y* is an outcome, $C_1 \ldots C_6$ are competency measures, *f* is an unspecified function that allows for nonlinear effects and nonlinear six-way interactions, and *X* is a vector of control variables. The function *f* is estimated using local regression and β is estimated using OLS. We use no transformations (logistic, for example) for binary outcome variables, because the flexible functional form limits the value of such a transformation. Standard errors are estimated using bootstrapping, in which we take into account the sampling design of NELS by randomly selecting schools and then randomly selecting students from within those schools (both with replacement) for each bootstrap replication.

In this appendix, we explore each of the following in greater detail:

- Local regression estimation
- The backfitting algorithm
- Bootstrapping algorithm

A. LOCAL REGRESSION ESTIMATION

Local regression is a semiparametric approach to regression in which a global fit of a dependent variable *Y* to an independent variable *X* is based on a large number of local fits. The term "local" refers to a bandwidth around a particular value of *X*. Within that bandwidth, a linear regression model is estimated, possibly including higher-order terms of *X*. Separate models are estimated for multiple bandwidths, covering the entire empirical domain of *X*. A global fit of *Y* to *X* is inferred from these local fits by plotting the predicted value of *Y* for every value of *X* using the appropriate local fit for each value of *X*. Thus, the global fit is “semiparametric” because it relies on the estimation of multiple parameters locally, but there is no single parametric function that describes the global fit.

Three key choices must be made when estimating local regression models: the degree of the local polynomial, the size of the bandwidth, and the weighting function. (The following discussion is based primarily on Loader 1999.) The degree of the local polynomial refers to the specification of the local regression. We chose a quadratic form, so that each competency enters the local regression with both a linear and a squared term, and such that up to six-way interactions between competencies are also included in the local regression function.

The size of the bandwidth refers to the number of points to be included in each local regression. We use a nearest-neighbor bandwidth, in which 70 percent of the data are used for each local fit. Wider bandwidths result in smoother fits, while narrower bandwidths yield “bumpier” fits. A narrower bandwidth will provide a better fit to the data, but it is difficult to determine if it is fitting real relationships or if it is simply fitting noise. For density estimation, there are suggested procedures for selecting an optimal bandwidth. For regression, however, there is no clear concept of an optimal bandwidth that is purely data driven. We chose a bandwidth that yields a smoother fit, because we prefer to believe that we are estimating an underlying, reasonably well-behaved production function. Or, as Loader puts it, “We hope that nature isn’t too nasty” (Loader 1999, page 22).

The weighting function generates a weight for each point in the local regression, typically such that points that are further away from the center of the bandwidth receive a lower weight. We used the tricube weight function described by Loader (1999), $W(u) = \left(1 - |u|^3\right)^3$, where u equals $\frac{x_i - x}{h(x)}$, x is the point at the center of the bandwidth $h(x)$, and x_i is the point for which a weight is being constructed. The tricube function generates a bell curve, in which points closer to the center of the bandwidth receive a heavier weight than points further from the center.

B. THE BACKFITTING ALGORITHM

By using GAMs, we can add control variables to the model whose effects are estimated parametrically using OLS, thereby saving on computation time and degrees of freedom. GAMs can be estimated using the backfitting algorithm described in Hastie and Tibshirani (1990). The equation $Y = \alpha + f\left(C_1, \ldots, C_6\right) + \beta X + \varepsilon$ can be estimated using the backfitting algorithm as follows:

1. Initialize $\alpha = avg\left(Y\right)$, $f\left(C_1, \ldots, C_6\right) = 0$, and $\beta X = 0$.
2. Use OLS to fit $Y - \alpha - f\left(C_1, \ldots, C_6\right)$ to X. This yields an estimate of β.
3. Use local regression to fit $Y - \alpha - \beta X$ to $C_1, \ldots, C_6$. This yields our first estimate of f.
4. Iterate steps 2 and 3 until β and f stop changing. Note that f and β each include a constant term, so the overall average α does not change during iterations.

C. BOOTSTRAPPING ALGORITHM

Calculating the variance of all the statistics created in this report analytically would have been very challenging, given the complexity of the estimation techniques, the complexity of the postestimation statistics we calculated, and the complexity of the sample design of NELS. Bootstrapping provides a convenient, albeit computationally intensive, alternative. The bootstrapping procedure we used allowed us to conduct all statistical tests of interest, including the significance of the slopes of the curves in Figures D.1-D.17. An outline of the bootstrapping procedure is as follows:

1. We generate 500 samples by first randomly selecting (with replacement) schools within each strata of NELS. Then, within each selected school, we randomly select

(with replacement) students. We save these 500 samples for use in all our analyses. For subgroup analyses, we apply the subgroup criteria to each of the 500 samples.

2. For each sample, we estimated all our regression models (every outcome, every subgroup) and every postestimation statistic (for example, the proportion of students who benefit most from math test score for a given outcome and the mean marginal effect of math test score for a given outcome).

3. We calculate the variance-covariance matrix of all statistics of interest across 500 replications. This allows us to test any difference in statistics of interest—for example, the difference between the effect of the "one-size-fits-all" plan and the "individualized" plan described in Chapter IV.

APPENDIX B

DESCRIPTIVE TABLES

TABLE B.1

VARIATION IN THE COMPONENTS OF COMPETENCY COMPOSITES:
WORK HABITS COMPOSITE

Select Components of the Composites	Percentile of Competency Composite		
	25th Percentile	50th Percentile	75th Percentile
8th-Grade Variables			
Time Spent on Math Homework Each Week, Asked of Students			
None	9.5	7.6	3.8
Less than one hour	44.7	43.4	32.1
One to two hours	37.2	35.1	40.3
Three hours or more	8.6	14.0	23.8
Time Spent on Science Homework Each Week, Asked of Students			
None	26.9	16.5	9.9
Less than one hour	45.7	45.6	47.0
One to two hours	23.0	34.2	34.9
Three hours or more	4.3	3.7	8.3
Time Spent on English Homework Each Week, Asked of Students			
None	10.4	9.8	5.9
Less than one hour	55.1	52.4	46.7
One to two hours	29.2	32.0	37.8
Three hours or more	5.3	5.8	9.6
Time Spent on Social Studies Homework Each Week, Asked of Students			
None	22.3	13.7	10.7
Less than one hour	46.0	48.8	41.6
One to two hours	27.6	29.8	32.9
Three hours or more	4.2	7.6	14.8
Time Spent on All Other Homework Each Week, Asked of Students			
None	15.3	14.9	13.7
Less than one hour	42.9	42.4	36.8
One to two hours	34.1	32.8	35.3
Three hours or more	7.7	9.9	14.3
During the Current School Year, Parents Received a Warning About Student's Attendance, Asked of Students			
At least once	7.1	5.8	1.3
Never	92.9	94.2	98.7
Student Comes to Class without Pen or Paper, Asked of Students			
Usually or often	24.3	16.3	9.8
Seldom	45.9	57.7	53.7
Never	29.8	26.0	36.5
Student Comes to Class without Books, Asked of Students			
Usually or often	6.2	3.3	0.8
Seldom	50.3	46.8	35.5
Never	43.5	49.9	63.8

TABLE B.1 (*continued*)

Select Components of the Composites	Percentile of Competency Composite 25th Percentile	50th Percentile	75th Percentile
Student Comes to Class without Homework Done, Asked of Students			
Usually or often	19.0	14.2	3.7
Seldom	60.5	59.4	56.2
Never	20.5	26.4	40.1
Student Cuts Class, Asked of Students			
Less than once a week to daily	93.6	97.1	98.4
Never or almost never	6.4	2.9	1.6
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students			
Three days or more	16.1	8.1	3.4
One or two days	25.1	22.6	16.4
None	58.8	69.3	80.2
Student Rarely Completes Homework, Asked of Teachers			
Yes	17.8	6.4	3.3
No	82.2	93.6	96.7
Student Is Frequently Absent, Asked of Teachers			
Yes	5.6	4.0	2.8
No	94.4	96.0	97.2
Student Is Frequently Tardy, Asked of Teachers			
Yes	2.8	0.4	0.5
No	97.2	99.6	99.5
Student Is Frequently Inattentive, Asked of Teachers			
Yes	21.6	9.4	4.1
No	78.4	90.6	96.0
10th-Grade Variables			
Time Spent on All Homework Each Week, Asked of Students			
None	7.0	5.1	1.3
One hour or less	29.4	24.8	15.0
Two to three hours	37.5	31.6	28.7
Four to six hours	12.0	16.8	19.6
Seven hours or more	14.2	21.8	35.5
Student Comes to Class without Pen or Paper, Asked of Students			
Usually or often	14.0	4.9	2.9
Seldom	56.1	50.5	37.6
Never	29.9	44.6	59.5
Student Comes to Class without Books, Asked of Students			
Usually or often	7.6	1.3	1.3
Seldom	43.4	40.0	27.2
Never	49.1	58.7	71.5
Student Comes to Class without Homework Done, Asked of Students			
Usually or often	21.2	10.5	5.6
Seldom	66.6	73.3	66.2

TABLE B.1 (*continued*)

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
Never	12.2	16.2	28.1
Number of Times Student Has Cut Class in First Half of School Year, Asked of Students			
At least once	40.1	25.7	15.0
Never	59.9	74.3	85.0
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students			
Three times or more	38.1	32.2	18.3
Once or twice	46.5	37.7	41.2
Never	15.5	30.1	40.5
How Often Student Tries as Hard as He or She Can in Math Class, Asked of Students			
Never or less than once a week	14.3	5.4	3.2
Once or a few times a week	37.0	35.3	27.4
Almost every day	48.7	59.3	69.5
How Often Student Tries as Hard as He or She Can in English Class, Asked of Students			
Never or less than once a week	13.1	8.9	5.2
Once or a few times a week	44.6	45.0	32.1
Almost every day	42.3	46.2	62.7
How Often Student Tries as Hard as He or She Can in History Class, Asked of Students			
Not taking subject	29.3	29.4	32.6
Never or less than once a week	9.4	6.9	4.5
Once or a few times a week	34.1	33.5	27.6
Almost every day	27.2	30.2	35.3
How Often Student Tries as Hard as He or She Can in Science Class, Asked of Students			
Not taking subject	11.2	9.9	5.7
Never or less than once a week	10.3	8.5	2.3
Once or a few times a week	37.5	39.9	27.7
Almost every day	40.9	41.7	64.3
Student Usually Works Hard for Good Grades, Asked of Teachers			
No	55.0	25.2	9.3
Yes	45.0	74.8	90.7
Student Completes Homework, Asked of Teachers			
Never or rarely	6.3	2.2	1.1
Some of the time	30.5	15.4	4.9
Most of the time	51.5	47.8	40.6
All of the time	11.8	34.5	53.5
How Often Student Is Absent, Asked of Teachers			
Some, most, or all of the time	34.5	23.4	14.1
Rarely	60.2	70.6	72.1
Never	5.3	6.0	13.8

TABLE B.1 (*continued*)

Select Components of the Composites	Percentile of Competency Composite		
	25th Percentile	50th Percentile	75th Percentile
How Often Student Is Tardy, Asked of Teachers			
Some, most, or all of the time	12.7	5.4	2.7
Rarely	47.4	38.3	24.2
Never	39.9	56.3	73.1
How Often Student Is Attentive in Class, Asked of Teachers			
Never or rarely	4.6	2.0	0.5
Some of the time	31.1	15.2	8.7
Most of the time	54.1	60.7	53.2
All of the time	10.2	22.2	37.6
12th-Grade Variables			
Time Spent on All Homework Each Week, Asked of Students			
None or less than one hour	17.2	12.7	5.5
One to three hours	33.4	28.3	18.9
Four to six hours	23.7	20.1	20.9
Seven to twelve hours	17.5	28.1	34.8
Thirteen hours or more	8.3	10.9	19.9
Student Comes to Class without Pen or Paper, Asked of Students			
Usually or often	16.5	6.3	3.8
Seldom	48.1	38.2	29.9
Never	35.4	55.5	66.3
Student Comes to Class without Books, Asked of Students			
Usually or often	14.0	4.9	2.0
Seldom	49.6	37.7	27.8
Never	36.3	57.4	70.2
Student Comes to Class without Homework Done, Asked of Students			
Usually or often	24.0	17.9	3.8
Seldom	63.0	59.4	63.5
Never	13.1	22.7	32.8
Number of Times Student Has Cut Class in Current School Year, Asked of Students			
Three times or more	31.8	19.8	8.6
One to two times	36.9	29.5	24.3
Never	31.3	50.7	67.1
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students			
Three times or more	63.0	44.3	30.8
One or two times	29.5	39.4	39.4
Never	7.5	16.2	29.8
Student Is Motivated to Work Hard for Good Grades, Asked of Teachers			
No	56.8	25.4	11.2
Yes	43.2	74.6	88.8

TABLE B.1 (*continued*)

Select Components of the Composites	Percentile of Competency Composite		
	25th Percentile	50th Percentile	75th Percentile
Student Completes Homework on Time, Asked of Teachers			
Never or rarely	16.4	8.4	1.9
Some of the time	34.0	18.9	12.1
Most of the time	41.2	49.8	43.5
All of the time	8.4	22.9	42.6
How Often Student Is Absent, Asked of Teachers			
Some, most, or all of the time	49.7	28.3	22.4
Rarely	48.0	65.7	68.3
Never	2.3	6.0	9.3
How Often Student Is Tardy, Asked of Teachers			
Some, most, or all of the time	26.7	13.3	6.9
Rarely	33.1	36.8	31.2
Never	40.2	50.0	62.0
How Often Student Is Attentive in Class, Asked of Teachers			
Never or rarely	1.1	1.0	0.7
Some of the time	6.0	2.0	0.6
Most of the time	35.1	12.6	9.3
All of the time	46.5	62.0	54.2

Source: Authors' tabulation of data from NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the percentile value of the composites. The values presented in this table are calculated by finding the proportion of students with the specified characteristic within +/- 2 percentile points of the stated competency percentile (approximately 400 students).

TABLE B.2

VARIATION IN THE COMPONENTS OF COMPETENCY COMPOSITES:
PROSOCIAL BEHAVIOR COMPOSITE

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
8th Grade Variables			
Student Was Sent to the Office for Misbehaving First Semester, Asked of Students			
At least once	44.5	15.3	0.3
Never	55.5	84.7	99.7
Parents Received a Warning About Student's Behavior First Semester, Asked of Students			
At least once	28.6	4.1	2.3
Never	71.4	95.9	97.7
Got into a Physical Fight with Another Student First Semester, Asked of Students			
At least once	30.5	7.6	4.4
Never	69.5	92.4	95.6
Student Is Disruptive in Class, Asked of Teachers			
Yes	15.6	4.9	0.0
No	84.4	94.8	99.9
Don't know	0.0	0.3	0.1
10th Grade Variables			
Student Got in Trouble for Not Following School Rules in First Semester, Asked of Students			
At least once	62.7	46.6	11.1
Never	37.3	53.4	88.9
Student Was Put on an In-school Suspension in First Semester, Asked of Students			
At least once	9.5	2.2	0.0
Never	90.5	97.8	100.0
Student Was Put on Probation (Suspended) from School First Semester, Asked of Students			
At least once	6.3	0.4	0.0
Never	93.7	99.6	100.0
Got into a Physical Fight with Another Student First Semester, Asked of Students			
At least once	19.4	4.3	0.0
Never	80.6	95.7	100.0
Student Is Disruptive in Class, Asked of Teachers			
Some, most, or all of the time	24.4	12.5	10.8
Rarely	34.7	36.0	9.2
Never	41.0	51.5	80.1

TABLE B.2 (*continued*)

Select Components of the Composites	Percentile of Competency Composite: 25th Percentile	50th Percentile	75th Percentile
12th Grade Variables			
Student Got in Trouble for Not Following School Rules in First Semester, Asked of Students			
At least once	59.8	29.4	1.7
Never	40.2	70.6	98.3
Student Was Put on an In-school Suspension in First Semester, Asked of Students			
At least once	11.8	4.8	0.0
Never	88.3	95.2	100.0
Student Was Put on Probation (Suspended) from School First Semester, Asked of Students			
At least once	6.1	0.3	0.1
Never	93.9	99.8	99.9
Got into a Physical Fight with Another Student First Semester, Asked of Students			
At least once	20.3	4.2	0.0
Never	79.8	95.8	100.0
Student Is Disruptive in Class, Asked of Teachers			
Some, most, or all of the time	18.1	8.5	0.0
Rarely	25.5	30.3	23.4
Never	56.4	61.2	76.6

Source: Authors' tabulation of data from NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the percentile value of the composites. The values presented in this table are calculated by finding the proportion of students with the specified characteristic within +/- 2 percentile points of the stated competency percentile (approximately 400 students).

TABLE B.3

VARIATION IN THE COMPONENTS OF COMPETENCY COMPOSITES:
SPORTS PARTICIPATION COMPOSITE

Select Components of the Composites	Percentile of Competency Composite: 25th Percentile	50th Percentile	75th Percentile
8th-Grade Variables			
Participated in School Varsity Sports During Current School Year, Asked of Students			
Did not participate	85.8	36.3	24.5
Participated	14.2	63.7	75.5
Participated in Intramural Sports During Current School Year, Asked of Students			
Did not participate	86.3	47.7	38.3
Participated	13.7	52.3	61.8
Participated in Cheerleading During Current School Year, Asked of Students			
Did not participate	97.8	85.7	87.3
Participated	2.2	14.3	12.7
10th Grade Variables			
Participated in Baseball or Softball in Current School Year, Asked of Students			
School does not offer	7.3	3.2	7.6
Did not participate	87.6	90.4	64.7
Participated	5.1	6.4	27.7
Participated in Basketball in Current School Year, Asked of Students			
School does not offer	5.0	0.8	4.5
Did not participate	94.5	86.8	64.5
Participated	0.5	12.4	31.0
Participated in Football in Current School Year, Asked of Students			
School does not offer	8.6	6.8	9.1
Did not participate	90.3	86.9	69.1
Participated	1.1	6.3	21.8
Participated in Soccer in Current School Year, Asked of Students			
School does not offer	24.1	25.2	34.5
Did not participate	75.1	71.8	55.8
Participated	0.8	3.0	9.7
Participated in Swim Team in Current School Year, Asked of Students			
School does not offer	30.0	39.8	48.8
Did not participate	69.0	56.8	45.5
Participated	0.9	3.4	5.8
Participated in Other Team Sport in Current School Year, Asked of Students			
School does not offer	10.2	9.1	11.0
Did not participate	88.1	83.0	60.6
Participated	1.7	8.0	28.5

TABLE B.3 (*continued*)

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
Participated in Other Individual Sport in Current School Year, Asked of Students			
School does not offer	8.1	4.8	6.5
Did not participate	84.8	69.5	57.2
Participated	7.1	25.7	36.4
Participated in Cheerleading in Current School Year, Asked of Students			
School does not offer	5.9	3.5	8.8
Did not participate	93.2	90.9	84.8
Participated	0.9	5.6	6.4
Participated in Pom-Pom, Drill Team in Current School Year, Asked of Students			
School does not offer	13.4	11.8	19.1
Did not participate	86.5	83.3	76.9
Participated	0.1	4.8	4.0
12th Grade Variables			
Participated in a Team Sport in Current School Year, Asked of Students			
School does not offer	5.4	1.7	1.8
Did not participate	94.0	85.9	47.1
Participated	0.6	12.4	51.1
Participated in an Individual Sport in Current School Year, Asked of Students			
School does not offer	6.2	4.5	6.1
Did not participate	93.5	81.5	65.4
Participated	0.4	14.1	28.5
Participated in Role Pom-Pom, Drill Team in Current School Year, Asked of Students			
School does not offer	6.2	2.7	4.4
Did not participate	93.0	90.3	86.7
Participated	0.8	7.0	8.9
Participated in an Intramural Team Sport in Current School Year, Asked of Students			
School does not offer	7.3	10.1	12.1
Did not participate	91.6	80.0	54.2
Participated	1.2	9.8	33.7
Participated in an Intramural Individual Sport in Current School Year, Asked of Students			
School does not offer	9.5	12.5	19.3
Did not participate	90.3	80.8	62.5
Participated	0.2	6.7	18.3

Source: Author's tabulation of data from the NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the percentile value of the composites. The values presented in this table are calculated by finding the proportion of students with the specified characteristic within +/– 2 percentile points of the stated competency percentile (approximately 400 students).

