

**MIDDLE AND HIGH SCHOOL SKILLS, BEHAVIORS, ATTITUDES, CURRICULUM  
PLACEMENT AND THEIR CONSEQUENCES**

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## Introduction

The path to a level of educational attainment adequate for middle class employment and earnings has never been as long as it is in the U. S. today. Successful completion of kindergarten followed by five years of elementary school, three years of middle school, and four years of high school are essential, as is completion of at least some post-secondary schooling, preferably a four-year college degree. Further, many college educated adults now attain post-baccalaureate training and degrees that qualify them for positions in our increasingly differentiated and professionalized occupational structure. Within this stratification system, failure at K-12 tends to predict occupational and earnings placement below a middle-class level. This is often accompanied by higher rates of unemployment and involvement with the criminal justice system, lower marriage rates, greater health problems, and decreased longevity over the life course.

Thus, at least some success at K-12 is needed for later life success. But what are the determinants of K-12 success? In particular, what processes and mechanisms determine the evolution of schooling careers as students develop from elementary through middle and high school, and possibly on to post-secondary education? Much research has been undertaken on these topics, but this research tends to be fragmented across disciplinary lines. Economists have emphasized cognitive skills, measured by test scores, as both determinants and consequences of schooling success. In this model of human capital formation, skill begets skill as teachers assist students to “invest in their human capital.” More recently, economists have added learning-related skills and behaviors, including attention, organization, and effort, to the variables they focus on. The prior paper, by Duncan and Magnuson, is an example. Sociologists and psychologists also study test score data and learning-related skills and

behaviors, but they tend to further expand the list of variables to include social-psychological attitudes and student placement into school structures such as curriculum tracks, as determinants of success. In particular, sociologists and some psychologists have a long history of including attitude scales measuring students' self-esteem, sense of personal control over life outcomes, and educational expectations as determinants of educational and occupational attainment. In addition, sociologists have given much attention to students' placement into school structures, particularly ability groupings and academic and non-academic curriculum tracks, as determinants of schooling outcomes. These variables are likely to be particularly important for understanding educational outcomes in middle and high school, since teenagers act to attain goals within a world of intense social interaction involving peers, parents, and teachers.

Yet it is rare for these disparate research traditions to be combined in a single study, where the relative magnitudes of the effects of different sets of variables can be assessed. Doing so is the goal of this study. Using data from the National Educational Longitudinal Study (NELS), I examine disparities in school success that already exist in middle school (8<sup>th</sup> grade), and how these evolve during high school, and lead to disparate attainment of post-secondary education and earnings by age 26. The child's background is measured by gender, race/ethnicity, and socio-economic status (SES). Cognitive performance in eighth grade is measured as an average of standardized test scores in English, Math, History and Science. Learning-related behaviors in 8<sup>th</sup> grade are measured by the average reports from two teachers on the student's absenteeism, tardiness, inattentiveness, and disruptive behaviors. Course grades (grade point average -- GPA) are also measured in 8<sup>th</sup> grade. These are the primary mechanism by which teachers provide performance feedback to students and parents, and should

therefore be associated with the student's attitudes and expectations. Attitudes in 8<sup>th</sup> grade are measured by standardized scales of self-esteem and locus of control (sense of personal control over life outcomes).

The student's placement into the academic or non-academic curriculum track is measured in 10<sup>th</sup> grade. A standardized scale of the student's expectations for how many years of schooling he or she will attain is also measured in 10<sup>th</sup> grade. Twelfth grade outcomes are whether the student ever dropped out of school, was ever arrested, and the student's grade point average. Outcomes measured at age 26 are whether or not the student had obtained a post-secondary degree, and weekly earnings.

### **Background**

With their focus on standardized test scores as measures of the skills embodied in human capital, and the notion that "skills beget skills" as a model of human capital development over time (Cunha et al., 2006), it is not surprising that economists have long estimated models in which school success in high school, college and beyond, as well as labor market success, are driven by students' prior cognitive skills measured by test scores in kindergarten, elementary, and middle school. Perhaps more surprising is that economists have added measures of student *behaviors* – those that are learning-related and attentional, as well as social, including both internalizing and externalizing behavior problems – to their models (Duncan and Dunifon 1997; Duncan et al. 2007; Heckman and Rubinstein 2001; Heckman, Stixrud, and Urzua 2006). Doing so builds on an earlier research tradition by economists and sociologists (Bowles and Gintis 1976; Jencks et al. 1979) that enriched the model of educational and labor market attainment by including measures of socialization, personality, and behavior, as well as

variation in these across different levels of family social class background. In a review of this literature for sociologists, Farkas (2003: 556-557) characterized it as “a new paradigm for understanding the microprocesses underlying stratification outcomes. Patterns of habitual behavior, particularly the extent of conscientiousness or good work habits, developed from birth through adolescence, in conjunction with the cognitive skills developed alongside these behaviors, determine school success and schooling and occupational attainment. These skills and habits then combine with skills and habits developed on the job to determine employment and earnings success.”