TABLE B.4

VARIATION IN THE COMPONENTS OF COMPETENCY COMPOSITES: LEADERSHIP COMPOSITE

Select Components of the Composites	Percentile of Competency Composite: 25th Percentile	50th Percentile	75th Percentile
8th-Grade Variables			
Participated in Science Fair During Current School Year, Asked of Students			
Did not participate	72.5	69.8	64.1
Participated	27.5	30.3	34.9
Participated as an officer	—	—	1.0
Participated in School Varsity Sports During Current School Year, Asked of Students			
Did not participate	54.6	54.0	35.6
Participated	43.3	44.7	54.5
Participated as an officer	2.2	1.4	9.9
Participated in School Intramural Sports During Current School Year, Asked of Students			
Did not participate	59.9	60.6	46.1
Participated	38.9	39.4	45.5
Participated as an officer	1.2	0.1	8.5
Participated in Cheerleading During Current School Year, Asked of Students			
Did not participate	91.6	90.5	83.2
Participated	8.1	9.5	9.2
Participated as an officer	0.3	—	7.6
Participated in Band or Orchestra During Current School Year, Asked of Students			
Did not participate	72.7	77.5	69.4
Participated	27.1	22.6	26.6
Participated as an officer	0.2	—	3.9
Participated in Chorus or Choir During Current School Year, Asked of Students			
Did not participate	74.3	78.0	69.9
Participated	25.7	21.9	26.9
Participated as an officer	0.1	0.1	3.3
Participated in Dance During Current School Year, Asked of Students			
Did not participate	74.9	78.9	62.0
Participated	24.8	21.1	33.2
Participated as an officer	0.3	—	4.8
Participated in History Club During Current School Year, Asked of Students			
Did not participate	98.8	96.8	97.3
Participated	1.2	3.2	2.3
Participated as an officer	—	—	0.4

TABLE B.4 (*continued*)

Select Components of the Composites	Percentile of Competency Composite		
	25th Percentile	50th Percentile	75th Percentile
Participated in Science Club During Current School Year, Asked of Students			
Did not participate	97.8	97.4	96.8
Participated	2.3	2.7	2.5
Participated as an officer	—	—	0.8
Participated in Math Club During Current School Year, Asked of Students			
Did not participate	96.7	96.1	94.5
Participated	3.3	3.9	4.9
Participated as an officer	—	—	0.6
Participated in Foreign-Language Club During Current School Year, Asked of Students			
Did not participate	92.0	94.3	95.9
Participated	8.0	5.7	3.9
Participated as an officer	—	—	0.2
Participated in Other Subject Club During Current School Year, Asked of Students			
Did not participate	90.4	89.2	92.4
Participated	9.5	10.8	7.0
Participated as an officer	0.14	—	0.7
Participated in Debate or Speech Team During Current School Year, Asked of Students			
Did not participate	96.6	96.4	93.8
Participated	3.4	3.6	5.5
Participated as an officer	—	—	0.7
Participated in Drama Club During Current School Year, Asked of Students			
Did not participate	96.3	95.8	91.9
Participated	3.6	4.1	7.1
Participated as an officer	0.2	0.2	1.0
Participated in Academic Honor Society During Current School Year, Asked of Students			
Did not participate	92.0	92.1	86.7
Participated	7.7	7.9	12.7
Participated as an officer	0.3	—	0.6
Participated in Student Newspaper During Current School Year, Asked of Students			
Did not participate	92.5	90.8	87.6
Participated	7.5	9.2	9.1
Participated as an officer	—	—	3.2
Participated in Student Yearbook During Current School Year, Asked of Students			
Did not participate	92.9	90.8	77.7
Participated	6.4	8.6	14.4
Participated as an officer	0.7	0.6	8.0

TABLE B.4 (*continued*)

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
Participated in Student Council During Current School Year, Asked of Students			
Did not participate	95.6	97.6	80.0
Participated	4.4	2.4	10.6
Participated as an officer	—	—	9.4
Participated in Computer Club During Current School Year, Asked of Students			
Did not participate	97.5	96.6	95.7
Participated	2.6	3.4	3.9
Participated as an officer	—	—	0.4
Participated in Religious Organization During Current School Year, Asked of Students			
Did not participate	83.0	84.6	79.7
Participated	17.0	15.4	16.4
Participated as an officer	—	—	4.0
Participated in Vocational Education Club During Current School Year, Asked of Students			
Did not participate	98.4	98.1	95.2
Participated	1.6	1.9	4.0
Participated as an officer	—	—	0.8
Participated, Outside School, in Scouting this Year, Asked of Students			
Did not participate	91.7	87.4	85.7
Participated	8.0	12.6	9.3
Participated as an officer	0.3	—	5.0
Participated, Outside School, in Religious Youth Groups this Year, Asked of Students			
Did not participate	65.1	63.9	54.5
Participated	34.6	36.1	35.8
Participated as an officer	0.3	—	9.8
Participated, Outside School, in Hobby Clubs this Year, Asked of Students			
Did not participate	84.4	86.0	83.1
Participated	15.6	14.1	14.1
Participated as an officer	—	—	2.8
Participated, Outside School, in Neighborhood Clubs or Programs this Year, Asked of Students			
Did not participate	86.9	86.8	82.7
Participated	13.1	13.2	15.5
Participated as an officer	—	—	2.8
Participated, Outside School, in Boys' or Girls' Clubs this Year, Asked of Students			
Did not participate	95.7	93.6	88.8
Participated	4.3	6.4	10.1
Participated as an officer	—	—	1.1

TABLE B.4 (*continued*)

Select Components of the Composites	Percentile of Competency Composite 25th Percentile	50th Percentile	75th Percentile
Participated, Outside School, in Nonschool Team Sports this Year, Asked of Students			
Did not participate	65.2	68.8	56.0
Participated	34.7	31.1	38.8
Participated as an officer	0.2	0.2	5.2
Participated, Outside School, in 4-H Club this Year, Asked of Students			
Did not participate	93.0	87.7	87.1
Participated	6.0	12.0	7.8
Participated as an officer	1.0	0.4	5.1
Participated, Outside School, in Y or Other Youth Groups this Year, Asked of Students			
Did not participate	84.8	85.3	81.1
Participated	15.2	14.7	14.7
Participated as an officer	—	—	4.3
Participated, Outside School, in Summer Programs, Workshops, or Institutes this Year, Asked of Students			
Did not participate	89.2	85.5	69.9
Participated	10.5	14.4	27.0
Participated as an officer	0.3	0.1	3.1
Participated, Outside School, in Other Activities this Year, Asked of Students			
Did not participate	64.0	68.1	45.9
Participated	35.4	31.5	46.5
Participated as an officer	0.6	0.4	7.6
10th-Grade Variables			
Participated in Baseball or Softball in Current School Year, Asked of Students			
School does not offer	7.1	4.5	7.4
Did not participate	79.2	83.5	74.7
Participated at intramural or junior varsity level	9.6	7.8	8.4
Participated at varsity level or as captain/co-captain	4.2	4.1	9.6
Participated in Basketball in Current School Year, Asked of Students			
School does not offer	4.9	1.9	5.7
Did not participate	76.9	82.7	66.7
Participated at intramural or junior varsity level	15.8	13.3	19.2
Participated at varsity level or as captain/co-captain	2.5	2.2	8.4
Participated in Football in Current School Year, Asked of Students			
School does not offer	9.1	8.0	12.8
Did not participate	81.6	82.6	70.0
Participated at intramural or junior varsity level	6.1	5.4	8.8
Participated at varsity level or as captain/co-captain	3.2	4.1	8.4

TABLE B.4 (*continued*)

Select Components of the Composites	Percentile of Competency Composite 25th Percentile	50th Percentile	75th Percentile
Participated in Soccer in Current School Year, Asked of Students			
School does not offer	29.9	21.5	30.9
Did not participate	65.7	76.0	58.9
Participated at intramural or junior varsity level	3.2	2.3	4.8
Participated at varsity level or as captain/co-captain	1.3	0.3	5.5
Participated in Swim Team in Current School Year, Asked of Students			
School does not offer	36.9	33.9	45.8
Did not participate	59.8	63.5	50.1
Participated at intramural or junior varsity level	1.6	1.6	2.3
Participated at varsity level or as captain/co-captain	1.7	1.0	1.8
Participated in Other Team Sport in Current School Year, Asked of Students			
School does not offer	11.2	10.1	13.5
Did not participate	75.5	77.9	64.0
Participated at intramural or junior varsity level	10.4	8.7	12.2
Participated at varsity level or as captain/co-captain	2.9	3.4	10.3
Participated in Other Individual Sport in Current School Year, Asked of Students			
School does not offer	9.1	8.4	8.2
Did not participate	64.0	65.7	58.0
Participated at intramural or junior varsity level	15.6	13.2	10.0
Participated at varsity level or as captain/co-captain	11.3	12.8	23.9
Participated in Cheerleading in Current School Year, Asked of Students			
School does not offer	6.6	5.8	8.9
Did not participate	88.5	91.3	83.4
Participated at intramural or junior varsity level	4.1	2.6	3.3
Participated at varsity level or as captain/co-captain	0.9	0.3	4.3
Participated in Pom-Pom, Drill Team in Current School Year, Asked of Students			
School does not offer	17.8	15.3	22.3
Did not participate	80.6	82.1	68.3
Participated at intramural or junior varsity level	1.3	1.1	6.6
Participated at varsity level or as captain/co-captain	0.3	1.5	2.8
Participated in Band, Orchestra, Choir or Music Group in Current School Year, Asked of Students			
School does not offer	4.8	3.7	2.4
Did not participate	75.6	73.7	68.0
Participated	19.4	22.6	25.5
Participated as an officer	0.2	—	4.1

TABLE B.4 (*continued*)

Select Components of the Composites	Percentile of Competency Composite		
	25th Percentile	50th Percentile	75th Percentile
Participated in School Play or Musical in Current School Year, Asked of Students			
School does not offer	5.7	4.7	5.0
Did not participate	86.4	85.1	80.6
Participated	7.9	10.1	13.0
Participated as an officer	—	—	1.5
Participated in Student Government in Current School Year, Asked of Students			
School does not offer	10.1	5.3	9.7
Did not participate	89.2	93.9	78.6
Participated	0.8	0.8	8.1
Participated as an officer	—	—	3.6
Participated in Honor Society in Current School Year, Asked of Students			
School does not offer	8.0	5.4	5.8
Did not participate	85.5	88.7	86.1
Participated	6.5	5.9	7.6
Participated as an officer	—	—	0.5
Participated in School Yearbook, Newspaper, or Literary Magazine in Current School Year, Asked of Students			
School does not offer	2.8	1.4	2.3
Did not participate	88.7	92.7	86.9
Participated	8.5	5.8	9.1
Participated as an officer	0.0	0.1	1.8
Participated in Service Clubs in Current School Year, Asked of Students			
School does not offer	19.7	16.1	18.2
Did not participate	73.0	75.9	66.9
Participated	7.2	8.0	11.7
Participated as an officer	0.1	0.1	3.2
Participated in an Academic Club in Current School Year, Asked of Students			
School does not offer	11.0	6.8	8.9
Did not participate	62.5	62.7	53.4
Participated	25.7	30.6	34.8
Participated as an officer	0.8	—	3.0
Participated in a Hobby Club in Current School Year, Asked of Students			
School does not offer	23.3	18.4	24.0
Did not participate	71.9	76.5	68.1
Participated	4.2	4.5	6.7
Participated as an officer	0.6	0.6	1.2

TABLE B.4 (*continued*)

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
Participated in Vocation or Professional Club Current School Year, Asked of Students			
School does not offer	15.3	12.6	16.9
Did not participate	76.5	77.4	62.2
Participated	7.8	9.7	16.9
Participated as an officer	0.4	0.2	4.1
12th-Grade Variables			
Participated in a Team Sport in Current School Year, Asked of Students			
School does not offer	2.1	7.1	0.7
Did not participate	73.4	75.3	62.3
Participated at junior varsity level	2.7	2.3	0.2
Participated at varsity level or as captain/co-captain	21.7	15.2	36.9
Participated in an individual Sport in Current School Year, Asked of Students			
School does not offer	4.2	8.2	3.4
Did not participate	80.2	77.8	64.9
Participated at junior varsity level	1.0	1.3	1.4
Participated at varsity level or as captain/co-captain	14.6	12.7	30.4
Participated in Role Pom-Pom, Drill Team in Current School Year, Asked of Students			
School does not offer	3.8	7.9	2.8
Did not participate	92.8	86.2	81.1
Participated at junior varsity level	0.2	1.1	0.3
Participated at varsity level or as captain/co-captain	3.2	4.8	15.9
Participated in Band, Orchestra, Chorus or Music Group in Current School Year, Asked of Students			
School does not offer	1.4	5.3	1.9
Did not participate	80.5	78.6	68.8
Participated	14.4	14.9	16.4
Participated as an officer	3.7	1.2	13.0
Participated in Drama Club, School Play, or Musical in Current School Year, Asked of Students			
School does not offer	2.7	6.9	3.2
Did not participate	84.2	83.1	72.2
Participated	12.1	9.6	18.0
Participated as an officer	1.0	0.4	6.7
Participated in Student Government in Current School Year, Asked of Students			
School does not offer	4.3	7.5	6.3
Did not participate	85.3	86.0	71.5
Participated	10.4	6.5	13.2
Participated as an officer	—	—	9.1

TABLE B.4 (*continued*)

Select Components of the Composites	Percentile of Competency Composite 25th Percentile	50th Percentile	75th Percentile
Participated in Honor Society in Current School Year, Asked of Students			
School does not offer	2.1	5.6	2.7
Did not participate	87.1	85.9	70.6
Participated	10.4	8.4	20.0
Participated as an officer	0.5	0.1	6.7
Participated in School Yearbook, Newspaper, or Literary Magazine in Current School Year, Asked of Students			
School does not offer	1.0	2.4	0.4
Did not participate	84.3	82.6	69.2
Participated	14.3	14.9	19.6
Participated as an officer	0.4	0.1	10.8
Participated in Service Clubs in Current School Year, Asked of Students			
School does not offer	13.1	12.2	18.6
Did not participate	81.8	82.4	65.9
Participated	5.0	5.4	11.2
Participated as an officer	0.1	—	4.3
Participated in an Academic Club in Current School Year, Asked of Students			
School does not offer	6.5	7.2	8.1
Did not participate	74.2	70.4	53.3
Participated	17.5	21.9	29.1
Participated as an officer	1.9	0.5	9.5
Participated in a Hobby Club in Current School Year, Asked of Students			
School does not offer	20.3	17.8	20.5
Did not participate	75.2	75.3	68.3
Participated	4.1	6.6	9.4
Participated as an officer	0.4	0.3	1.8
Participated in Vocation or Professional Club in Current School Year, Asked of Students			
School does not offer	11.2	12.6	13.2
Did not participate	72.3	75.2	68.8
Participated	9.1	9.7	10.6
Participated as an officer	7.3	2.6	7.5
Participated in an Intramural Team Sport in Current School Year, Asked of Students			
School does not offer	7.2	10.6	11.0
Did not participate	73.7	77.2	59.9
Participated	18.2	12.2	16.7
Participated as an officer	0.9	—	12.5

TABLE B.4 (*continued*)

	Percentile of Competency Composite		
Select Components of the Composites	25th Percentile	50th Percentile	75th Percentile
Participated in an Intramural Individual Sport in Current School Year, Asked of Students			
School does not offer	10.3	13.1	18.4
Did not participate	79.6	79.0	61.2
Participated	8.7	7.4	15.2
Participated as an officer	1.5	0.6	5.3

Source: Author's tabulation of data from the NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the percentile value of the composites. The values presented in this table are calculated by finding the proportion of students with the specified characteristic within +/– 2 percentile points of the stated competency percentile (approximately 400 students). For sports variables, we count students as being in a leadership role if they are a captain/co-captain or if they participate at a varsity level.

TABLE B.5

THE RELATIONSHIP BETWEEN COMPONENTS OF COMPETENCY COMPOSITES AND OUTCOMES: WORK HABITS COMPOSITE

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
8th-Grade Variables					
Time Spent on Math Homework Each Week, Asked of Students					
None	8.7	70.2	31.2	15.5	$28,419
Less than one hour	40.5	75.9	43.3	27.0	$29,403
One to two hours	34.2	79.3	48.4	33.4	$30,705
Three hours or more	16.6	86.6	55.8	45.0	$33,025
Time Spent on Science Homework Each Week, Asked of Students					
None	17.5	74.4	37.7	22.5	$30,080
Less than one hour	44.8	78.8	46.6	31.2	$30,273
One to two hours	29.6	79.4	49.3	34.6	$30,479
Three hours or more	8.0	80.4	49.1	36.8	$31,396
Time Spent on English Homework Each Week, Asked of Students					
None	11.5	68.8	34.1	20.2	$29,562
Less than one hour	46.0	79.1	46.1	30.0	$29,983
One to two hours	33.0	78.6	47.2	33.0	$30,817
Three hours or more	9.5	85.3	56.2	42.9	$31,928
Time Spent on Social Studies Homework Each Week, Asked of Students					
None	14.1	70.2	39.0	22.3	$30,864
Less than one hour	42.3	78.3	44.9	30.0	$29,831
One to two hours	33.7	79.9	48.0	33.4	$31,072
Three hours or more	9.9	85.0	54.0	41.7	$30,187
Time Spent on All Other Homework Each Week, Asked of Students					
None	16.1	75.9	39.7	23.9	$30,671
Less than one hour	40.6	78.1	45.0	30.5	$30,318
One to two hours	31.4	79.0	47.8	32.3	$30,186
Three hours or more	11.8	80.8	53.7	40.1	$30,562

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
During the Current School Year, Parents Received a Warning About Student's Attendance, Asked of Students					
At least once	11.4	61.4	24.7	9.8	$28,072
Never	88.6	80.1	48.6	33.5	$30,494
Student Comes to Class Without Pen or Paper, Asked of Students					
Usually or often	21.6	72.5	36.0	22.7	$29,869
Seldom	48.8	80.4	48.2	33.4	$30,850
Never	29.6	79.4	50.1	33.8	$29,944
Student Comes to Class Without Books, Asked of Students					
Usually or often	9.3	66.5	27.9	14.3	$28,765
Seldom	40.4	78.4	46.8	32.2	$30,667
Never	50.4	80.9	49.2	33.7	$30,498
Student Comes to Class Without Homework Done, Asked of Students					
Usually or often	21.1	66.2	31.1	15.7	$28,156
Seldom	51.8	81.3	47.3	32.2	$30,729
Never	27.1	82.7	55.9	41.5	$31,465
Student Cuts Class, Asked of Students					
Less than once a week to daily	9.2	68.1	29.3	13.6	$29,281
Never or almost never	90.8	79.3	47.7	32.9	$30,477
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students					
Three days or more	11.6	73.4	34.2	17.4	$31,037
One or two days	24.8	76.7	45.5	29.4	$29,838
None	63.6	79.8	48.5	34.4	$30,438
Student Rarely Completes Homework, Asked of Teachers					
Yes	18.2	58.3	21.5	6.5	$27,033
No	81.8	82.3	51.5	36.4	$30,596
Student Is Frequently Absent, Asked of Teachers					
Yes	10.9	58.0	25.2	10.0	$25,647
No	89.1	80.3	48.5	33.4	$30,457

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Student Is Frequently Tardy, Asked of Teachers					
Yes	5.6	59.0	24.4	8.3	$26,683
No	94.4	78.9	47.0	31.9	$30,143
Student Is Frequently Inattentive, Asked of Teachers					
Yes	20.2	61.8	25.6	12.1	$27,887
No	79.8	82.1	51.1	35.9	$30,482
10th-Grade Variables					
Time Spent on All Homework Each Week, Asked of Students					
None	7.2	58.5	25.7	8.2	$28,434
One hour or less	24.3	76.2	39.1	21.7	$29,795
Two to three hours	28.6	81.2	47.9	30.5	$29,823
Four to six hours	16.6	82.6	49.6	36.0	$30,657
Seven hours or more	23.3	91.7	65.2	53.2	$33,105
Student Comes to Class Without Pen or Paper, Asked of Students					
Usually or often	10.0	76.2	40.7	24.3	$31,578
Seldom	43.7	80.7	47.7	32.2	$30,912
Never	46.3	82.1	50.2	34.6	$29,937
Student Comes to Class Without Books, Asked of Students					
Usually or often	6.1	70.3	30.0	13.6	$26,931
Seldom	37.6	81.0	48.3	33.2	$30,958
Never	56.3	82.0	49.9	34.0	$30,637
Student Comes to Class Without Homework Done, Asked of Students					
Usually or often	17.7	72.5	35.0	20.1	$29,092
Seldom	63.3	82.5	49.0	32.6	$30,272
Never	19.0	83.0	57.3	43.5	$32,835
Number of Times Student Has Cut Class in First Half of School Year, Asked of Students					
At least once	36.6	75.8	38.6	21.8	$30,524
Never	63.4	83.7	53.5	38.6	$30,502
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students					
Three times or more	36.0	79.3	44.6	26.4	$31,016

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Once or twice	38.4	80.2	46.4	31.6	$29,780
Never	25.6	83.7	55.4	42.3	$30,896
How Often Student Tries as Hard as He or She Can in Math Class, Asked of Students					
Never or less than once a week	9.1	77.7	43.2	27.0	$32,492
Once or a few times a week	33.6	82.5	49.5	33.4	$30,296
Almost every day	57.3	81.2	48.8	34.1	$30,217
How Often Student Tries as Hard as He or She Can in English Class, Asked of Students					
Never or less than once a week	10.5	79.3	45.1	29.0	$32,416
Once or a few times a week	40.3	82.7	47.9	32.9	$30,670
Almost every day	49.2	80.0	49.0	33.3	$29,921
How Often Student Tries as Hard as He or She Can in History Class, Asked of Students					
Not taking subject	8.3	78.3	42.2	27.0	$31,504
Never or less than once a week	30.1	81.7	47.7	32.1	$30,205
Once or a few times a week	29.5	83.0	48.8	33.4	$30,852
Almost every day	32.1	79.2	49.6	34.0	$30,240
How Often Student Tries as Hard as He or She Can in Science Class, Asked of Students					
Not taking subject	8.7	78.9	43.5	27.7	$32,904
Never or less than once a week	8.7	67.1	37.2	15.2	$26,420
Once or a few times a week	35.7	83.1	49.6	35.3	$31,368
Almost every day	46.9	82.4	49.9	34.8	$30,097
Student Usually Works Hard for Good Grades, Asked of Teachers					
No	36.8	69.4	31.0	14.3	$28,809
Yes	63.2	88.2	60.6	46.4	$32,009
Student Completes Homework, Asked of Teachers					
Never or rarely	8.7	58.3	24.7	8.5	$28,269
Some of the time	20.1	72.0	31.8	14.8	$28,769
Most of the time	37.8	81.9	47.7	30.7	$30,178
All of the time	33.4	92.5	69.8	57.6	$33,128

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
How Often Student Is Absent, Asked of Teachers					
Some, most, or all of the time	30.6	69.5	34.3	17.4	$28,511
Rarely	59.9	85.8	55.5	40.3	$31,350
Never	9.5	91.6	63.9	52.1	$32,620
How Often Student Is Tardy, Asked of Teachers					
Some, most, or all of the time	13.5	68.3	34.1	17.1	$29,349
Rarely	32.5	80.5	47.0	29.9	$30,801
Never	54.0	85.3	55.4	41.5	$30,869
How Often Student Is Attentive in Class, Asked of Teachers					
Never or rarely	7.1	64.6	26.8	10.1	$28,314
Some of the time	21.6	70.0	33.0	16.6	$29,473
Most of the time	48.1	83.8	51.3	35.7	$30,492
All of the time	23.2	92.2	69.1	55.9	$33,138
12th-Grade Variables					
Time Spent on All Homework Each Week, Asked of Students					
None or less than one hour	13.8	72.4	33.4	15.2	$31,335
One to three hours	23.8	83.7	47.4	27.9	$29,829
Four to six hours	21.6	84.8	52.9	37.5	$29,697
Seven to twelve hours	25.9	86.4	56.2	43.0	$31,183
Thirteen hours or more	14.9	91.4	62.0	50.7	$33,293
Student Comes to Class Without Pen or Paper, Asked of Students					
Usually or often	10.4	75.6	36.3	22.4	$31,684
Seldom	37.4	82.9	49.5	33.6	$31,526
Never	52.2	86.4	54.4	38.7	$30,143
Student Comes to Class Without Books, Asked of Students					
Usually or often	8.3	73.9	34.7	21.6	$30,024
Seldom	37.9	84.1	52.4	36.3	$31,981
Never	53.8	85.5	52.0	36.4	$30,125
Student Comes to Class Without Homework Done, Asked of Students					
Usually or often	16.2	77.0	39.0	25.3	$29,198
Seldom	59.8	85.5	51.5	35.7	$31,217
Never	24.1	84.5	56.4	40.1	$30,986

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Number of Times Student Has Cut Class in Current School Year, Asked of Students					
Three times or more	25.1	80.1	41.1	24.1	$31,789
One to two times	26.0	85.1	48.9	33.8	$31,689
Never	49.0	85.0	56.5	41.7	$29,998
Number of Times Student Was Late for School Over the Past Four Weeks, Asked of Students					
Three times or more	48.0	82.7	46.3	30.5	$31,846
One or two times	33.0	85.5	53.1	37.6	$30,081
Never	19.0	83.8	57.3	42.8	$29,884
Student Is Motivated to Work Hard for Good Grades, Asked of Teachers					
No	32.9	78.6	40.1	23.5	$30,450
Yes	67.1	92.9	67.8	55.6	$33,139
Student Completes Homework on Time, Asked of Teachers					
Never or rarely	10.3	68.4	31.2	18.3	$29,451
Some of the time	19.7	84.1	46.4	27.2	$30,719
Most of the time	41.3	90.7	60.8	46.9	$33,024
All of the time	28.7	94.1	73.0	62.7	$32,855
How Often Student Is Absent, Asked of Teachers					
Some, most, or all of the time	32.7	82.3	45.5	28.5	$31,642
Rarely	58.5	90.4	63.3	50.7	$32,380
Never	8.8	92.4	71.9	62.4	$32,780
How Often Student Is Tardy, Asked of Teachers					
Some, most, or all of the time	16.2	83.1	44.9	27.1	$32,253
Rarely	37.6	86.7	57.5	44.4	$32,259
Never	46.2	90.6	63.6	50.6	$32,074

TABLE B.5 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
How Often Student Is Attentive in Class, Asked of Teachers					
Never or rarely	5.0	74.6	30.4	17.9	$31,158
Some of the time	19.0	77.9	43.0	26.0	$30,230
Most of the time	50.4	90.0	59.3	45.1	$32,487
All of the time	25.5	93.8	73.0	62.1	$33,360

Source: Author's tabulation of data from the NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the outcome variables. Full-time workers are the 5,645 respondents who were not currently enrolled in a postsecondary education program who worked more than 35 hours per week in 1999, and who worked more than 40 weeks in 1999. The remaining columns are based on a sample of 9,970 respondents. These values are not weighted.

TABLE B.6

THE RELATIONSHIP BETWEEN COMPONENTS OF COMPETENCY COMPOSITES AND OUTCOMES: PROSOCIAL BEHAVIOR COMPOSITE

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
8th-Grade Variables					
Student Was Sent to the Office for Misbehaving First Semester, Asked of Students					
At least once	31.3	67.4	31.7	16.6	$30,197
Never	68.7	82.8	52.2	37.1	$30,258
Parents Received a Warning About Student's Behavior First Semester, Asked of Students					
At least once	20.6	67.2	32.6	17.5	$29,726
Never	79.4	80.8	49.3	34.2	$30,339
Got Into a Physical Fight with Another Student First Semester, Asked of Students					
At least once	21.5	64.2	31.6	15.2	$29,364
Never	78.5	81.7	49.7	35.0	$30,497
Student Is Disruptive in Class, Asked of Teachers					
Yes	12.3	65.9	28.3	13.5	$29,744
No	87.6	79.5	48.4	33.4	$29,941
10th-Grade Variables					
Student Got in Trouble for Not Following School Rules in First Semester, Asked of Students					
At least once	43.9	75.8	40.4	24.8	$30,685
Never	56.1	84.6	53.9	38.2	$30,368
Student Was Put on an in-School Suspension in First Semester, Asked of Students					
At least once	11.5	61.5	27.8	10.6	$29,566
Never	88.5	83.3	50.7	35.3	$30,617

TABLE B.6 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Student Was Put on Probation (Suspended) from School First Semester, Asked of Students					
At least once	7.1	56.0	22.5	6.2	$28,547
Never	92.9	82.7	50.0	34.5	$30,648
Got into a Physical Fight with Another Student First Semester, Asked of Students					
At least once	15.8	67.3	32.4	16.5	$31,330
Never	84.2	83.5	51.1	35.5	$30,326
Student Is Disruptive in Class, Asked of Teachers					
Some, most, or all of the time	19.4	73.1	35.9	18.8	$30,240
Rarely	25.0	79.3	45.2	31.2	$31,706
Never	55.7	85.1	56.6	41.3	$30,227
12th-Grade Variables					
Student Got in Trouble for Not Following School Rules in First Semester, Asked of Students					
At least once	34.6	79.5	44.8	28.1	$32,345
Never	65.4	86.1	53.7	38.9	$30,044
Student Was Put on an in-School Suspension in First Semester, Asked of Students					
At least once	10.7	65.6	29.9	13.2	$30,818
Never	89.3	86.0	53.1	37.8	$30,862
Student Was Put on Probation (Suspended) from School First Semester, Asked of Students					
At least once	9.7	70.2	29.0	11.9	$28,498
Never	90.3	85.2	52.9	37.7	$31,015
Got Into a Physical Fight with Another Student First Semester, Asked of Students					
At least once	6.0	62.0	20.6	7.7	$30,199
Never	94.0	85.2	52.5	36.9	$30,853

TABLE B.6 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Student Is Disruptive in Class, Asked of Teachers					
Some, most, or all of the time	10.4	81.5	45.7	33.0	$33,341
Rarely	20.5	82.6	53.3	38.2	$32,584
Never	69.1	90.5	61.7	48.1	$31,877

Source: Author's tabulation of data from the NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the outcome variables. Full-time workers are the 5,645 respondents who were not currently enrolled in a postsecondary education program, who worked more than 35 hours per week in 1999, and who worked more than 40 weeks in 1999. The remaining columns are based on a sample of 9,970 respondents. These values are not weighted.

TABLE B.7

THE RELATIONSHIP BETWEEN COMPONENTS OF COMPETENCY COMPOSITES AND OUTCOMES:
SPORTS PARTICIPATION AND LEADERSHIP COMPOSITES

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
8th-Grade Variables					
Participated in Science Fair During Current School Year, Asked of Students					
Did not participate	72.4	76.4	44.2	29.7	$30,280
Participated	26.8	83.8	51.1	35.6	$30,235
Had a leadership role	0.8	70.2	33.5	20.4	$30,171
Participated in School Varsity Sports During Current School Year, Asked of Students					
Did not participate	52.3	75.3	42.5	27.0	$28,223
Participated	43.8	81.8	49.6	36.0	$32,225
Had a leadership role	3.9	78.3	51.4	34.6	$37,949
Participated in Intramural Sports During Current School Year, Asked of Students					
Did not participate	57.0	75.2	44.0	29.6	$29,349
Participated	40.7	82.9	49.4	33.8	$31,709
Had a leadership role	2.3	76.1	40.4	29.1	$31,262
Participated in Cheerleading During Current School Year, Asked of Students					
Did not participate	89.4	77.7	45.8	31.3	$30,299
Participated	9.3	85.3	50.2	32.1	$30,308
Had a leadership role	1.3	72.7	37.5	27.5	$29,145
Participated in Band or Orchestra During Current School Year, Asked of Students					
Did not participate	77.6	76.4	43.8	29.3	$30,363
Participated	21.4	85.8	54.0	37.8	$30,002
Had a leadership role	1.1	72.1	52.2	44.6	$30,441

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Chorus or Choir During Current School Year, Asked of Students					
Did not participate	76.3	77.3	44.8	30.2	$30,598
Participated	22.5	82.1	51.0	35.4	$28,976
Had a leadership role	1.2	77.5	36.0	27.3	$32,893
Participated in Dance During Current School Year, Asked of Students					
Did not participate	74.0	78.3	45.5	30.4	$30,054
Participated	24.2	79.0	48.9	34.5	$30,979
Had a leadership role	1.8	65.7	36.2	26.9	$31,431
Participated in History Club During Current School Year, Asked of Students					
Did not participate	97.0	78.9	46.5	31.7	$30,333
Participated	2.5	58.3	31.9	16.2	$28,081
Had a leadership role	0.4	55.0	22.2	13.9	$29,077
Participated in Science Club During Current School Year, Asked of Students					
Did not participate	95.3	78.9	46.8	31.8	$30,353
Participated	4.0	68.9	34.2	22.0	$27,656
Had a leadership role	0.7	56.1	20.9	17.9	$26,358
Participated in Math Club During Current School Year, Asked of Students					
Did not participate	94.4	78.6	46.4	31.4	$30,240
Participated	4.7	80.0	43.9	34.1	$30,881
Had a leadership role	0.9	55.0	23.9	13.4	$33,105
Participated in Foreign Language Club During Current School Year, Asked of Students					
Did not participate	93.7	78.5	46.2	31.5	$30,311
Participated	5.5	81.2	45.7	29.6	$29,265
Had a leadership role	0.9	50.4	26.1	20.3	$29,930

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Other Subject Club During Current School Year, Asked of Students					
Did not participate	90.2	78.3	46.1	31.2	$30,333
Participated	8.4	81.0	47.6	33.4	$29,195
Had a leadership role	1.4	61.5	29.8	21.5	$33,691
Participated in Debate or Speech Team During Current School Year, Asked of Students					
Did not participate	94.2	78.2	46.0	31.0	$30,224
Participated	5.0	83.0	53.2	41.0	$31,783
Had a leadership role	0.8	64.3	27.5	17.8	$32,714
Participated in Drama Club During Current School Year, Asked of Students					
Did not participate	91.5	78.0	45.7	30.7	$30,250
Participated	7.7	81.5	49.3	37.7	$30,036
Had a leadership role	0.8	75.3	38.8	26.5	$28,439
Participated in Academic Honor Society During Current School Year, Asked of Students					
Did not participate	86.9	76.6	43.6	28.0	$29,763
Participated	12.0	92.0	65.7	55.1	$33,934
Had a leadership role	1.1	71.7	46.9	39.1	$30,337
Participated in Student Newspaper During Current School Year, Asked of Students					
Did not participate	88.7	77.9	45.5	30.6	$30,167
Participated	9.8	83.7	51.6	36.3	$31,036
Had a leadership role	1.5	74.1	53.8	45.6	$31,014
Participated in Student Yearbook During Current School Year, Asked of Students					
Did not participate	84.8	78.3	45.4	30.5	$30,053
Participated	13.5	79.2	50.3	36.5	$31,060
Had a leadership role	1.7	74.2	44.0	34.5	$33,589