An attractive feature of this emerging paradigm is that, by adding learning-related behaviors to prior test scores as predictors of later test scores, the theoretical framework is expanded to begin to describe the causal mechanisms by which some students perform better at school and work because they bring strong effort and focused attention to these tasks. Yet, despite the increased richness of the resulting models, they still give little or no attention to three important aspects of student life in schools. The first of these is attitudes relating to self-concept (self-esteem and locus of control) and educational expectations. The second is school structures, particularly ability groups and curriculum tracks. The third is course grades – the primary feedback from teachers to students on the adequacy of students’ performance. The following section begins by discussing prior research on the role of learning-related behaviors in the school achievement process. This is followed by discussions of self-concept and educational expectations, curriculum track placement, and school grades.

### *Learning-Related Behaviors*

Bowles and Gintis (1976) and Jencks et al (1979) were the first researchers to prominently contrast the effects of “noncognitive traits” with those of test scores as

determinants of educational, occupational, and earnings success. (See Jencks et al, 1979, chapter five, for the use of the “noncognitive traits” label to reference a wide-ranging set of attitudinal and behavioral variables.) Bowles and Gintis reported that measures of rule orientation, dependability, and internalization predicted high school students’ grade point averages after controlling test scores. Jencks et al measured the effects of personality self-assessments, self-reported “indirect measures of personality,” and teacher-reported student character traits on achievement. The personality self-assessments included sociability, social sensitivity, impulsiveness, vigor, calmness, tidiness, culture, leadership, self-confidence, and mature personality. The indirect measures of personality included study habits, working so quickly that the student failed to do their best work, positive group affiliations (e.g. school newspapers, school subject-matter clubs, debating clubs), negative group affiliations (e.g. political clubs, military units), leadership roles, dating activities, reading habits, culture and hobbies, and orientation to the world of work. The teacher-rated personality traits included cooperativeness, dependability, executive ability, emotional control, industriousness, initiative, integrity, perseverance, and appearance. The authors found that a number of these variables had significant effects on achievement.

In an important theoretical paper, Swidler (1986) argued that group cultural differences may be relevant to understanding group achievement differences. But rather than thinking of culture as determining action through its effect on *values*, the ends toward which action is directed, she argued for viewing culture as a tool kit of *skills, habits, and styles*, the means by which strategies of action are constructed. Swidler (1986: 275) goes on to note “if one asked a slum youth why he did not take steps to pursue a middle-class path to success...the answer might well be not ‘I don’t

want that life,' but instead, 'Who, me?' One can hardly pursue success in a world where the accepted skills, styles, and informal know-how are unfamiliar. One does better to look for a line of action for which one already has the cultural equipment.”

Farkas et al. (1990a; see also Farkas 1996) followed up on this observation by testing the extent to which teacher-judged student work habits (homework, class participation, effort, and organization), disruptiveness, and appearance and dress, combined with basic cognitive skills measured by test scores and coursework mastery measured by a curriculum-referenced test, determine the teacher-assigned course grade in seventh and eighth grade. The authors found that basic cognitive skills and good work habits increase coursework mastery, which increases course grades. Then, after controls for basic skills and coursework mastery test scores, better student work habits are found to further increase course grades. Thus, learning-related behaviors strongly increase course grades, both indirectly via their positive effect on coursework mastery, and directly, since teachers grade directly on these behaviors, over and above the student's coursework mastery.

Rosenbaum (2001: chapter 8) went further in this research direction, estimating models in which learning-related behaviors, along with test scores, help determine course grades, and then these variables, plus grades, determine educational attainment and earnings. He too found that learning-related behaviors affect grades, and that both these behaviors and grades affect later outcomes.

Economists Duncan and colleagues (Duncan and Dunifon 1997, 1998; Dunifon, Duncan, and Brooks-Gunn 2001) and Heckman and colleagues (Heckman and Lochner 2000; Heckman and Rubinstein 2001; Cunha, Heckman, Lochner, and Masterov 2006; Cunha and Heckman 2008) also examined the relationship between family background

and learning-related behaviors and skills, and the consequences of these behaviors and skills for education and employment outcomes across the life cycle. They too found that, even after controlling test scores, these behaviors and skills play a significant role in explaining achievement differences between individuals.