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Student Council During Current School Year, Asked of Students					
Did not participate	88.0	77.5	44.4	29.2	$29,774
Participated	8.3	84.3	56.0	44.9	$32,542
Had a leadership role	3.7	83.1	57.6	48.8	$36,909
Participated in Computer Club During Current School Year, Asked of Students					
Did not participate	93.0	79.1	46.7	32.0	$30,423
Participated	6.1	72.7	39.5	25.0	$29,002
Had a leadership role	0.9	55.4	28.2	14.6	$29,282
Participated in Religious Organization During Current School Year, Asked of Students					
Did not participate	84.8	76.8	43.9	29.2	$30,031
Participated	13.7	87.4	58.0	45.0	$31,952
Had a leadership role	1.5	80.2	52.6	37.5	$32,171
Participated in Vocational Education Club During Current School Year, Asked of Students					
Did not participate	96.1	78.7	46.2	31.8	$30,373
Participated	3.1	71.6	40.0	18.1	$28,616
Had a leadership role	0.8	57.7	26.3	17.0	$26,531
Participated, Outside School, in Scouting this Year, Asked of Students					
Did not participate	86.3	78.0	46.3	31.6	$30,340
Participated	11.5	79.6	43.0	27.4	$29,160
Had a leadership role	2.2	88.2	53.9	42.5	$33,003
Participated, Outside School, in Religious Youth Groups this Year, Asked of Students					
Did not participate	65.3	73.8	41.0	25.5	$29,981
Participated	31.9	87.1	55.7	42.4	$30,935
Had a leadership role	2.8	86.1	59.1	45.7	$29,691

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated, Outside School, in Hobby Clubs this Year, Asked of Students					
Did not participate	84.4	78.2	46.5	31.9	$29,791
Participated	14.6	79.7	44.7	28.4	$33,251
Had a leadership role	1.1	69.4	40.1	28.4	$30,982
Participated, Outside School, in Neighborhood Clubs or Programs this Year, Asked of Students					
Did not participate	87.7	78.4	46.5	31.8	$30,158
Participated	11.0	79.2	43.4	27.4	$31,436
Had a leadership role	1.3	73.1	39.7	30.4	$28,979
Participated, Outside School, in Boys' or Girls' Clubs this Year, Asked of Students					
Did not participate	90.7	78.6	46.4	32.0	$30,311
Participated	8.5	77.8	42.2	24.0	$29,514
Had a leadership role	0.8	68.5	35.4	21.9	$33,400
Participated, Outside School, in Nonschool Team Sports this Year, Asked of Students					
Did not participate	62.4	75.8	43.5	28.4	$28,640
Participated	35.6	82.7	51.0	36.7	$33,156
Had a leadership role	2.0	84.6	44.7	32.6	$31,953
Participated, Outside School, in 4-H Club this Year, Asked of Students					
Did not participate	90.5	78.9	46.4	32.1	$30,476
Participated	7.6	71.5	39.3	21.8	$28,390
Had a leadership role	1.9	84.6	59.8	36.7	$28,632
Participated, Outside School, in Y or Other Youth Groups this Year, Asked of Students					
Did not participate	85.6	78.0	45.6	30.9	$30,006
Participated	13.2	81.2	48.8	34.8	$31,432
Had a leadership role	1.2	68.0	41.6	24.7	$33,969

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated, Outside School, in Summer Programs, Workshops, or Institutes this Year, Asked of Students					
Did not participate	81.4	76.6	44.6	29.6	$30,058
Participated	17.4	86.8	53.1	39.8	$30,634
Had a leadership role	1.2	78.5	44.8	28.1	$31,897
Participated, Outside School, in Other Activities this Year, Asked of Students					
Did not participate	55.8	74.4	42.5	27.4	$29,990
Participated	40.6	83.6	51.3	37.2	$30,950
Had a leadership role	3.7	78.8	47.1	30.8	$31,373
10th-Grade Variables					
Time Spent Each Week on School-Sponsored Extracurricular Activities, Asked of Students					
None	38.1	72.4	37.5	18.6	$27,980
Less than one hour	17.1	81.9	49.9	34.3	$30,207
One to four hours	19.6	84.3	50.9	36.9	$31,284
Five hours or more	25.2	90.8	61.4	49.3	$33,692
Participated in Baseball or Softball in Current School Year, Asked of Students					
Did not participate	84.3	80.9	48.4	32.4	$29,942
Participated	15.4	84.2	49.6	35.5	$33,459
Had a leadership role	0.3	59.5	29.3	20.1	$25,652
Participated in Basketball in Current School Year, Asked of Students					
Did not participate	79.9	80.3	47.2	31.1	$29,838
Participated	19.4	85.6	53.1	39.4	$32,641
Had a leadership role	0.7	81.2	51.3	27.2	$30,418
Participated in Football in Current School Year, Asked of Students					
Did not participate	84.6	81.4	49.2	33.0	$29,898
Participated	15.1	80.2	43.8	31.0	$33,367
Had a leadership role	0.3	78.0	46.3	23.6	$31,176

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Soccer in Current School Year, Asked of Students					
Did not participate	92.5	80.6	47.6	31.5	$30,031
Participated	7.3	90.3	60.4	48.8	$36,341
Had a leadership role	0.2	75.4	36.9	36.9	$42,794
Participated in Swim Team in Current School Year, Asked of Students					
Did not participate	96.0	81.0	48.1	32.1	$30,289
Participated	3.9	87.0	55.7	45.9	$33,411
Had a leadership role	0.1	78.8	29.3	29.3	$31,719
Participated in Other Team Sport in Current School Year, Asked of Students					
Did not participate	84.4	79.8	46.5	30.8	$30,320
Participated	14.8	88.5	57.6	43.1	$30,865
Had a leadership role	0.7	91.0	64.4	37.3	$26,336
Participated in Other Individual Sport in Current School Year, Asked of Students					
Did not participate	76.6	78.9	45.4	29.0	$29,295
Participated	22.7	88.9	58.4	45.6	$34,303
Had a leadership role	0.7	85.5	56.0	20.0	$31,376
Participated in Cheerleading in Current School Year, Asked of Students					
Did not participate	93.8	80.8	48.2	32.5	$30,544
Participated	5.1	87.4	60.1	43.0	$28,737
Had a leadership role	1.0	89.6	30.5	18.4	$24,093
Participated in Pom-Pom, Drill Team in Current School Year, Asked of Students					
Did not participate	95.8	81.0	48.3	32.8	$30,470
Participated	3.8	87.3	53.1	33.9	$28,520
Had a leadership role	0.4	82.1	46.0	17.6	$26,846

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Band, Orchestra, Choir, or Music Group in Current School Year, Asked of Students					
Did not participate	78.2	80.1	46.2	30.8	$30,914
Participated	20.4	85.6	56.8	39.9	$29,041
Had a leadership role	1.4	90.5	57.5	38.7	$29,420
Participated in School Play or Musical in Current School Year, Asked of Students					
Did not participate	88.6	80.8	47.8	32.0	$30,721
Participated	10.8	85.8	55.0	39.6	$28,949
Had a leadership role	0.6	87.4	41.8	24.1	$27,392
Participated in Student Government in Current School Year, Asked of Students					
Did not participate	92.3	80.3	46.5	30.5	$30,069
Participated	5.3	94.1	70.2	56.3	$36,219
Had a leadership role	2.4	97.8	77.4	68.2	$36,531
Participated in Honor Society in Current School Year, Asked of Students					
Did not participate	92.0	80.0	46.2	29.8	$30,050
Participated	7.7	97.0	75.8	67.8	$35,775
Had a leadership role	0.3	86.3	52.8	44.0	$41,055
Participated in School Yearbook, Newspaper, or Literary Magazine in Current School Year, Asked of Students					
Did not participate	90.6	81.0	47.4	31.6	$30,314
Participated	8.4	86.9	59.6	45.0	$32,554
Had a leadership role	0.9	70.6	56.7	42.3	$33,930
Participated in Service Clubs in Current School Year, Asked of Students					
Did not participate	87.9	80.2	46.1	29.8	$30,138
Participated	11.0	90.6	67.1	54.3	$33,837
Had a leadership role	1.0	88.4	57.8	52.4	$30,895

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in an Academic Club in Current School Year, Asked of Students					
Did not participate	68.7	78.8	45.7	28.5	$29,948
Participated	29.9	86.7	54.4	41.6	$31,477
Had a leadership role	1.4	91.0	62.6	53.5	$33,312
Participated in a Hobby Club in Current School Year, Asked of Students					
Did not participate	92.5	81.2	48.0	32.2	$30,243
Participated	7.0	83.5	55.5	40.6	$32,792
Had a leadership role	0.5	77.0	45.3	34.9	$29,053
Participated in Vocation or Professional Club Current School Year, Asked of Students					
Did not participate	88.3	82.4	49.4	34.1	$30,643
Participated	10.1	73.1	41.7	21.1	$28,147
Had a leadership role	1.6	70.1	40.6	25.4	$35,564
12th-Grade Variables					
Time Spent Each Week on School-Sponsored Extracurricular Activities, Asked of Students					
None	30.4	72.5	33.7	14.3	$27,773
Less than one hour	13.1	84.0	51.0	34.3	$29,587
One to four hours	20.5	87.3	55.7	40.8	$30,404
Five hours or more	36.0	91.5	62.3	50.2	$34,007
Participated in a Team Sport in Current School Year, Asked of Students					
Did not participate	70.3	82.1	48.8	32.0	$29,481
Participated	18.6	86.2	53.0	39.6	$32,437
Had a leadership role	11.1	94.0	64.3	52.0	$36,125
Participated in an Individual Sport in Current School Year, Asked of Students					
Did not participate	80.0	82.2	48.5	32.1	$29,839
Participated	14.0	90.1	61.2	47.9	$34,393
Had a leadership role	6.0	95.2	66.8	56.8	$36,026

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Role Pom-Pom, Drill Team in Current School Year, Asked of Students					
Did not participate	92.4	83.4	50.6	34.8	$30,808
Participated	4.6	90.2	58.8	44.5	$29,727
Had a leadership role	3.0	94.2	66.6	54.2	$29,903
Participated in Band, Orchestra, Chorus, or Music Group in Current School Year, Asked of Students					
Did not participate	79.9	82.8	49.6	34.2	$31,187
Participated	14.0	87.8	55.8	36.3	$28,673
Had a leadership role	6.1	93.4	66.7	54.7	$31,084
Participated in Drama Club, School Play, or Musical in Current School Year, Asked of Students					
Did not participate	84.3	82.7	49.8	33.9	$31,174
Participated	12.6	91.5	59.9	44.4	$29,048
Had a leadership role	3.1	93.4	61.8	52.4	$28,812
Participated in Student Government in Current School Year, Asked of Students					
Did not participate	84.5	82.5	48.6	32.0	$30,264
Participated	9.2	90.7	61.5	48.5	$32,081
Had a leadership role	6.3	95.7	74.8	66.8	$37,043
Participated in Honor Society in Current School Year, Asked of Students					
Did not participate	80.7	81.1	44.4	26.7	$29,888
Participated	15.9	97.4	81.2	72.6	$34,502
Had a leadership role	3.4	94.6	80.8	76.5	$37,836
Participated in School Yearbook, Newspaper, or Literary Magazine in Current School Year, Asked of Students					
Did not participate	80.9	82.2	48.9	32.5	$30,671
Participated	13.8	90.8	58.5	44.6	$30,060
Had a leadership role	5.3	96.7	72.8	62.1	$35,657

TABLE B.7 (*continued*)

Components of the Composites	Percent with Characteristic	Percent Who Enter Any Postsecondary Educational Program	Percent Who Complete Any Postsecondary Education Program	Percent Who Complete a Bachelor's Degree	Average 1999 Annual Earnings for Full-time Workers
Participated in Service Clubs in Current School Year, Asked of Students					
Did not participate	85.9	82.9	48.8	32.4	$30,533
Participated	10.8	90.7	66.5	54.7	$31,725
Had a leadership role	3.3	95.7	72.9	63.0	$35,584
Participated in an Academic Club in Current School Year, Asked of Students					
Did not participate	74.6	81.3	47.9	31.2	$30,233
Participated	21.1	91.6	60.1	47.0	$32,207
Had a leadership role	4.3	97.2	72.3	62.0	$33,686
Participated in a Hobby Club in Current School Year, Asked of Students					
Did not participate	92.3	83.7	50.9	35.2	$30,617
Participated	6.6	89.6	59.6	43.4	$32,649
Had a leadership role	1.1	88.7	58.3	45.1	$43,199
Participated in Vocation or Professional Club Current School Year, Asked of Students					
Did not participate	81.4	86.0	53.1	38.2	$31,170
Participated	13.2	73.5	41.0	22.0	$28,502
Had a leadership role	5.4	82.3	53.9	33.8	$32,038
Participated in an Intramural Team Sport School Year, Asked of Students					
Did not participate	77.7	83.5	51.2	34.6	$30,043
Participated	16.4	84.1	51.6	39.9	$32,883
Had a leadership role	5.9	91.6	57.2	41.4	$34,421
Participated in an Intramural Individual Sport School Year, Asked of Students					
Did not participate	87.0	83.5	51.4	35.4	$30,527
Participated	9.8	87.0	52.7	39.1	$31,112
Had a leadership role	3.2	91.4	56.6	39.1	$37,947

TABLE B.7 *(continued)*

Source: Authors' tabulation of data from NELS.

Note: This table illustrates the relationship between the individual variables that make up the competency composites and the outcome variables. Full-time workers are the 5,645 respondents who were not currently enrolled in a postsecondary education program, who worked more than 35 hours per week in 1999, and who worked more than 40 weeks in 1999. The remaining columns are based on a sample of 9,970 respondents. These values are not weighted.

APPENDIX C

SUPPLEMENTARY ANALYSES

In this appendix, we present a variety of supplemental and sensitivity analyses. The analyses presented here are the following:

- Average effects of math, reading, history, and science test scores
- Average effects of nonacademic competencies
- A detailed explanation of why there are more students for whom sports participation is most predictive of enrollment than work habits despite the fact that work habits has a greater average effect
- Subgroup analysis by sex, educational aspirations, and parents' education
- A sensitivity analysis of how the effect of sports participation changes when individual sports are excluded from the composite
- An analysis of how sensitive the relative effects of competencies are to assumptions regarding the effect of postsecondary education on earnings

A. THE AVERAGE VALUE OF FOUR ACADEMIC COMPETENCIES

Although we have seen that reading, math, history, and science test scores are all highly correlated, it is still possible that these academic competencies differ in their ability to predict postsecondary educational attainment and earnings. If they do differ, then our choice of the test score that we use to compare academic to nonacademic competencies will affect our findings. Furthermore, any difference in the predictive power of these test scores may be of interest in and of itself to parents, teachers, and policymakers. These differences must be interpreted cautiously, however, because the high correlation among these competencies means that any difference in predictive power is likely to be small and statistically insignificant.

To calculate the predictive power of these four test scores, we estimated a separate regression for each of the four test scores, for each of the four outcomes, resulting in a total of 16 regressions. We estimated a separate regression for each test score rather than include all four in a single regression due to the high correlation among test scores. In each regression, we also included the nonacademic competencies and control variables described in Section III.

Table C.1 reports the results of these 16 regressions. Each cell in the table represents the mean marginal effect of a 10 percentile point increase in each test score for each outcome. The estimated effects of these test scores on enrollment in any postsecondary education program, completion of any postsecondary education program, and completion of a bachelor's program are all indistinguishable. Specifically, all four test scores increase the probability of enrollment by approximately 1.5 percent, of completion by approximately 1.5 percent, and of completion of a bachelor's degree by between 3 and 4 percent.

TABLE C.1

MEAN MARGINAL EFFECT OF A 10 PERCENTILE POINT INCREASE IN TEST SCORES

	Outcome			
Academic Competencies	Enroll in Any Postsecondary Program	Complete Any Postsecondary Education Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Math	0.015**	0.017**	0.037**	0.029**
Reading	0.015**	0.018**	0.034**	0.008
History	0.016**	0.015**	0.033**	0.018**
Science	0.014**	0.017**	0.030**	0.014*

Source: Author's calculations using data from the NELS.

Note: Due to the high correlation among academic competencies, each entry in this table is from a separate regression analysis. That is, the four test scores were not included in the same regression for each outcome. Each regression controls for the five nonacademic competency measures (work habits composite, sports participation, prosocial behavior composite, leadership composite, and the locus of control composite), as well as a variety of student, household, and school control variables.

There are 9,977 high school graduates who are included in the "enroll in any postsecondary program" regression. The 8,506 students who did enroll in any program were included in the "complete any postsecondary program" and "complete a bachelor's degree" regressions. The 5,645 respondents who were employed full-time and not enrolled in any education program were included in the "log of 1999 earnings" regression.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

The effects of test scores on earnings, however, are more variable. While a 10 percentile point increase in math test scores is associated with a statistically significant 2.9 percent increase in earnings, a similar increase in reading test scores has a statistically insignificant effect of just 0.8 percent. The difference in the effect of math and reading is significant at the 10 percent level. The effects of history and science also appear to be less than those of math, although these differences are not statistically significant.

The existence of such a large difference in the effects of math and reading test scores on earnings is surprising, particularly given the high correlation between these two tests. However, these findings are consistent with other studies regarding the relative value of reading and math test score in predicting earnings. Murnane et al. 1995, using data from both High School and Beyond and the National Longitudinal Study of 1972, find that math test scores are better predictors of earnings than reading test scores. The National Job Corps Study examined the relationship between earnings and an adult literacy and numeracy test. That study also found that the numeracy test was more predictive of earnings than the literacy test (Glazerman et al. 2000).

Throughout this report, we use math test score as a proxy for academic ability. This choice does not affect findings for the postsecondary education outcomes. However, it does affect findings for the earnings outcomes. If we were to use another measure of academic ability, then the nonacademic competencies would appear even more predictive. Because our ultimate finding for earnings is that the nonacademic competencies are jointly more predictive of earnings than academic ability, the use of math test score as our proxy for academic ability is a conservative choice. Put another way, using a different test score to proxy for academic ability would only strengthen our conclusions.

B. THE AVERAGE VALUE OF NONACADEMIC COMPETENCIES AND MATH TEST SCORE

The average effects of each competency on each outcome are reported in Table IV.1 and discussed briefly in Chapter IV, Section A. Below we provide more detail for these findings by competency.

1. Math Test Score

Math test score is the only competency measure that is strongly predictive of all four outcomes (Table IV.1, row 1). For three of four outcomes, the estimated effect of math test score is greater, though not significantly so, than the other competencies (the only exception is completion of any postsecondary program). These findings appear to provide support for policies that would place a much greater emphasis on developing academic (particularly math) skills than other competencies, for students overall.

2. Work Habits Composite

The work habits composite is not significantly different from math test scores in its ability to predict postsecondary educational outcomes (Table IV.1, row 2). However, in contrast to math scores, work habits do not appear to be a good predictor of earnings. One hypothesis regarding the source of this discrepancy is that the work habits composite is actually measuring study habits and that having good study habits in an educational setting is not necessarily correlated with good work habits in a workplace setting. For example, a student who is not interested in academics may have poor study habits in school but might have strong work habits on the job.

An alternative hypothesis is that at the early point in many workers' careers when earnings data were collected, employers have not yet had an opportunity to observe work habits and adjust compensation accordingly. It may be that this early measure of earnings is affected more by the competencies that are easily observed on a resume (for example, test scores and past leadership roles) than competencies that can only be observed through direct, prolonged experience with a worker.

A third hypothesis is that work habits are too highly correlated with other competency measures. To test this, we estimated the earnings regression without any of the other competencies. We found that there is no statistically significant effect of work habits on earnings even if all other competency measures are excluded from the regression.

3. Sports-Related Competencies

Participation in sports has a significant association with completion of any form of postsecondary education, with completion of a bachelor's degree, and with earnings (Table IV.1, row 3). In Table IV.2, we also see that sports participation is associated with enrolling in postsecondary education for many students. Thus, sports participation is the only competency measure other than math test score that is predictive of all four outcomes for at least some students.

4. Prosocial Behavior Composite

Prosocial behavior is not related to any of the outcomes analyzed in this study (Table IV.1, row 4). In fact, the effect of prosocial behavior with the largest magnitude is a negative effect on earnings (though this effect is not statistically significant). We can only speculate as to the interpretation of this finding. One possible explanation for the weak predictive power of prosocial behavior is that respondents' behavior later in life is not strongly correlated with their behavior in high school. Alternatively, it may be that, within certain bounds, "bad behavior" might not always be bad. For example, students who are "disruptive" might also be more willing to take risks or might be more likely to question authority. These are behaviors that, if properly channeled, might be rewarded in some instances. Thus it may be that the positive and negative effects of behavior are offsetting, resulting in no overall effect.

a. Leadership Roles

For students overall, taking on more leadership roles in high school is not associated with educational attainment, though it is associated with earnings (Table IV.1, row 5). This difference may reflect the possibility that educational attainment depends on individual achievement, whereas success in a workplace may be more dependent on an ability to take on leadership roles in a team environment. Even those who are not in visible leadership positions (such as supervisors or project directors) may need to take a leading role on smaller tasks.

5. Locus of Control

A higher locus of control is associated with a higher probability of entering a postsecondary educational program, but not with completing a program (Table IV.1, row 6). This may suggest that, all else being equal, a higher locus of control gives students the confidence to enter college (either because they are more likely to apply, or because they appear more capable to admission committees) but that actual success in college depends on students' other competencies.

A higher locus of control is also positively related to earnings. On the one hand, this may suggest that greater confidence does lead to greater productivity in the workplace. On the other hand, if the hypothesis stated above regarding work habits is true—that is, if our early earnings measure reflects variation in starting salary that is due to characteristics that employers can observe when first hiring employees rather than characteristics that are observed on the job—then the benefit of a higher locus of control may be to "get a foot in the door" in a higher-paying position rather than to actually improve productivity. If true, this would be consistent with the pattern described above, in which students with a higher locus of control are more likely to enroll in postsecondary education but are no more likely to be successful.

C. SPORTS PARTICIPATION, WORK HABITS, AND ENROLLMENT

A significant finding revealed when looking beyond the average effects of competencies on enrollment in postsecondary education is that sports participation appears much more effective than work habits, which is the opposite conclusion drawn from looking at average effects. For 21 percent of students, sports participation is more predictive of enrollment than any other competency (Table IV.2). Furthermore, the number of students for whom sports participation is the most predictive competency is twice as large as the number for whom work habits is most predictive. Yet in Table IV.1, we see that math test score, work habits, and locus of control are the only competencies with a statistically significant average effect on enrollment—the effect of sports participation is insignificant.

This apparent difference in the effectiveness of sports participation and work habits is due to the fact that when work habits is at its most effective, math ability is even more effective, and when math ability is not effective, sports participation is more effective than work habits. First, Figure D1 shows that there actually is a wide range of the sports participation distribution in which sports participation does have a significant effect on enrollment. For students between the 40th and 80th percentiles of sports participation, the marginal effect is statistically significant.[1] Second, sports participation appears to be the most effective competency when math and locus of control are above average (Table IV.4), an observation consistent with the diminishing marginal returns to both of these competencies seen in Figure D.1 (the effect of both competencies

[1] It would appear that the average effect might be insignificant due to the flat and downward sloping parts of the curve. However, the downward sloping part of the curve is not statistically significant.

becomes insignificant beyond the 60th percentile). Third, work habits appear to be most effective when math ability is low (which also happens to be when math ability is most effective) and work habits appear to have no significant effect on enrollment when math ability is above average (Figure D.5). Thus, when work habits are most effective, math ability is even more effective. When math ability is not effective, sports participation is more effective than work habits. It is the combination of these nonlinearities that yields the surprising difference in interpretation when we look beyond average effects.

D. THE AVERAGE VALUE OF COMPETENCIES BY SUBGROUP

Improving the outcomes of students from disadvantaged backgrounds is a goal of many policymakers and educators. In this section, we examine subgroups of students defined by educational aspirations and parents' educational attainment, where we consider students with less educated parents and lower aspirations to be representative of "disadvantaged" students. Improving the outcomes of these students requires an understanding of exactly what factors associated with a "disadvantaged background" inhibit success later in life. For example, are students whose parents have less education disadvantaged because they have fewer financial resources, because their parents are less able to help them with homework, or because of some other reason? Are students with low educational aspirations less likely to succeed simply because they have lower aspirations, or are their low aspirations the result of other factors that also affect outcomes, such as students' abilities, access to resources, and quality of education?

A partial explanation for the lower earnings and educational attainment of disadvantaged students is that they may not have the same skills, abilities, and attitudes as students from more advantaged households. To the extent that this explanation is valid, policymakers have the potential to improve the postsecondary outcomes of these students by helping them build these competencies. If feasible, policymakers and educators would ideally focus their efforts on helping disadvantaged students improve the competencies of greatest value to those students.

Understanding how the relative effects of competencies vary among easily identifiable subgroups is a first step towards devising a more refined policy in which the development of different competencies is emphasized for different students. However, using such broad subgroups as the basis for targeting efforts to develop specific competencies may be unappealing for at least two reasons. First, there may be considerable variation in individual student needs within these broad subgroups. Second, targeting disadvantaged groups to receive a different education may raise serious legal and ethical concerns.

Understanding *why* the relative effects of competencies vary across subgroups is the second, and more important, step towards devising a more refined policy. Of particular interest are explanations for this variation that are policy-relevant—that is, explanations that suggest a direct connection to a specific policy action. The possible explanation, which is the focus of this study, is that the effect of competencies for disadvantaged students might differ from other groups because they have lower overall competency levels or have a different mix of strengths and weaknesses.[2]

For the present study, we are particularly interested in testing the hypothesis of whether differences in the effects of competencies among students are due to differences in the competency levels of students. In this section, we examine whether average effects of competencies differ among subgroups defined by students' educational aspirations and parents'

[2] There may be many other explanations for why the effects of competencies would vary across these groups. For example, there may be important interaction between the competencies examined in this study and other factors, such as financial resources or parents' connections, that might influence the relative value of competencies.

education.[3] We then look to see if these differences might be explained by differences in average competency levels between groups.

Overall, we see noticeable variation among subgroups in the effects of competencies. However, while the magnitude of these differences may appear large, the number of differences that are statistically significant is small. Where significant differences do exist, we use an Oaxaca-style decomposition to calculate the proportion of the difference in effects between subgroups that can be explained by different competency levels between groups. This analysis suggests that competency differences between subgroups do contribute to the differences in effects between subgroups but that there are also other unobserved factors at work.[4] In Chapter IV, Section B, we more directly examine the extent to which the effects of competencies vary by the levels of competencies.

Below, we first describe the Oaxaca-style decomposition we used, followed by a discussion of findings for subgroups defined by educational aspirations and parents' education. We conclude by examining the consistency of these findings with the nonlinearities and interactions described in Chapter IV.

1. Oaxaca-Style Decomposition

To investigate whether differences in the effects of competencies between subgroups are due to the different average competency levels of the subgroups or to other unobserved factors (which would be manifest as a different estimate of the function $f\left(C_1,...,C_6\right)$ (see equation 1)),

[3] We also examined subgroups defined by race, but all competency effects were statistically insignificant due to the limited sample available in these subgroups.

[4] While it is difficult to speculate what these factors might be, they could include unobserved competencies, students' career goals, or family's assets and networks.

we calculated the proportion of the difference in effects between subgroups that can be explained by different competency levels between groups.

Specifically, we calculated this proportion in two ways: $\frac{\bar{f}_{group\_1}\left(C_{group\_1}\right)-\bar{f}_{group\_1}\left(C_{group\_2}\right)}{\bar{f}_{group\_1}\left(C_{group\_1}\right)-\bar{f}_{group\_2}\left(C_{group\_2}\right)}$ and $\frac{\bar{f}_{group\_2}\left(C_{group\_1}\right)-\bar{f}_{group\_2}\left(C_{group\_2}\right)}{\bar{f}_{group\_1}\left(C_{group\_1}\right)-\bar{f}_{group\_2}\left(C_{group\_2}\right)}$, where $\bar{f}_{group\_y}\left(C_{group\_x}\right)$ indicates the average outcome given the competency levels of all the individuals in *group_x* and the production function estimated for *group_y*. We know intuitively that these proportions should only take values between 0 and 1. However, because $\bar{f}_{group\_1}$ and $\bar{f}_{group\_2}$ are statistics that are estimated separately, each with a standard error, it is possible that these proportions will fall outside of the range of 0 to 1.

2. Variation by Educational Aspirations

Student competencies vary considerably depending on students' educational aspirations (see Table C.2). Students who aspire to a degree greater than a bachelor's are above average in all

TABLE C.2

MEAN COMPETENCY LEVELS, BY EDUCATIONAL ASPIRATIONS

	Subgroups			
Competency	All Students	Less than Bachelor's Degree	Bachelor's Degree	Greater than Bachelor's Degree
Math	50	35	53	64
Work Habits	50	42	51	55
Sports-Related Competencies	50	45	51	53
Behavior	50	43	52	55
Leadership	49	43	49	57
Locus of Control	51	41	53	60

Source: Author's calculations using data from the NELS.

areas, have particularly high math test scores, and have a strong locus of control. Students who aspire to less than a bachelor's degree are at the other extreme, while those who aspire to a bachelor's degree are near the median on all competency measures.

In four cases, there are differences between these groups in the effects of competencies that are statistically significant at the 10 percent level.[5] Table C.3 shows differences in competency effects by educational aspirations. Three of these cases involve postsecondary enrollment, while the fourth involves bachelor's completion. For enrollment, we find that work habits, locus of control, and math ability are more predictive of enrollment for students who aspire to less than a bachelor's degree. For bachelor's completion, we find that the effect of work habits is strongest for students who aspire to more than a bachelor's degree.

The observed difference between subgroups in the effect of work habits and locus of control on enrollment appears to be only weakly related to differences in competencies. For work habits, the proportion of the difference in effects due to differences in competencies is either –0.23 or 0.34, depending on which of the two formulas are used (see above). For locus of control, the proportion of the difference in effects due to competency levels is either 0.03 or –0.01.

The difference between subgroups in the effect of math on enrollment does appear to be largely due to differences in competencies. The proportion of the difference in effects between subgroups that is due to competency differences is either 0.77 or 1.05, depending on which of the two formulas are used.

The difference between subgroups in the effect of work habits on bachelor's completion appears to be at least partly explained by differences in competencies. The proportion of the

[5] We use a 10 percent level of significance because the variance of the difference between two effects is always greater than the variance of the individual effects, making it more difficult to detect significant differences.

TABLE C.3

MEAN MARGINAL EFFECT OF A 10 PERCENTILE POINT INCREASE IN EACH COMPETENCY, BY EDUCATIONAL ASPIRATIONS

	Outcome			
Competencies	Enroll in Any Postsecondary Education Program	Complete any Postsecondary Education Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Student's Educational Aspirations Less than a Bachelor's Degree				
Math Test Score	0.026**	0.014	0.032**	0.040**
Work Habits Composite	0.018*	0.007	0.018*	0.005
Sports-Related Competencies	0.004	0.009	0.015*	0.015
Prosocial Behavior Composite	0.007	0.010	0.002	–0.021
Leadership Roles	–0.003	–0.007	0.010	0.014
Locus of Control	0.016**	0.016	0.005	0.024**
Sample Size	**2,808**	**1,885**	**1,885**	**1,708**
Student's Educational Aspirations Equal to a Bachelor's Degree				
Math Test Score	0.013**	0.017**	0.035**	0.022*
Work Habits Composite	0.010*	0.028**	0.027**	0.013
Sports-Related Competencies	0.004	0.013*	0.019**	0.024**
Prosocial Behavior Composite	0.002	0.004	0.013*	–0.003
Leadership Roles	0.001	0.006	0.006	0.019*
Locus of Control	0.001	0.008	0.006	0.025**
Sample Size	**4,461**	**4,048**	**4,048**	**2,578**
Student's Educational Aspirations Greater than a Bachelor's Degree				
Math Test Score	0.006	0.013	0.023**	0.026
Work Habits Composite	–0.001	0.031**	0.039**	–0.001
Sports-Related Competencies	0.006	0.015*	0.013*	0.013
Prosocial Behavior Composite	0.008*	–0.005	0.001	–0.004
Leadership Roles	–0.002	0.001	0.013	0.016
Locus of Control	0.009**	–0.001	–0.004	0.038**
Sample Size	**2,642**	**2,526**	**2,526**	**1,329**

Source: Author's calculations using data from the NELS.

Note: The mean marginal effects presented in this table are regression adjusted for student, household, and school characteristics.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

difference in effects between subgroups that is due to competency differences is 0.32 or 0.94, depending on which formula is used.

In addition to the absolute differences in competency effects described above, we also see a pattern where the effect of math test score relative to nonacademic competencies is greater for students with lower educational aspirations. Among students who aspire to more than a bachelor's degree, the average effect of math test scores is statistically insignificant for enrollment, completion of any degree, and earnings. Math is only significant for bachelor's completion, and even then the effect of work habits is larger. Among those who aspire to less than a bachelor's degree, however, the effect of math is statistically significant for enrollment, completion of a bachelor's degree, and earnings. Furthermore, the average effect of math is higher than any other competency in each of those three cases. The consistency of this pattern suggests that improving academic ability is relatively more important for students with low educational aspirations.

3. Variation by Parents' Education

Student competencies vary considerably depending on parents' education (Table C.4). Students whose parent has at least a bachelor's degree are above average in all areas and have particularly high math test scores. Students whose parents have at most a high school degree are at the other extreme, while those whose parents have some college are near the median on all competency measures.[6]

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[6] Although there is overlap between educational aspirations and parents' education, there is variation in these subgroup definitions. Of students who aspire to less than a bachelor's degree (the lowest level of educational aspirations), 45 percent have parents who have at least some college. Of students who aspire to more than a bachelor's degree, 60 percent have parents who have less than a bachelor's degree.

TABLE C.4

MEAN COMPETENCY LEVELS, BY PARENT'S EDUCATION

	Subgroups			
Competency	All Students	High School	Some College	Bachelor's or Higher
Math	50	42	51	65
Work Habits	50	47	49	55
Sports-Related Competencies	50	47	51	54
Behavior	50	48	50	55
Leadership	49	46	50	54
Locus of Control	51	48	52	55

Source: Author's calculations using data from the NELS.

In three cases, there are differences between these groups in the effects of competencies that are statistically significant at the 10 percent level. Table C.5 shows differences in competency effects by parents' education. The three differences that are statistically significant all involve postsecondary enrollment, are all differences between students whose parents have at most a high school degree and those whose parents have at least a bachelor's degree, and are all statistically significant at the 5 percent level. Specifically, the competencies with different effects between subgroups are work habits, locus of control, and math test score.

Using the Oaxaca-style decomposition described above, we calculated the proportion of these differences in effects that are due to different competency levels between subgroups. For work habits, the proportion of the difference between subgroups that is due to competencies is 0.05 or 0.46, depending on which formula is used to calculate the proportion. For locus of control, the proportion is either 0.15 or 0.22. For math test scores, the proportion is either 0.73 or 0.65.

TABLE C.5

MEAN MARGINAL EFFECT OF A 10 PERCENTILE POINT INCREASE IN EACH COMPETENCY, BY PARENT'S EDUCATION

	Outcome			
Competencies	Enroll in Any Postsecondary Education Program	Complete Any Postsecondary Education Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Students Whose Parents Have a High School Degree				
Math Test Score	0.026**	0.025**	0.043**	0.039**
Work Habits Composite	0.019**	0.019**	0.027**	0.002
Sports-Related Competencies	0.004	0.003	0.001	0.016
Prosocial Behavior Composite	0.012	0.002	0.005	–0.016
Leadership Roles	0.005	0.005	0.014	0.014
Locus of Control	0.017**	0.013	0.011	0.019**
Sample Size	**3,498**	**2,628**	**2,628**	**2,092**
Students Whose Parents Have Some College				
Math Test Score	0.012**	0.013	0.040**	0.028**
Work Habits Composite	0.007	0.032**	0.027**	0.004
Sports-Related Competencies	0.002	0.020**	0.024**	0.015
Prosocial Behavior Composite	–0.004	–0.001	0.014	–0.016
Leadership Roles	–0.003	0.005	0.007	0.021*
Locus of Control	0.006	0.004	0.003	0.018*
Sample Size	**3,810**	**3,327**	**3,327**	**2,169**
Students Whose Parents Have a Bachelor's Degree or Higher				
Math Test Score	0.009**	0.020*	0.030**	0.020
Work Habits Composite	0.001	0.020*	0.032**	0.010
Sports-Related Competencies	0.007**	0.016**	0.016**	0.042**
Prosocial Behavior Composite	0.003	0.002	0.001	–0.009
Leadership Roles	–0.007	0.001	0.015	0.009
Locus of Control	0.003	0.002	–0.004	0.033**
Sample Size	**2,140**	**2,094**	**2,094**	**1,134**

Source: Author's calculations using data from the NELS.

Note: The mean marginal effects presented in this table are regression adjusted for student, household, and school characteristics.

*Significantly different from zero at the .10 level, two-tailed test.
**Significantly different from zero at the .05 level, two-tailed test.

4. Consistency of Subgroup Findings with Nonlinearities and Complementarities

As discussed above, students with higher aspirations and better-educated parents tend to have higher competency levels, while students with lower aspirations and less-educated parents have lower competency levels. We also observe some statistically significant differences in the average effects of competencies between subgroups. Those differences appear to be consistent with the relationships identified in Chapter IV. Specifically,

1. We find that the average effect of work habits on enrollment is higher for students who aspire to less than a bachelor's degree than for students who aspire to more than a bachelor's. This is consistent with the interaction between math test score and work habits observed in Figure D.5, because math test score is positively related to educational aspirations.