### *Self-Concept and Educational Expectations*

Behaviors and skills do not arise in a vacuum. Rather, their development is motivated by the student's school-related attitudes and expectations. Human agency involves goal-setting and goal-seeking, and sociologists and psychologists have long hypothesized that these processes are strongly affected by the individual's self-concept -- feelings of self-esteem (perception of oneself as a person of worth) and sense of personal control (perception of oneself as an effective person). Among adolescents, self-esteem results from positive interactions with, and support from, parents, peers, teachers, and others (Rosenberg 1979, 1989; Rosenberg, Schooler, and Schoenbach, 1989). It is associated with low rates of depression, but its effects on educational success are uncertain (Rosenberg, Schooler, and Schoenbach, 1989; Ross and Broh 2000). Sense of control involves whether one feels able to affect outcomes by one's own actions (*internal* locus of control) or, by contrast, one feels relatively helpless in the face of outside forces (*external* locus of control). A sense of personal control is hypothesized to result from past successes, and to improve academic performance via increased effort, motivation, and persistence (Rotter 1966; Seeman 1983; Bandura 1986). This has been shown to partially explain the positive relationship between parental social class and children's school success via a mechanism in which well-educated parents help children develop the skills and habits needed for academic success, which not only directly improves achievement, but also increases the

children's sense of control, thereby further improving achievement (Mirowsky and Ross 1998; Ross and Broh 2000).

Yet empirically separating the effects of self-esteem and locus of control on school achievement can be difficult. One problem is that each may have reciprocal effects with school achievement – each variable may itself be caused by achievement, increasing the difficulty in isolating its effect *upon* achievement. A second problem is that self-esteem and locus of control are likely to be correlated, so that each must be controlled when estimating the effects of the other. Thus, reviewing findings in this area, Ross and Broh (2000) suggested that whereas Liu et al. (1992) found reciprocal effects between self-esteem and academic achievement among students in grades 7-12, their failure to simultaneously control locus of control may have led to spurious effect estimates. Ross and Broh observe that this conclusion is consistent with the finding by Mone et al. (1995) that when both self-efficacy and self-esteem are used as predictors of academic performance, only self-efficacy is found to have an effect. It is also consistent with the finding by Rosenberg, Schooler, and Schoenbach (1989) that the correlation between self-esteem and school achievement is due to an effect of achievement on self-esteem, not one in the opposite direction. Finally, Ross and Broh's (2000) own study finds that locus of control, but not self-esteem, affects school achievement.

In the present study, I follow Ross and Broh's admonition to simultaneously include both self-esteem and locus of control in the model when estimating the effects of these variables on school achievement. I also extend Ross and Broh's logic to the inclusion of other relevant variables in the model. In particular, I include a measure of

the student's expectations for her or his ultimate level of educational attainment. This variable played an important role in the "Wisconsin Model" of socioeconomic attainment.

The Wisconsin Model (Sewell et al. 1969, 1970, Sewell and Hauser 1976) aimed to add a social-psychological mechanism to the dominant model of intergenerational socioeconomic attainment (Blau and Duncan 1967). This mechanism involves the process of socialization, in which parents and peers affect the educational aspirations and expectations of students, which in turn affect student motivation and effort, and thus achievement. Indeed, studies have repeatedly found that student aspirations and expectations do indeed affect student achievement, even after many other variables are controlled. However, these studies almost never include controls for a full set of correlated variables – test scores, self-esteem, locus of control, learning-related behaviors, and curricular track placement. (Studies that include some, but not all of these correlated variables, include Rosenbaum 2001 and Downey, Ainsworth, and Qian 2009.) Such studies are unable to assess the relative importance of these variables in affecting the process of school achievement as students make the transition from middle childhood to adolescence, high school, and beyond.

### *Curriculum Track Placement*

Sociologists of education have a long-standing interest in *school structures*. Particularly important among these are student placement into ability groups and curriculum tracks. Such placement has been shown to significantly affect student effort and achievement, even after prior test scores are controlled (Gamoran and Mare 1989; Rosenbaum 2001; Hallinan 2003; Carbonaro 2005; Tach and Farkas 2006). This is not surprising, since students in lower ability groups and less academically oriented curriculum tracks often experience diminished self-esteem, sense of personal control, educational expectations,

and learning-related behaviors. Yet no prior empirical research has included these variables, alongside curriculum track placement, in a comprehensive model of educational achievement. By including all of these variables in our model, we will be able to assess their inter-relations and relative magnitudes of effect on educational outcomes.

### **Conceptual Model**

This paper builds on the previous one by Duncan and Magnuson, in which the cognitive performance, attention and behaviors of students are followed from kindergarten through elementary school, and their consequences for later outcomes are estimated. Here, we measure these outcomes in middle school, and track their consequences through to the end of high school, on to postsecondary education and into the world of work. Although school and neighborhood differences no doubt affect student test scores, behaviors, and their outcomes, these school and neighborhood effects are not the focus of this paper. Instead, we estimate models that include school fixed-effects, thereby eliminating the effects of differences between schools. The resulting “within-school estimates” reveal how student-level variables affect one another within each school.