2. We find that the average effect of locus of control on enrollment is higher for students who aspire to less than a bachelor's degree than for students who aspire to a bachelor's. This is consistent with the diminishing returns to locus of control observed in Figure D.1, because locus of control is positively related to educational aspirations.

3. We find that the average effect of math test scores on enrollment is higher for students who aspire to less than a bachelor's degree than for students who aspire to more than a bachelor's. This is consistent with the diminishing returns to math test score observed in Figure D.1, because math test score is positively related to educational aspirations.

4. We find that the average effect of work habits on bachelor's completion is higher for students who aspire to more than a bachelor's degree than for students who aspire to less than a bachelor's degree. This is consistent with the complementarity between work habits and math test scores observed in Figure D.13, because math test score is positively related to educational aspirations.

5. We find that the average effect of work habits on enrollment is higher for students whose parent has at most a high school degree than for students whose parent has at least a bachelor's. This is consistent with the interaction between math test score and work habits observed in Figure D.5, because math test score is positively related to parents' education.

6. We find that the effect of locus of control on enrollment is higher for students whose parent has at most a high school degree than for students whose parent has at least a bachelor's. This is consistent with the diminishing returns to locus of control observed in Figure D.1, because locus of control is positively related to parents' education.

7. We find that the effect of math test scores on enrollment is higher for students whose parent has at most a high school degree than for students whose parent has at least a bachelor's. This is consistent with the diminishing returns to math test score observed in Figure D.1, because math test score is positively related to educational aspirations.

As the above list indicates, every statistically significant subgroup difference in the effects of competencies is consistent with one of the nonlinear or interactive relationships observed in Chapter IV. Furthermore, the findings for the two subgroups (aspirations and parents' education) are also generally consistent. We believe these consistent patterns provide strong suggestive evidence that our more flexible functional form provides a significantly better fit to the data than a simple linear model. This is confirmed by the statistical test comparing the one-size-fits-all approach to the individualized approach in Chapter IV.

E. EFFECT OF REMOVING INDIVIDUAL SPORTS FROM SPORTS COMPOSITE

The effect of sports participation is more difficult to interpret than the other competency measures, because it is not clear which competencies are represented by participating in sports. We have speculated that sports participation might reflect teamwork skills. One way to investigate this hypothesis would be to split the sports composite into a measure of team sports and a measure of individual sports, to see if the two types of sports have different effects.

However, only three of the variables that make up the sports composite are clearly measures of individual sports. The remaining are either team sports or are broad measures that include both types. Therefore, the data do not support a convincing investigation of this hypothesis. Nevertheless, we did calculate the effect of the sports measure with the individual sports variables removed. We found no significant difference between that effect and the effect of the overall measure (Table C.6).

TABLE C.6

MEAN MARGINAL EFFECT OF A 10 PERCENTILE POINT INCREASE IN EACH COMPETENCY, FOR TWO CONSTRUCTIONS OF THE SPORTS PARTICIPATION VARIABLE

	Outcome			
Competencies	Enroll in Any Postsecondary Education Program	Complete Any Postsecondary Education Program	Complete a Bachelor's Degree	Log of 1999 Earnings
Sports Composite Includes Both Team and Individual Sports				
Math Test Score	0.015**	0.017**	0.037**	0.029**
Work Habits Composite	0.011**	0.024**	0.029**	0.004
Sports-Related Competencies	0.005	0.012**	0.015**	0.018**
Prosocial Behavior Composite	0.003	0.003	0.007	–0.011
Leadership Roles	0.001	0.002	0.008	0.017**
Locus of Control	0.010**	0.008	0.002	0.024**
Sports Composite Includes Only Team Sports				
Math Test Score	0.016**	0.016**	0.037**	0.027**
Work Habits Composite	0.010**	0.025**	0.029**	0.002
Sports-Related Competencies	0.003	0.010**	0.014**	0.014*
Prosocial Behavior Composite	0.003	0.002	0.004	–0.003
Leadership Roles	0.002	–0.003	0.005	0.016*
Locus of Control	0.009**	0.007	0.004	0.023**

Source: Author's calculations using data from the NELS.

Note: The mean marginal effects presented in this table are regression adjusted for student, household, and school characteristics. The top pane calculates effects using the same sports participation composite as in Table II.2. The bottom pane only includes team sports.

There are 9,977 high school graduates who are included in the "enroll in any postsecondary program" regression. The 8,506 students who did enroll in any program were included in the "complete any postsecondary program" and "complete a bachelor's degree" regressions. The 5,645 respondents who were employed full-time and not enrolled in any education program were included in the "log of 1999 earnings" regression.

*Significantly different from zero at the .10 level, two-tailed [or one-tailed] test.
**Significantly different from zero at the .05 level, two-tailed [or one-tailed] test.

F. VARYING ASSUMPTIONS REGARDING THE EFFECT OF POSTSECONDARY EDUCATION ON EARNINGS

Due to the select nature of the respondents included in our earnings regressions, our estimates of the "full effect" of competencies on earnings could be biased. The full effect of competencies on earnings (which is the effect reported in all tables and figures in this report) includes both the direct effect of competencies on earnings and the indirect effect through postsecondary education. The indirect effect through postsecondary education is based on the effect of competencies on postsecondary education and the effect of postsecondary education on earnings.

Specifically, the effect of postsecondary education on earnings may be understated, for two reasons. First, students in this sample who did not attend any postsecondary education have more experience in the labor market than students who did not, meaning that the effect of postsecondary education on earnings is negatively biased. This cannot be directly accounted for in the regression model, because years of postsecondary education and years of experience are nearly collinear. Second, this sample excludes graduate students, who may receive a larger return to postsecondary education. The implication of this bias is that when finding the "full effect" of competencies on earnings, we may understate the effect of competencies that have a strong effect on postsecondary education because we are understating the effect of postsecondary education on earnings.

To explore the sensitivity of our earnings findings to this issue, we estimated a regression in which we imposed an assumption regarding the effect of postsecondary education on earnings. Specifically, we assumed that the effect of enrolling in any postsecondary education on earnings is 10 percent, that the effect of completing any degree is 10 percent, and that the effect of completing a bachelor's degree is 20 percent (thus, the cumulative effect of completing a bachelor's degree is 40 percent).

Table C.7 presents findings from these regressions. Effects of competencies are presented both in terms of average effects (the first two columns) and the proportion of students for whom each competency is most effective (last two columns). The effects of competencies corresponding to different assumptions regarding the effect of postsecondary education on earnings are presented in the "High Effect of Postsecondary Education" column and the "Low Effect of Postsecondary Education" column. The "Low Effect" column presents results based on

TABLE C.7

SENSITIVITY OF THE RELATIONSHIP BETWEEN COMPETENCIES AND EARNINGS WITH RESPECT TO ASSUMPTIONS REGARDING THE EFFECT OF POSTSECONDARY EDUCATION ON EARNINGS

	Average Effect of Each Competency on the Log of 1999 Earnings		Proportion of Students for Whom Each Competency Is Most Predictive of the Log of 1999 Earnings	
Competencies	Low Effect of Postsecondary Education Program	High Effect of Postsecondary Education Program	Low Effect of Postsecondary Education Program	High Effect of Postsecondary Education Program
Math Test Score	0.029**	0.035**	0.33	0.42
Work Habits Composite	0.004	0.010	0.02	0.04
Sports-Related Competencies	0.018**	0.021**	0.20	0.18
Prosocial Behavior Composite	–0.011	–0.009	0.02	0.02
Leadership Roles	0.017**	0.018**	0.14	0.10
Locus of Control	0.024**	0.027**	0.30	0.23

Source: Author's calculations using data from the NELS.

Note: The 5,645 respondents who were employed full-time and not enrolled in any education program were included in the "log of 1999 earnings" regression.

*Significantly different from zero at the .10 level, two-tailed [or one-tailed] test.
**Significantly different from zero at the .05 level, two-tailed [or one-tailed] test.

the estimates of the relationship between Postsecondary Education and earnings found using our data (3 percent, 0 percent, and 14 percent for enrollment, completion, and bachelor's completion, respectively). The "High Effect" column uses the assumptions from the previous paragraph.

Although the relative effect of math on earnings is noticeably greater under the "High Effect" assumption, a majority of students would still benefit more from improving a nonacademic competency than from improving math test score. Furthermore, we tested the "individualized plan" versus "one size fits all" hypothesis using the same approach as in Table IV.3, but under the "High Effect" assumption. We found that the effect of the one size fits all plan to be 6.5 percent, that the effect of the individualized plan tis10 percent, and that the difference between them is statistically significant at the 5 percent level. Thus, our main findings for earnings are robust to varying assumptions regarding the effect of postsecondary education on earnings.

APPENDIX D

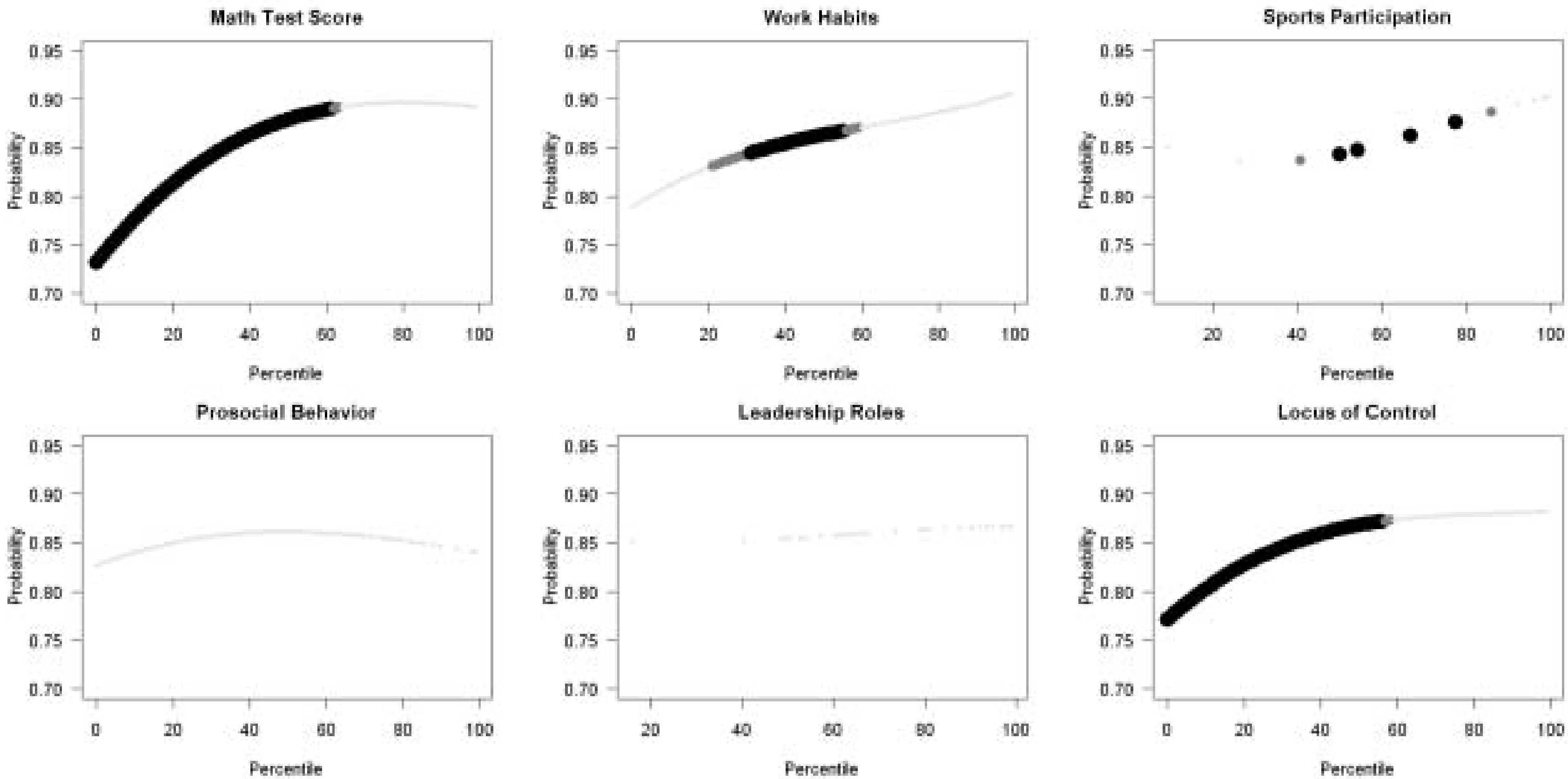
FIGURES SHOWING COMPETENCY EFFECTS

Figures D.1—D.4 show the relationship between each outcome and each competency, while Figures D.5—D.17 highlight specific relationships between competencies and their effects on outcomes. In Figures D.1—D.4, each point in each plot is the mean predicted outcome conditional on a given value of the competency of interest. For example, in Figure D.1, the first plot shows the relationship between the probability of enrolling in a postsecondary program and math test score. At a given point in this plot—for example, the 20th percentile of math test score—a predicted probability is calculated for every student in the data using their actual values of all other variables (both competencies and control variables) but setting the percentile of math test score equal to 20. The mean of all of these predicted outcomes is then calculated and plotted. Thus, we predict that, if everyone in our sample were at the 20th percentile of math test score but retained all of their other characteristics, then just over 80 percent of students would enroll in some postsecondary program. If everyone in our sample were at the 60th percentile of math test score, we predict that nearly 90 percent of students would enroll in a postsecondary program. The shading and size of the points in the figure indicate the statistical significance of the marginal effect of the competency at each point. Large black points indicate that the marginal effect is statistically significant at the 5 percent level. Medium-sized gray points indicate significance at the 10 percent level. Small light gray points indicate that the marginal effect is not statistically significant.

In Figures D.5—D.17, we examine interactions between competencies using three plots and a table. The three plots show the relationship between an outcome and a variable *X*, given three different values of another variable *Y*. For example, in Figure D.5, we show the relationship between enrolling in a postsecondary program and work habits, holding math test score constant at the 25th, 50th, and 75th percentile. Each point in each plot is the mean predicted outcome conditional on a given value of work habits and a given value of math test score. For example, at a given point in the first plot in Figure D.5, such as the 50th percentile of work habits, a predicted probability is calculated for every student in the data using their actual values of all variables except math test score (which is held constant at the 25th percentile) and work habits (which, in this example, is held constant at the 50th percentile). The mean of all of these predicted outcomes is then calculated and plotted. Thus, we predict that if everyone in our sample were at the 25th percentile of math test score, and were at the 50th percentile of work habits, but retained all of their other characteristics, then about 85 percent of students would enroll in some postsecondary program. The table at the bottom of the figure indicates the mean marginal effects for each contiguous group of points sharing the same statistical significance (as indicated by the size and shading of the points). For example, in the first pane of Figure D.5, all points in the range 0 to 13 have a marginal effect that is positive and significant at the 10 percent level.

FIGURE D.1

PLOTS OF THE PROBABILITY OF EVER ENROLLING IN A POSTSECONDARY EDUCATION PROGRAM VERSUS EACH OF SIX COMPETENCIES

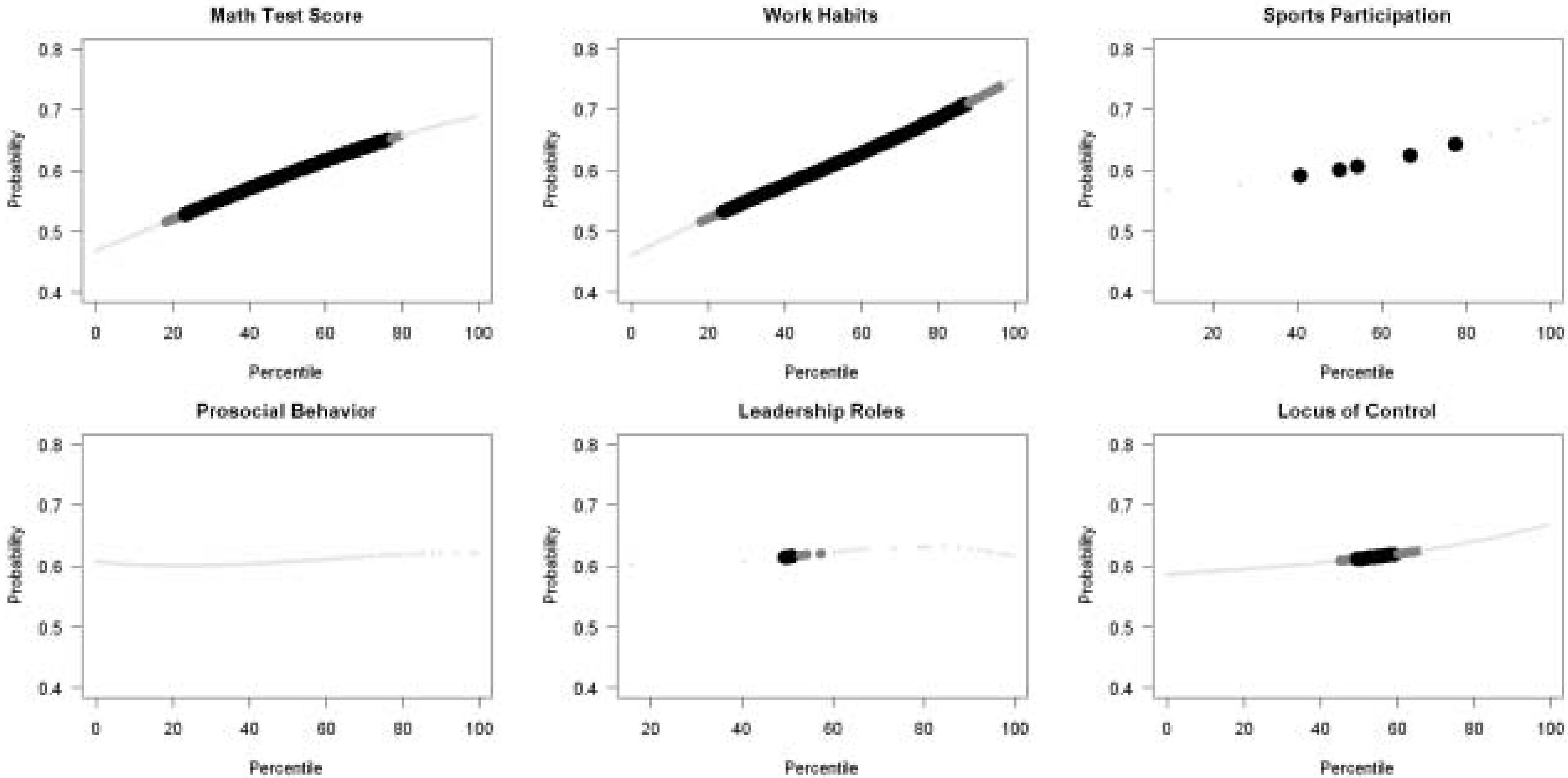


Source: Author's calculations using data from NELS.