Ideally, we would like to estimate models in which these variables are measured over time, with causally prior variables measured at an earlier time point than the outcomes they affect. However, even using panel data from the National Education Longitudinal Study (NELS), this is not always strictly possible. Instead, the NELS provides a variety of measures taken when the students were in 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grades, as well as, respectively 2 and 8 years after the 12<sup>th</sup> grade data collection. I have examined these measures, and constructed a conceptual model of the schooling

achievement process, in which a relatively complete set of 8<sup>th</sup> grade measures (test scores, learning-related behaviors, grade point average, self-esteem, and sense of personal control) are used as middle school outcomes for children with varying family backgrounds, and also as determinants of outcomes in 10<sup>th</sup> grade, 12<sup>th</sup> grade, and subsequently. The 10<sup>th</sup> grade outcomes are curriculum track placement and educational expectations, and the 12<sup>th</sup> grade outcomes are school dropout, ever arrested, and grade point average. Post high-school outcomes are whether the student had earned a post-secondary degree by age 26, as well as her or his earnings at this age.

This conceptual model is shown in Figure 1. Regarding the causal assumptions underlying this model, strictly speaking each of the 8<sup>th</sup> grade outcomes can be considered to result from, or be “caused by” the exogenous variables -- gender, race/ethnicity, and socio-economic class -- but, being measured at the same time point, none of the 8<sup>th</sup> grade variables can be considered to “cause” one another. Yet, it is useful to examine how these 8<sup>th</sup> grade variables relate to one another, which is revealed by regressing them on one another. To organize these regressions, I have structured the 8<sup>th</sup> grade variables in Figure 1 so that test scores and learning behaviors are listed first, grade point average is listed second, and self-esteem and locus of control are listed third. The logic is that, first, test scores measure cognitive skill, which develops in a strongly auto-correlated form from birth through elementary school (Duncan et al 2007). That is, cognitive skill in eighth grade is largely driven by cognitive skill at younger ages, and, after controlling such prior skill, is not strongly affected by variables such as attitudes. Second, learning-related behaviors tend to be determined very early in life, so that at most modest changes are observed as children age from kindergarten

entry to middle school (author's calculations from the Early Childhood Longitudinal Study – Kindergarten Cohort). Thus, both 8<sup>th</sup> grade test scores and learning-related behaviors are more likely to be determinants than consequences of 8<sup>th</sup> grade GPA and attitudes. Third, as shown by Farkas et al (1990a; see also Farkas 1996), course grades are largely determined by the student's test scores and learning-related behaviors. Finally, 8<sup>th</sup> grade self-esteem and locus of control are social psychological attitudes that are more fruitfully viewed as consequences of test scores, learning-related behaviors, and course grades than as determinants of these outcomes.

Figure 1 about here

Curriculum track placement and educational expectations are measured in 10<sup>th</sup> grade in the model. This is appropriate for track placement, since the student's placement into a high school curriculum track is often not firmly established until at least the tenth grade. It is also appropriate for the student's expectations for her or his ultimate educational attainment – educational expectations become increasingly meaningful in 10<sup>th</sup> grade, when the student's curriculum track placement and school performance level are becoming established, and high school graduation is only about two years in the future. Regressing these 10<sup>th</sup> grade outcomes on the 8<sup>th</sup> grade variables should provide a reasonable assessment of the relative importance of the 8<sup>th</sup> grade variables as determinants of these intermediate educational outcomes.

The 12<sup>th</sup> grade outcomes are school dropout, ever arrested by the police, and the student's grade point average. Dropping out from high school has been widely documented to have negative consequences for essentially all important life outcomes. Being arrested is also associated with many negative outcomes. The student's grade point average as a senior is perhaps the best available summary of her or his

performance in high school coursework, and is a significant predictor of many later life outcomes.

The age-26 outcomes are whether or not the student received a post-secondary degree, and the student's earnings. Educational attainment (years of schooling completed) is an important predictor of later occupational and earnings success; failing to gain a postsecondary degree seriously restricts employment opportunities (Jencks et al. 1979; Rosenbaum 2001). Earnings at age 26 are one measure of labor market success, although the relatively young age of these workers makes this measure a very incomplete picture of life cycle earnings.

### **Data and Research Methods**

I use data from the NELS, a nationally representative sample of eighth-graders, first surveyed in the spring of 1988. The study was sponsored by the National Center for Education Statistics (NCES), United States Department of Education. The base year NELS survey conducted in 1988 involved 25,000 eighth graders, from 1000 schools throughout the United States. A large proportion of this 1988 population was re-surveyed in 1990, 1992, 1994, and 2000. In 1990, many of the original participants were in the 10<sup>th</sup> Grade, while in 1992, they were in the 12<sup>th</sup> Grade. Data from the first 3 rounds included items about school (including some test scores), work, and home life. In the 2000 sample, most of the participants were in their mid-20's and in the workforce or raising families. Approximately 12,100 people completed some portion of the survey at the 5 sample time points.

### **Sample**

The analytic sample is restricted to respondents with complete data on the study variables and respondents with valid weight, PSU, and Stratum variables, which are

needed to calculate regression coefficients using complex sample design. This yields a final sample of 7,492 for all but the final three columns of Table 5. Those columns of Table 5 have a different sample size of 6,261, because the dependent variable, earnings in 1999, had additional constraints placed upon it.

## **Measures**

Child Sex - Females were the reference category, with male children coded as 1.

Race/Ethnicity - Non-Hispanic White is the reference category and the other categories are as follows: 1) African American; 2) Hispanic; and 3) Asian.

Base Year Socio-Economic Status (SES) - The NELS staff constructed the SES using variables from the parent questionnaire data. The variables are father's education level, mother's education level, father's occupation, mother's occupation, and family income. These were Z-scored, averaged, and the result was Z-scored. For the few cases where all parent data components were missing, student data were used to compute the SES. The first four components from the student data are the same as the components used from parent data, educational-level data, and occupational data. The fifth component for SES from the student data consisted of summing the non-missing household items, calculating a simple mean of these items, and then standardizing this mean.

Test Scores, 8th Grade – Standardized tests were given to study participants during the 8<sup>th</sup> Grade. Scores in English, Math, History and Social Studies were collected for the Base Year Survey. For our study, the four test scores were Z-scored (mean = 0, STD = 1) then summed and then Z-scored.

Learning Behaviors, 8th Grade – In the Base Year teacher's survey, teachers were asked to rate each participant in their class on their classroom characteristics. The

questions dealt with absenteeism, tardiness, inattentiveness, and disruptive behaviors. For our study, we used the participant characteristics rated from two different teachers. The values were each Z-scored (mean = 0, STD = 1), summed, and then Z-scored.

Self Esteem, 8th Grade – In the Base Year Survey, participants were questioned about their feelings of self-worth and satisfaction in their daily lives. The answers that were recorded for these questions were re-coded in some instances so that the direction of the variables all pointed in the same direction (value of 1 = low feeling, 5 high feeling). All variables were then Z-scored (mean = 0, STD = 1), then averaged. The result was then Z-scored.

Non-Academic Track, 10th Grade - In the first follow-up survey a question was asked about the student's present high school program. If the student had valid data and did not answer college preparatory, the student was given a value of 1 that corresponds to non-academic track.

Educational Expectations, 10<sup>th</sup> Grade – A group of questions in the first follow-up survey asked how far the participant thought they would go in school, their chances of high school graduation and whether they thought they would go to college in the future. The answers to these questions were Z-scored (mean = 0, STD = 1) and averaged. The result was then Z-scored.

Ever Dropped Out by 12<sup>th</sup> Grade – During the first and second follow-up surveys, participants were questioned about whether they had dropped out of school. For our study, if a participant answered yes to either of the questions asked in those two follow-up surveys, the participant was classified as a dropout and assigned the value of 1.

Ever Arrested by 12<sup>th</sup> Grade - During the first and second follow-ups, participants were asked whether they had ever been arrested. If a participant answered yes to any one of these questions, the participant was given a value of 1 for being arrested.

GPA by 12<sup>th</sup> Grade - Participants were asked about their school grades during the 10<sup>th</sup> and 12<sup>th</sup> grades. Grades in English, Math, History, Computer Science, Foreign Language or Social Studies were collected. For our study, the grades for both years were Z-scored (mean = 0, STD = 1) then averaged, creating a mean GPA for those two school years. The result was then Z-scored.

PSE Degree (Age 26) – During the fourth follow-up survey, participants were asked about their educational achievements after high-school. Participants listed what type, if any, of post secondary degree they have obtained.

Earnings (Age 26) – During the fourth follow-up survey, participants were asked the amount of income they earned in 1999 and how many weeks they worked in 1999. Our analysis was restricted to those that had income during 1999 and worked at least 1 week in 1999. This variable was Z-scored.

## **Database Set-up**

The NELS data was converted from raw data into SAS data set using SAS code included in the NELS CDROM. Variables listed above were created and simple means and STD were calculated using SAS as well. To calculate marginal effects, the dataset was converted into STATA using STAT Transfer. Because the NELS uses a complex sample design, the STATA SVY commands were used to determine logistical effects. The mfx command in STATA was then used to calculate the marginal effects (dy/dx) and significance of the logistic regression models. All regressions were run with school fixed effects, thereby eliminating the effects of any school level variables.

## **Results**

Table 1 shows the share of middle school (8<sup>th</sup> grade) students with (a) low test scores, (b) low learning related behaviors, and (c) both problems, separately by student and school subgroups. (“Low” is defined as falling into the bottom 20% of the distribution.) As in the paper by Duncan and Magnuson, we find a higher share of students with low test scores and low approaches to learning among low SES, African-American, Hispanic, and male students. The percentage of students having both problems is also elevated for these groups.