Note: Each of the six plots corresponds to each of the six student competencies analyzed in this study. The vertical axis in each plot indicates the probability that a student enrolls in any postsecondary education program. The horizontal axis indicates the percentile of each competency. The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant.

FIGURE D.2

PLOTS OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS EACH OF SIX COMPETENCIES

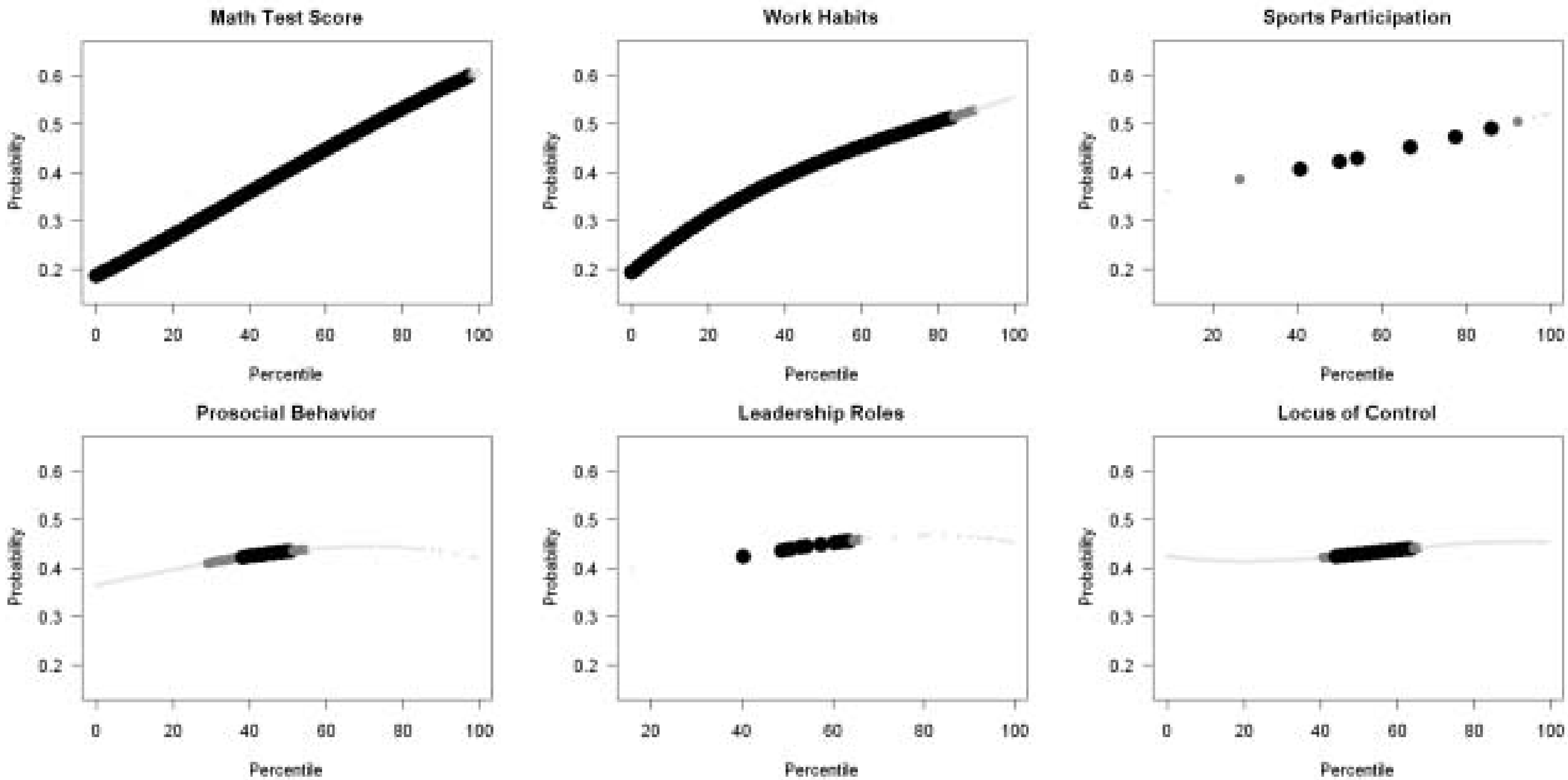


Source: Author's calculations using data from NELS.

Note: Each of the six plots corresponds to each of the six student competencies analyzed in this study. The vertical axis in each plot indicates the probability that a student completes a postsecondary education program. The horizontal axis indicates the percentile of each competency. The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant.

FIGURE D.3

PLOTS OF THE PROBABILITY OF COMPLETING A BACHELOR’S DEGREE VERSUS EACH OF SIX COMPETENCIES

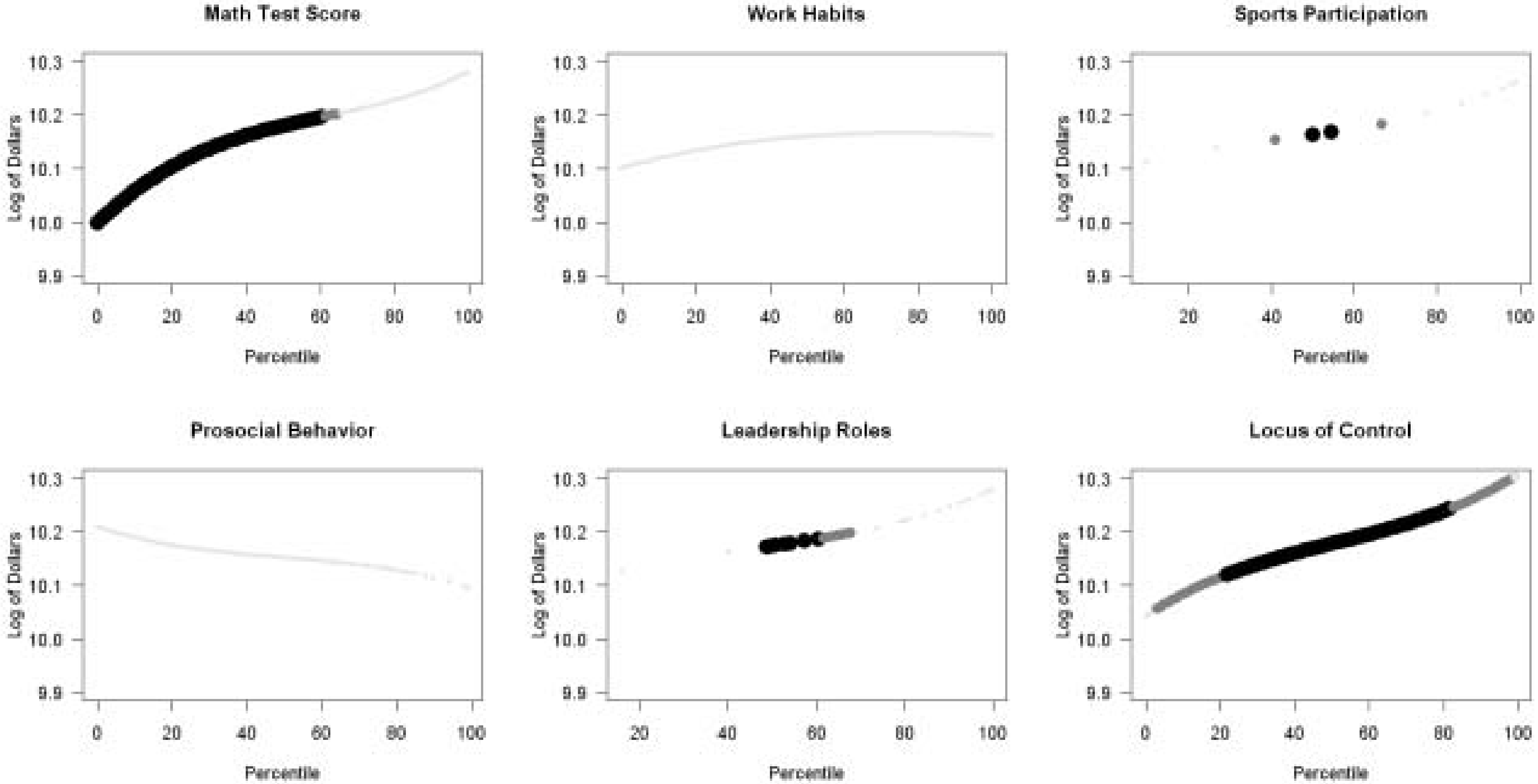


Source: Author’s calculations using data from NELS.

Note: Each of the six plots corresponds to each of the six student competencies analyzed in this study. The vertical axis in each plot indicates the probability that a student completes a bachelor’s degree. The horizontal axis indicates the percentile of each competency. The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant.

FIGURE D.4

PLOTS OF THE LOG OF 1999 EARNINGS VERSUS EACH OF SIX COMPETENCIES

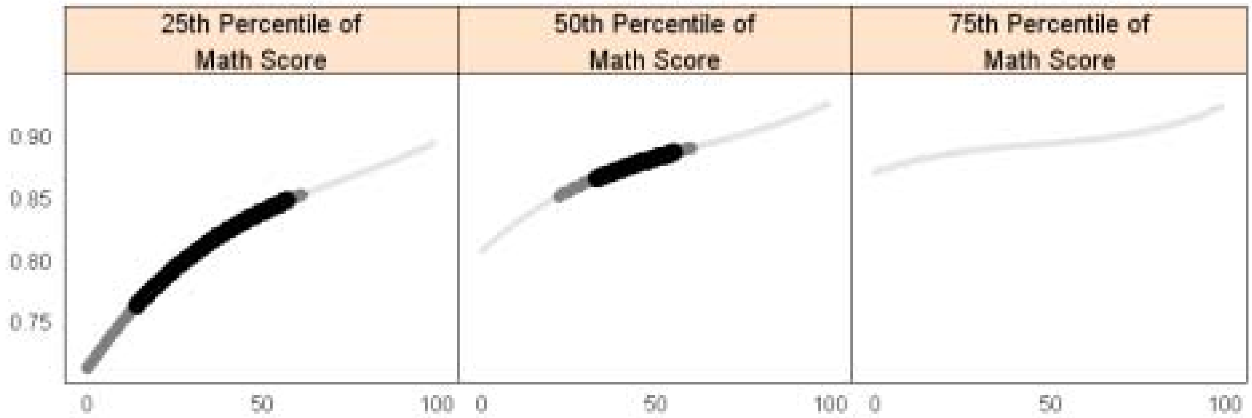


Source: Author’s calculations using data from NELS.

Note: Each of the six plots corresponds to each of the six student competencies analyzed in this study. The vertical axis in each plot indicates the log of 1999 earnings. The horizontal axis indicates the percentile of each competency. The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant.

FIGURE D.5

PLOT OF THE PROBABILITY OF ENROLLING IN A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE WORK HABITS, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	13	0.036	0	21	0.020	0	99	0.005
14	57	0.020	22	32	0.013			
58	61	0.012	33	55	0.009			
62	99	0.011	56	60	0.008			
			61	99	0.009			

Source: Author's calculations using data from NELS.

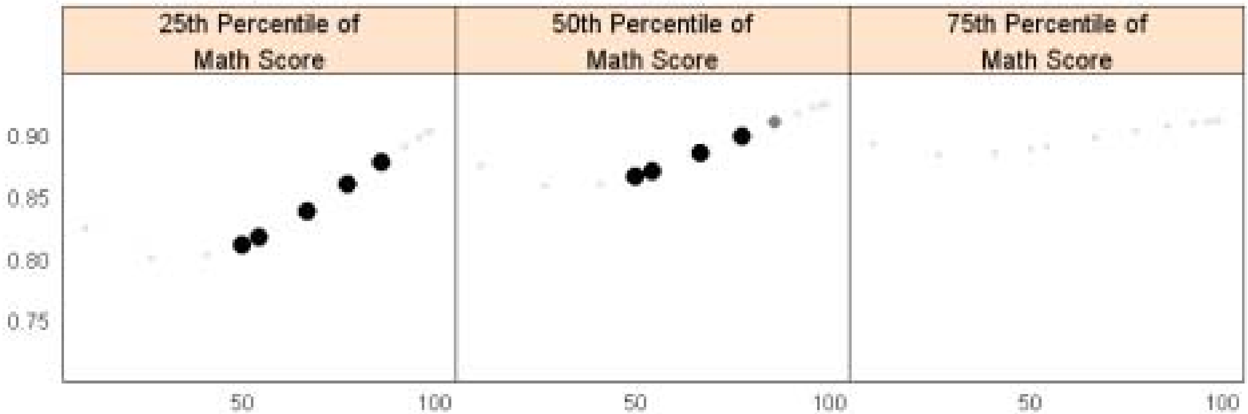
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 0 to 13 have a marginal effect that is positive and significant at the 10 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.6

PLOT OF THE PROBABILITY OF ENROLLING IN A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE SPORTS PARTICIPATION, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Sports Participation

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
10	41	–0.007	10	41	–0.005	9.5	99	0.002
50	86	0.018	50	77	0.011			
92	99	0.019	86	86	0.013			
			92	99	0.010			

Source: Author's calculations using data from NELS.

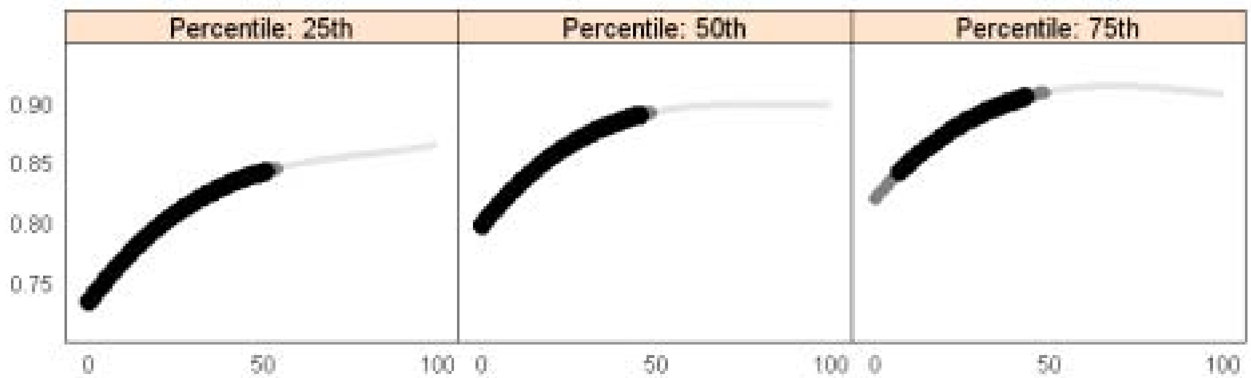
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 50 to 86 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.7

PLOT OF THE PROBABILITY OF ENROLLING IN A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE LOCUS OF CONTROL, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Locus of Control

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	51	0.021	0	45	0.020	0	6	0.031
52	54	0.007	46	48	0.006	7	43	0.017
55	99	0.004	49	99	0.001	44	48	0.007
						49	99	–0.001

Source: Author's calculations using data from NELS.

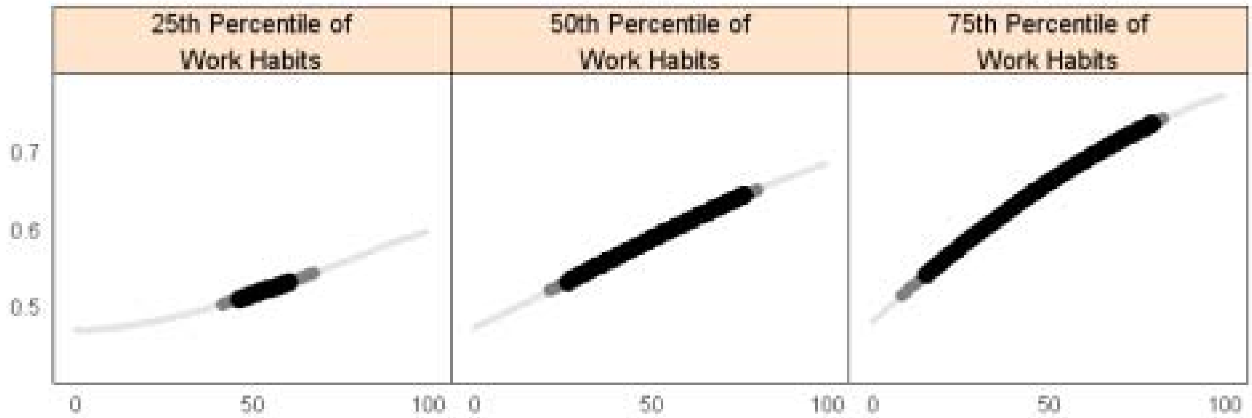
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 0 to 51 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.8

PLOT OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE MATH SCORE, HOLDING WORK HABITS CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Math Score

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	40	0.009	0	20	0.022	0	7	0.041
41	45	0.014	21	25	0.023	8	14	0.039
46	60	0.016	26	76	0.022	15	79	0.030
61	67	0.017	77	80	0.019	80	82	0.021
68	99	0.017	81	99	0.017	83	99	0.017

Source: Author's calculations using data from NELS.

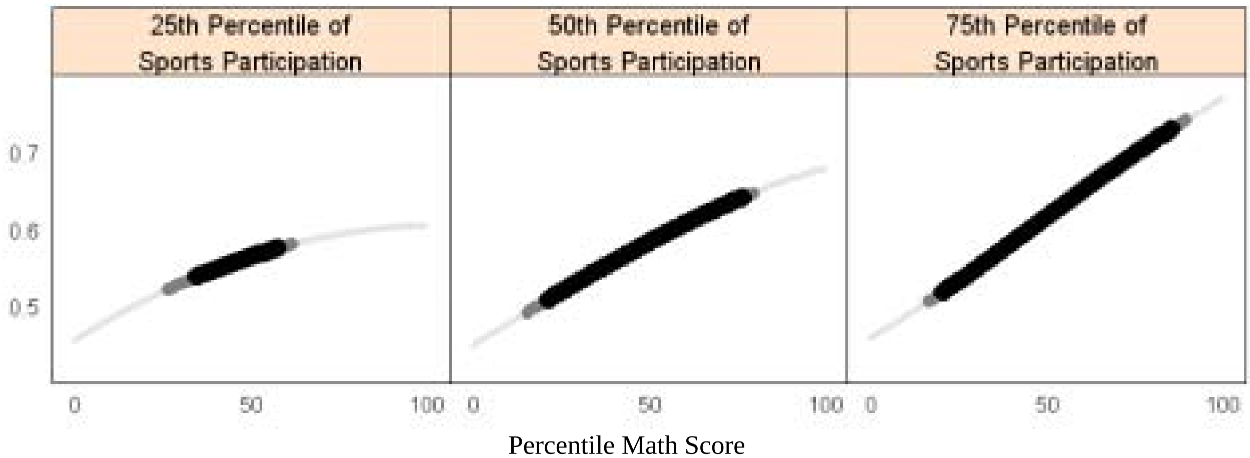
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 46 to 60 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.9

PLOT OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE MATH SCORE, HOLDING SPORTS PARTICIPATION CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	25	0.025	0	14	0.028	0	15	0.028
26	33	0.020	15	20	0.028	16	19	0.031
34	57	0.016	21	76	0.024	20	85	0.033
58	61	0.012	77	79	0.019	86	89	0.029
62	99	0.006	80	99	0.016	90	99	0.026

Source: Author's calculations using data from NELS.