Table 1 about here

At the school level, rates of low test scores and low learning behaviors are also elevated for high poverty, high minority, and urban schools, and are lower in high SES schools. Clearly, low income, high minority, and urban schools pose special challenges for their teachers, students, and administrators.

Tables 2 – 5 show the results of estimating the model in Figure 1. Table 2 shows the regression analysis results for predicting the five variables measured for eighth graders – test scores, learning behaviors, grade point average, self-esteem, and locus of control (sense of personal control over outcomes). These variables, measured when the student was in eighth grade, and regressed against gender, race/ethnicity, and parental SES, show patterns of inequality that developed from birth through the preschool, elementary, and middle school periods. Following this, the analyses in Tables 3 – 5 will reveal the consequences of these middle school outcomes for outcomes during high school and beyond.

Table 2 about here

The first column of Table 2 shows slightly higher test scores (an average of English, Math, History and Social Studies tests) for males than females. Socioeconomic status (SES) is strongly and positively related to test scores, with a one standard deviation increase in SES raising test scores by .35 standard deviation. In addition, after controlling SES, Blacks and Hispanics have significantly lower scores than whites, and Asians have higher scores than whites. For Blacks, this test score gap net of SES is almost  $\frac{1}{2}$  standard deviation; for Hispanics,  $\frac{1}{4}$  standard deviation. Clearly, by middle school, there are large test score inequalities across social class background and race/ethnicity groups.

The second column of this table also shows strong relationships between sociodemographics and 8<sup>th</sup> grade teachers' reports of students' learning-related behaviors. As reported by previous research (see, for example, Tach and Farkas 2006), males have worse learning-related behaviors than females. Also as reported

previously (Ogbu 1974, 1978, 1986; Mickelson 1990; Farkas et al. 1990a; Farkas 1996; Ainsworth-Darnell and Downey 1998; Farkas, Lleras, and Maczuga 2002; Carbonaro 2005; Tach and Farkas 2006; Farkas 2008), blacks and Hispanics have worse learning-related behaviors than whites, and Asians have better such behaviors than whites. Further, SES is positively related to learning-related behaviors (Tach and Farkas 2006). However, these relationships between sociodemographics and learning-related behaviors, while statistically significant and substantial in size, are generally of smaller magnitudes than those between sociodemographics and test scores (the two exceptions are the effects of gender and Asians on learning behaviors).

The third and fourth columns of this table show regressions predicting the student's grade point average. Column 3 shows the results when the sociodemographics are used as predictors while column 4 shows the results when test scores and learning-related behaviors are added to the equation. In column 3 we see that males have significantly lower GPAs than females, and Asians have significantly higher GPAs than whites. Blacks and Hispanics have similar GPAs to whites. Social class shows a strong positive effect on GPA, although this effect is not as large as the effect of social class on test scores. Clearly, parental social class affects children's educational outcomes at least partially via its strong effect on test scores, learning related behaviors, and course grades.

The fourth column shows the results when test scores and approaches to learning are added to the equation predicting the student's grade point average. As reported previously (Farkas 1996; Rosenbaum 2001), test scores and learning related behaviors are very strong predictors of course grades. In this calculation we also see

that test scores have a stronger effect on grades than do learning related behaviors. After controlling these variables, the effect of SES on GPA decreases by about 70%. Thus SES differentials in GPA are largely explained by the lower test scores and learning related behaviors of lower SES students.

The 5<sup>th</sup>, 6<sup>th</sup>, and 7<sup>th</sup> columns of this table show the results when increasingly complete sets of variables are used to predict self-esteem. Males report higher self esteem than females, and blacks and Hispanics report higher self-esteem than whites. The higher self-esteem of blacks has been reported before (Rosenberg and Simmons 1972; Mickelson 1990; Farkas, Lleras, and Maczuga 2002). We also find higher self-esteem among higher SES students.

When, first, test scores and approaches to learning, and then grade point average, are added to the equation, interesting results emerge. All three variables are positively and significantly related to self-esteem. The strongest of these associations are those with test scores and GPA. Moreover, with these variables controlled, the SES effect disappears. The higher self-esteem of higher SES students is completely accounted for by their higher test scores and learning-related behaviors.

The final three columns repeat these calculations for locus of control (the student's sense of personal control over life outcomes). Column 8 shows that, among the sociodemographics, SES has the largest effect on the sense of personal control. Combined with the other findings in this table, this shows the powerful effect of social class origins on a wide range of 8<sup>th</sup> grade outcomes.

Column 9 adds test scores and learning-related behaviors to the equation. Both have significant positive associations with the student's sense of personal control. The largest association is with test scores, which occurs despite the fact that students were not aware of their test scores. We speculate that test scores correlate with the student's knowledge of her or his level of academic performance, and that knowledge of low performance decreases both sense of personal control and self-esteem. Particularly interesting is that, with test scores, learning-related behaviors, and GPA controlled, the effect of SES on the sense of personal control disappears. As with self-esteem, the positive relationship between SES and locus of control is entirely due to the higher test scores, learning related behaviors, and GPA of higher SES students. A surprising finding is the large, significant negative coefficient for the association between Asian and sense of personal control, and the positive coefficient for the relationship between Black and sense of personal control. Further investigation of the social psychological dynamics within each of these ethnic groups would be useful.

The final column of this table adds the student's GPA to the equation. As with self-esteem, the academic performance measures of test scores and GPA are strongly related to locus of control. Clearly, students' sense of self is strongly associated with their performance in school.

Table 3 shows regressions predicting two 10<sup>th</sup> grade outcomes -- the student's probability of placement in the non-academic track, and the student's educational expectations. For each outcome, the first column shows the results using only the sociodemographics as predictors; the second column adds test scores and learning-

related behaviors, and the final column adds 8<sup>th</sup> grade GPA, self-esteem, and locus of control to the prediction equation.

Table 3 about here

The first column of Table 3 shows that males are more likely than females and Asians are less likely than whites to be placed into the non-academic track. SES has a strong and significant negative effect on non-academic track placement. This suggests the likelihood that curriculum track placement at least partially mediates the relationship between family SES and student educational attainment.

The second column of this table adds 8<sup>th</sup> grade test scores and learning-related behaviors to the equation. Both significantly decrease non-academic track placement, with the effect of test scores being four times larger than that of learning behaviors. These variables explain almost half the SES effect on placement. The third column adds 8<sup>th</sup> grade GPA, self-esteem, and locus of control to the equation. GPA and locus of control both significantly affect track placement. This is the first in a series of findings in which social psychological attitudes significantly affect outcomes, even after many other variables are controlled.

The fourth column of Table 3 shows the results when sociodemographic variables are used to predict educational expectations in 10<sup>th</sup> grade. SES exerts a large positive effect, as does being Asian. Being male is associated with a large negative effect on educational expectations.

The fifth column of this table adds test scores and approaches to learning to the prediction equation. Both significantly increase educational expectations. As before,

test scores exert the larger effect. With these variables controlled, the Asian and SES effects become smaller, showing that they are partially explained by these variables. Interestingly, the black/white differential becomes dramatically larger. This is consistent with prior discussions of the strong educational optimism among blacks, even after controlling their educational performance (Mickelson 1990).

The final column of Table 3 adds 8<sup>th</sup> grade GPA, self-esteem, and locus of control to the equation. All are positively and significantly associated with educational expectations. Indeed, every predictor in this equation is significantly associated with expectations! This suggests the complex nature of the causal structure underlying educational attitudes and outcomes.

Table 4 shows regressions predicting the 12<sup>th</sup> grade outcomes – ever dropped out of high school, ever arrested, and GPA. For each of these outcomes, the first column shows the result of using the sociodemographics as predictors; the second column adds test scores and learning related behaviors, and the third column adds the remaining 8<sup>th</sup> and 10<sup>th</sup> grade predictors.

Table 4 about here

The first column of Table 4 shows that the Asian and SES variables are the most powerful predictors of school dropout, with large and significant effects. The second column of this table shows the results of adding test scores and learning behaviors to the prediction equation. Both are significant, with the by now expected result that test scores exert the larger effect. Interestingly, once these variables are controlled, the effects of male, Black, and Hispanic become negative and significant, while the Asian

effect becomes smaller and loses significance. Column 3 adds the remaining predictors to the equation. Particularly striking here are the significant positive effect of non-academic track, and the significant negative effect of educational expectations on school dropout.

Columns 4 – 6 repeat these calculations for the student's chance of ever being arrested. Column 4 shows a large positive effect for males and a strong negative effect for Asians. The SES effect is significant but not large. The fifth column adds test scores and learning related behaviors to the equation. Both are significantly related to being arrested, and together explain the SES effect. Column 6 adds the remaining predictors. An interesting finding from this calculation is that only three variables significantly affect arrest rates – being male, learning-related behaviors, and educational expectations. The ability of good learning behaviors and higher educational expectations to partially shield students from involvement in crime is particularly suggestive.

Columns 7 – 9 of Table 4 show the equations predicting the student's 12<sup>th</sup> grade GPA. Column 7 shows that boys earn grades almost 1/3 standard deviation lower than girls. Blacks' grades are 1/5 standard deviation below whites; Asians attain grades almost half a standard deviation higher than whites. SES is strongly and positively associated with GPA, with a one standard deviation increase in SES increasing GPA by about 1/3 standard deviation. Column 8 adds test scores and approaches to learning to the equation. Both exert large and significant effects on GPA. A one standard deviation increase in 8<sup>th</sup> grade test scores is associated with a 1/2 standard deviation increase in 12<sup>th</sup> grade GPA. This is the largest effect found in any of the results. Further, a one standard deviation increase in learning behaviors is associated with a 1/4 standard

deviation increase in GPA. And these variables explain 2/3 of the effect of SES, and all of the black-white GPA difference.