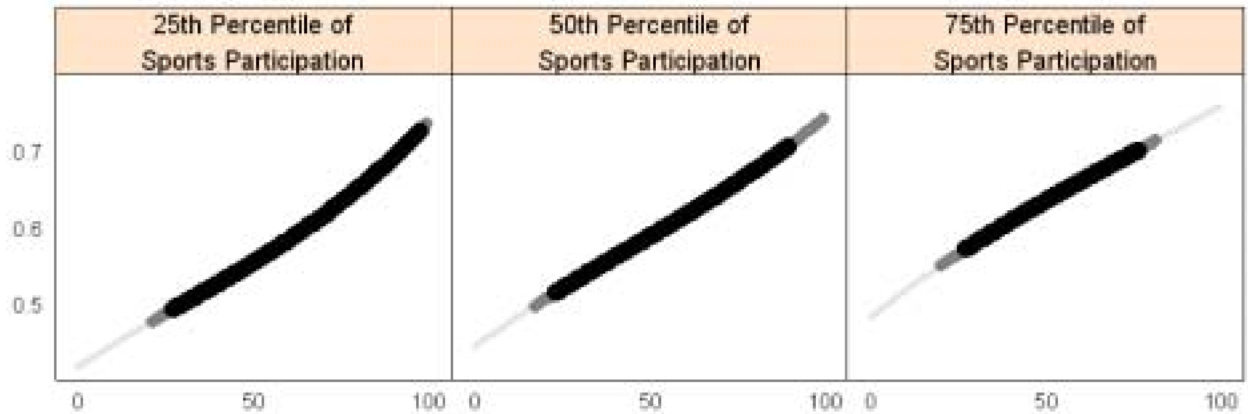
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 34 to 57 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.10

PLOT OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE WORK HABITS, HOLDING SPORTS PARTICIPATION CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	20	0.028	0	16	0.031	0	19	0.034
21	26	0.027	17	22	0.029	20	26	0.030
27	97	0.033	23	89	0.029	27	76	0.026
98	99	0.049	90	99	0.037	77	81	0.025
						82	99	0.025

Source: Author's calculations using data from NELS.

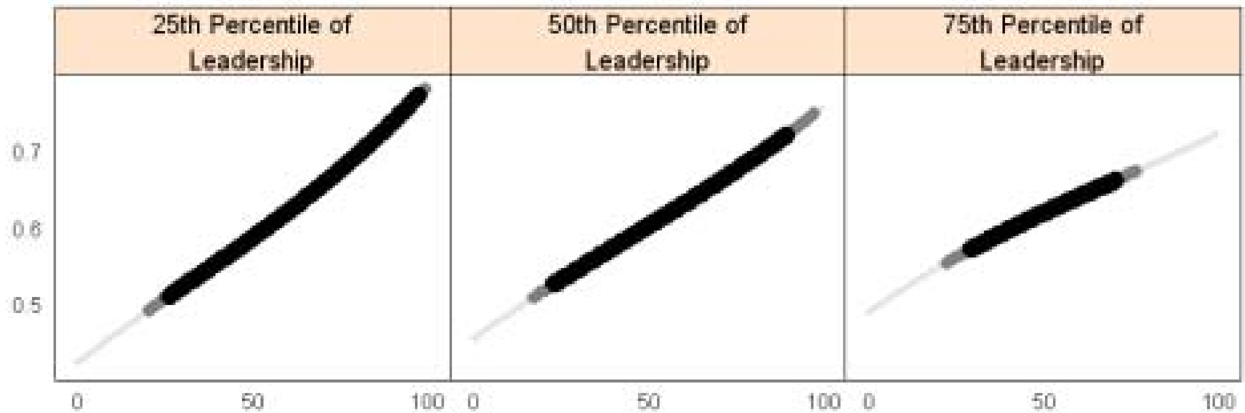
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 27 to 97 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.11

PLOT OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE WORK HABITS, HOLDING LEADERSHIP CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	19	0.033	0	16	0.032	0	21	0.029
20	25	0.032	17	22	0.030	22	28	0.025
26	97	0.037	23	89	0.030	29	70	0.022
98	99	0.049	90	97	0.035	71	76	0.020
			98	99	0.037	77	99	0.021

Source: Author's calculations using data from NELS.

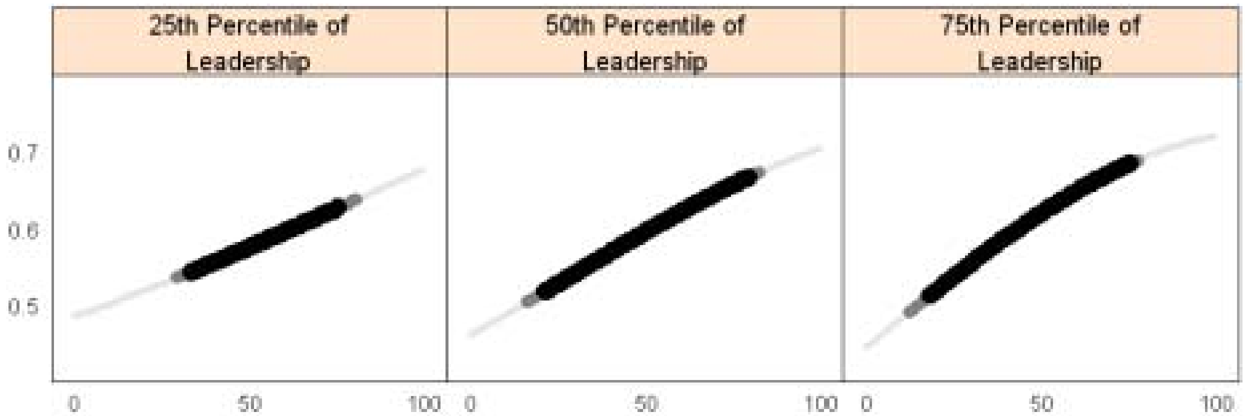
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 26 to 97 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.12

PLOT OF THE PROBABILITY OF COMPLETING A POSTSECONDARY EDUCATION PROGRAM VERSUS PERCENTILE MATH SCORE, HOLDING LEADERSHIP CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	28	0.017	0	15	0.026	0	11	0.037
29	32	0.019	16	20	0.027	12	17	0.037
33	75	0.020	21	79	0.026	18	75	0.030
76	80	0.021	80	82	0.021	76	77	0.020
81	99	0.021	83	99	0.018	78	99	0.013

Source: Author's calculations using data from NELS.

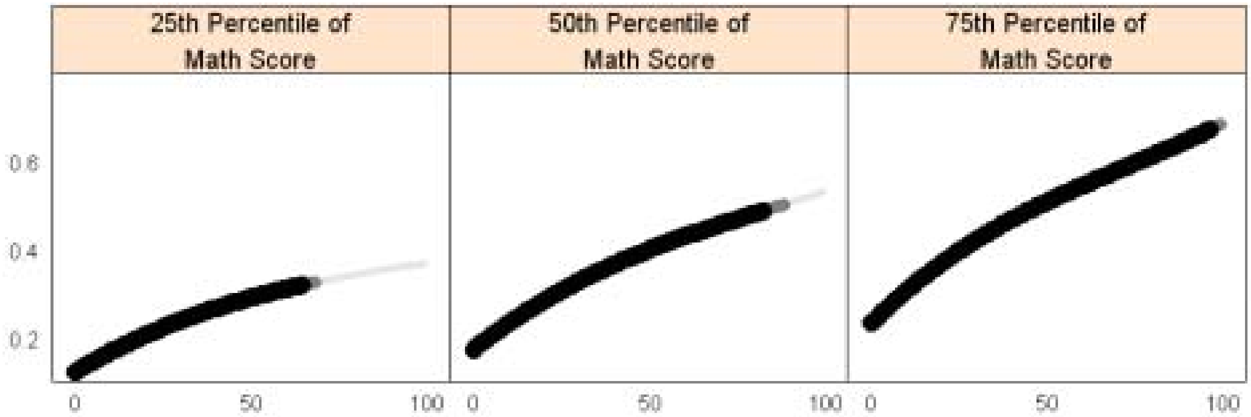
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 23 to 75 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.13

PLOT OF THE PROBABILITY OF COMPLETING A BACHELOR'S DEGREE VERSUS PERCENTILE WORK HABITS, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Work Habits

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	64	0.030	0	82	0.038	0	96	0.046
65	68	0.017	83	88	0.025	97	99	0.040
69	99	0.014	89	99	0.026			

Source: Author's calculations using data from NELS.

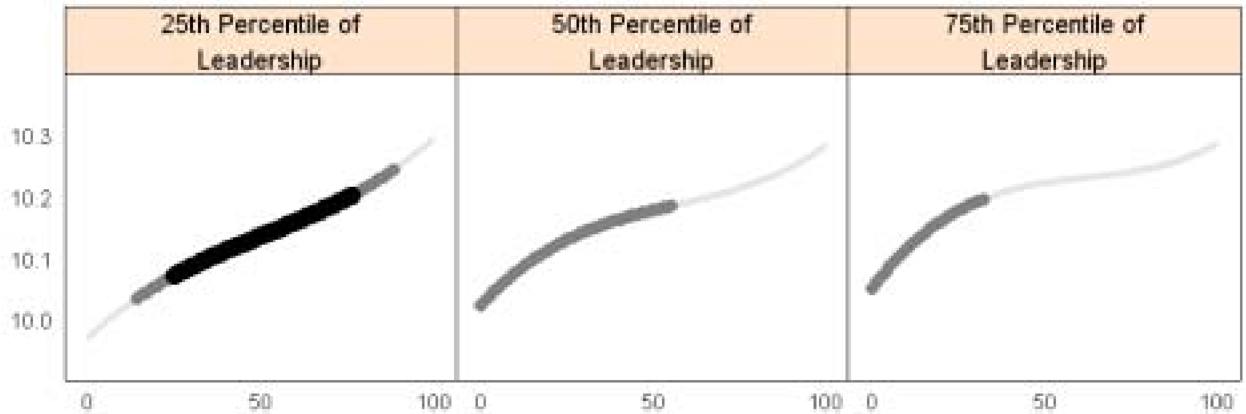
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 0 to 64 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.14

PLOT OF THE LOG OF 1999 EARNINGS VERSUS PERCENTILE MATH SCORE, HOLDING LEADERSHIP CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	13	0.045	0	55	0.029	0	32	0.045
14	24	0.034	56	99	0.022	33	99	0.013
25	76	0.026						
77	88	0.035						
89	99	0.045						

Source: Author's calculations using data from NELS.

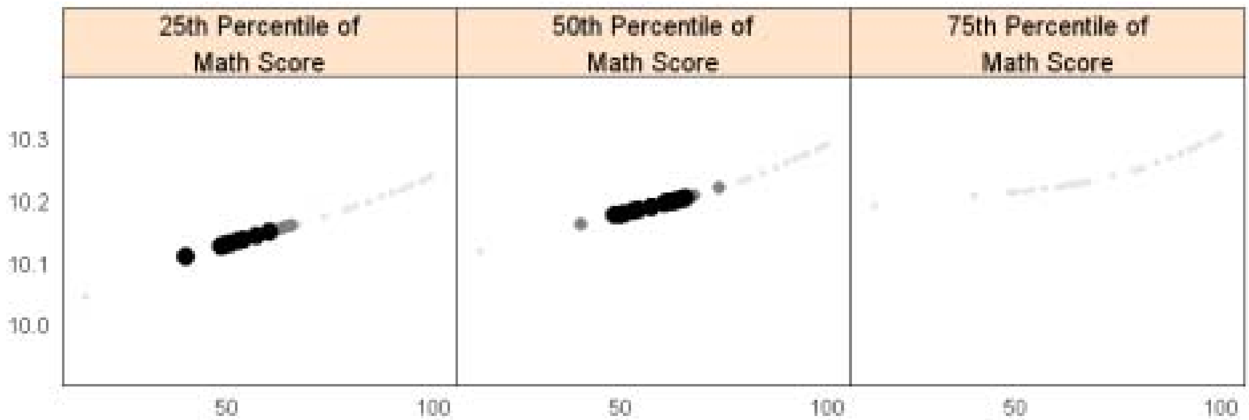
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 25 to 76 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.15

PLOT OF THE LOG OF 1999 EARNINGS VERSUS PERCENTILE LEADERSHIP, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Leadership

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
16	16	0.033	16	16	0.022	16	99	0.018
40	60	0.020	40	40	0.016			
62	66	0.019	49	66	0.017			
67	99	0.025	67	74	0.020			
			79	99	0.029			

Source: Author's calculations using data from NELS.

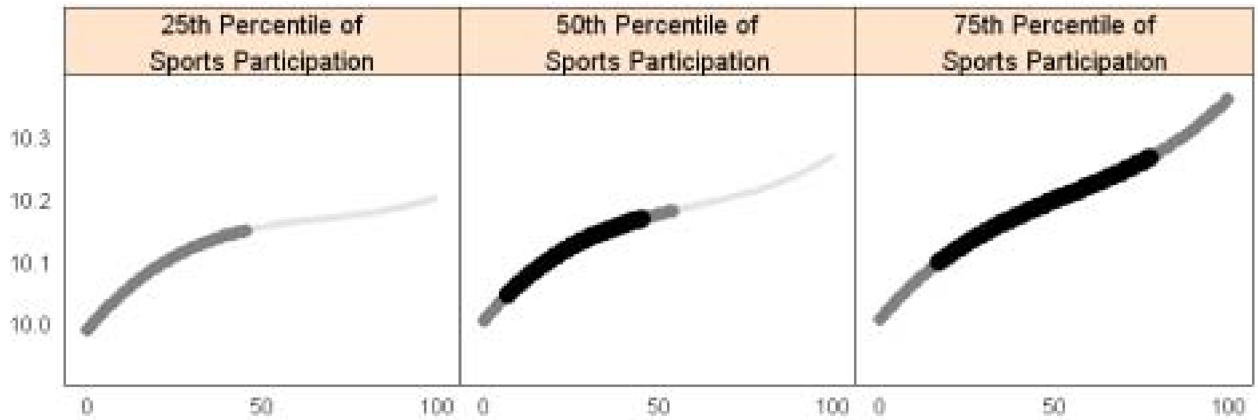
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 40 to 60 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.16

PLOT OF THE LOG OF 1999 EARNINGS VERSUS PERCENTILE MATH SCORE, HOLDING SPORTS PARTICIPATION CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Math Score

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
0	45	0.035	0	6	0.061	0	16	0.054
46	99	0.010	7	45	0.031	17	77	0.028
			46	54	0.014	78	99	0.043
			55	99	0.020			

Source: Author's calculations using data from NELS.

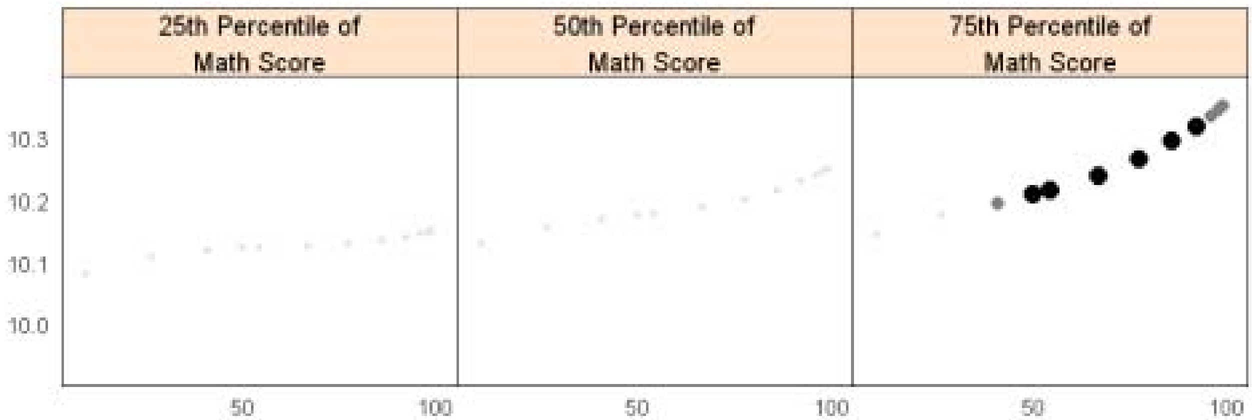
Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the first pane of the figure, all points in the range 0 to 45 have a marginal effect that is positive and significant at the 10 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.

FIGURE D.17

PLOT OF THE LOG OF 1999 EARNINGS VERSUS PERCENTILE SPORTS PARTICIPATION, HOLDING MATH SCORE CONSTANT AT THE 25th, 50th, AND 75th PERCENTILES



Percentile Sports Participation

MEAN MARGINAL EFFECTS FOR RANGES WITH SAME SIGN/SIGNIFICANCE IN FIGURE ABOVE

25th Percentile			50th Percentile			75th Percentile		
Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]	Range Min	Range Max	Mean Marginal Effect[a]
10	99	0.009	10	99	0.019	10	26	0.017
						41	41	0.014
						50	92	0.028
						96	99	0.050

Source: Author's calculations using data from NELS.

Note: The statistical significance of the marginal effect at each point is denoted by the size and shading of the point. Large black points indicate a marginal effect that is statistically significant at the 5 percent level. Medium-sized dark gray points indicate significance at the 10 percent level. Light gray small points indicate a marginal effect that is not statistically significant. The table above indicates the mean marginal effect and statistical significance for ranges of points of the same size and shading. For example, in the third pane of the figure, all points in the range 50 to 92 have a marginal effect that is positive and significant at the 5 percent level.

[a]The mean marginal effect of a 10 percentile point increase.

*Significantly different from zero at the .10 level.
**Significantly different from zero at the .05 level.