Column 9 adds the remaining predictors to the equation. Noteworthy here is the significant negative effect of non-academic track and the significant positive effect of educational expectations. These provide further evidence of the importance of these track placement and attitudinal variables on school outcomes.

Table 5 shows regression results predicting whether or not the student had attained a post-secondary educational (PSE) degree, and the student's earnings by age 26. As previously, the first regression shows the results when only the sociodemographic variables are used as predictors, the second shows the results of adding test scores and learning related behaviors, and the final column adds the remaining predictors (including whether or not the student had attained a PSE degree as a predictor of earnings).

Table 5 about here

The first column of Table 5 shows that males have significantly lower probabilities than females, and Asians have significantly higher probabilities than whites of obtaining a PSE degree. Higher SES significantly increases the probability of attaining a PSE degree. The second column shows that test scores and learning related behaviors are both positively and significantly associated with obtaining a degree. The third column has striking results – the largest effects on obtaining a PSE degree are due to 12<sup>th</sup> grade GPA and educational expectations, with test scores and learning related behaviors falling to insignificance once the full set of variables are controlled. Non-

academic track is also significant. It appears that attitudes and track placement play significant roles in PSE attainment, even after a great many correlated variables have been controlled.

The final outcome is weekly earnings, with results reported in columns 4 – 6. Column 4 of Table 5 shows that males earn significantly more than females, and Blacks earn significantly less than whites. SES is significantly and positively associated with earnings.

Column 5 adds the test scores and learning related behaviors to the equation. Test scores, but not learning related behaviors, significantly raise earnings. The final column adds the remaining predictors to the equation. Noteworthy are the positive effects of SES, 8<sup>th</sup> and 12<sup>th</sup> grade GPA and locus of control on earnings. Failure to obtain a PSE degree has a significant negative effect on earnings. Positive effects for males and negative effects for Blacks continue to be large and significant.

## **Discussion**

For some years, an interdisciplinary paradigm has been emerging for the study of the schooling achievement of students from birth through postsecondary schooling, and on into the labor market. This focuses on cognitive performance and learning-related behaviors as variables whose distributions differ across population subgroups, and whose trajectories help explain the different life outcomes experienced by these subgroups. The findings in this paper are consistent with this paradigm. They show that by middle school, low SES and ethnic minority students have lower test scores and learning related behaviors than middle class and white students, and that this fact is

quite consequential for subsequent schooling and other outcomes. In particular, 8<sup>th</sup> grade test scores and learning behaviors were found to significantly affect every 8<sup>th</sup>, 10<sup>th</sup>, 12<sup>th</sup> grade and later outcome in our analyses.

However, the results in this paper also expand the paradigm. Self-esteem, a sense of personal control, educational expectations, and curriculum track placement are all found to play a role in determining schooling and other outcomes, even after controlling test scores and learning related behaviors. These variables also mediate the effects of (a) race/ethnicity and social class and (b) 8<sup>th</sup> grade skills and behaviors on later outcomes. In particular, the student's non-academic track placement and educational expectations mediate the effects of both sets of variables on school dropout, 12<sup>th</sup> grade GPA, and whether or not the student earned a postsecondary degree.

These findings should not be surprising. We are social beings inhabiting a social world. Everywhere in school, learning is mediated by social processes. In a recent *Science* article, neuroscientists Meltzoff et al (2009) present “foundations for a new science of learning.” Their interdisciplinary approach, drawing from neuroscience, education, psychology, and machine learning emphasizes that learning is social, and is supported by brain circuits linking perception and action. They emphasize “brain mechanisms supporting close coupling and attunement between the self and other” as a primary focus of the emerging field of social neuroscience. Curricular track placement affects the teacher and peer group “others” that the student interacts with. Educational expectations are formed by these and other interactions, in conjunction with the student's experiences, understanding of these experiences, goals, and calculations. Our

results suggest that these processes of social interaction and expectation formation must be included in any comprehensive model of educational and labor market attainment.

The findings in this paper also have implications for intervention programs aimed to improve the educational and labor market outcomes of disadvantaged youths. A group of such interventions has focused on attempts to raise test scores, sometimes with disappointing results. Yet a recent study of Career Academies (“schools within a school”) found that personalized social support from teachers and peers can significantly raise labor market outcomes for at-risk males, even though no effect was observed on their test scores (Kemple 2008). This appears to have occurred via social interaction and attitude formation – the same types of variables that we have sought to add to the “test scores and learning behaviors” paradigm. A rich amalgam of variables, encompassing skills, behaviors, attitudes, and curriculum placement in models such as that in Figure 1 represents a potentially promising path toward theoretically and practically useful insights on the school and labor market attainment process.