Research Report

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Margarita Olivera-Aguilar
Harrison J. Kell
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RESEARCH REPORT

Investigating the Relationship Between Career and Technical Education High School Course-Taking and Early Job Outcomes

Margarita Olivera-Aguilar, Harrison J. Kell, Chelsea Ezzo, & Steven B. Robbins

ETS, Princeton, NJ

This study examined how high school course-taking patterns (i.e., career and technical education [CTE] vs. academic vs. no concentration), personal characteristics embedded in a social cognitive theory framework (e.g., self-efficacy, academic expectations), and contextual variables (e.g., parental expectations, socioeconomic status [SES]) interact with each other in the prediction of students' income and job satisfaction 8 years after graduating from high school. Using a nationally representative data set (the Educational Longitudinal Study of 2002), we found significant differences by sex and course-taking pattern in the prediction of income: Among men, CTE concentrators had the highest income, whereas among women, academic concentrators reported the greatest earnings. We observed similar levels of job satisfaction among academic and CTE concentrators. We also found that SES significantly moderated the effect of English self-efficacy and academic expectations in the prediction of income and general effort in the prediction of job satisfaction. Our findings highlight how a social cognitive framework can be used to investigate the links between high school course-taking, personal and contextual factors, and job outcomes. They additionally suggest the need to consider a broader set of outcomes for evaluating the benefits of CTE participation.

Keywords Career and technical education; academic concentrators; occupational concentrators; social cognitive theory; income; job satisfaction

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The study of course-taking patterns in high school has received widespread attention, partly because they are relatively easy to modify through a variety of avenues (e.g., advising, counseling, policy making) and partly because changes can result in myriad positive outcomes (Davenport Jr. et al., 1998). High school course-taking patterns can be investigated in a variety of ways, for example, by determining the number of math and science courses students take or by examining the overall rigor of the courses (Long et al., 2012; Roth et al., 2000; Trusty, 2002; Whitehurst, 2009). Another research tradition entails comparing the outcomes of students who focus on college preparation (e.g., English, math, science, social science, foreign languages) to those who focus on career and technical education (CTE). Generally, CTE courses provide students with skills and knowledge tailored to "middle skills jobs" (Dougherty, 2016; Imperatore & Hyslop, 2017), those occupations that are often defined as requiring education and training beyond high school but not a 4-year degree (Carnevale et al., 2012). Consequently, research investigating the benefits of CTE course-taking has focused not only on proximal academic outcomes (e.g., grades; Dougherty, 2016, 2018) but also on distal job outcomes (e.g., employment status, income; Dougherty et al., 2019; Plasman, 2019).

Studies examining the association between CTE concentration and job outcomes have found benefits associated to CTE participation. Using data from three nationally representative data sets, Mane (1999) found that, after controlling for numerous variables (e.g., family socioeconomic status [SES], self-esteem, locus of control), CTE course-taking had a much larger labor market payoff than academic course-taking for noncollege-bound students. More recently, Dougherty (2016) found that CTE concentration (defined as students taking three or more courses in CTE programs) was associated with increases in both probability of employment after graduation and wages. Plasman (2019) similarly found that, among noncollege-going individuals, CTE concentration in health science, trades (comprising concentrations in manufacturing, architecture and construction, or transportation and logistics), and agriculture and natural resources was beneficial in terms of earnings 3 years after graduating from high school.

Corresponding author: M. Olivera-Aguilar, E-mail: molivera-aguilar@ets.org

Prior research examining the differential effects of CTE versus college preparatory course-taking (e.g., English, math, science, social science, foreign languages) on proximal and distal outcomes has included diverse covariates, including demographics (e.g., race/ ethnicity, sex), contextual influences (e.g., SES), test scores, and personal characteristics (e.g., goals, motivation; e.g., Plasman, 2019). Such studies treat course-taking as their primary predictors and educational and occupational criteria as their primary outcomes, and they statistically control for the influence of contextual factors and personal characteristics, implicitly treating them as potentially confounding variables. Thus far, little attempt has been made to explicitly consider the contextual factors and personal characteristics that may meaningfully influence the association between predictors and criteria. The purpose of this study is to address this gap in the literature and thereby contribute to a more holistic view of the relationship between course-taking patterns and work-related outcomes.

We use nationally representative longitudinal data from the Educational Longitudinal Study of 2002 (ELS:2002) to examine how course-taking (i.e., CTE, academic, and no concentration), personal, and contextual variables—along with their potentially interactive effects—are related to students' career outcomes 8 years after high school graduation. We ground our effort in the social cognitive tradition (Bandura, 1986), as it is a comprehensive and well-established research paradigm that has been useful for identifying important variables and structuring relations among them (Bandura, 2018).

Social Cognitive Theories

Previous examinations of the link between course-taking and occupational outcomes (e.g., Plasman, 2019) have been framed in terms of human capital theory (Becker, 1964). T his model primarily features knowledge and skills as the main human attributes affected by schooling and posits that they are the major determinants of posteducational outcomes. Clearly, however, an enormous amount of research has identified additional variables that influence students' posteducational trajectories, including human attributes beyond cognitive knowledge and skills (e.g., noncognitive skills; Roberts et al., 2007), and that acknowledge the important impact of broader situational context on individual development (e.g., Davis-Kean, 2005).

Social cognitive theories (SCTs) compose a family of theoretical models that acknowledge the important role personal characteristics and contextual factors play in influencing people's cognitions (e.g., beliefs, goals, attitudes), how such cognitions influence behavior, and how that behavior in turn influences short- and long-term human outcomes (Bandura, 2012). These models include consideration of career-relevant knowledge and skills that are acquired through educational experiences (e.g., coursework) as well as a wide array of additional psychological constructs found to be important practically via empirical research (Richardson et al., 2012).

In the past decade (e.g., Brown et al., 2008; Brown et al., 2011), two additional constructs have come to figure prominently in SCT models: cognitive abilities ("one's abilities to learn, remember, reason, solve problems, and make sound judgments"; VandenBos, 2015, p. 205) and the personality trait conscientiousness ("the tendency to be organized, responsible, and hardworking"; VandenBos, 2015, p. 236). Both of these personal characteristics have been shown to be predictive of many important life outcomes (e.g., academic performance, career success, educational attainment, health, and job performance; Roberts et al., 2007) and, accordingly, are also often found to contribute importantly when included in SCT models (e.g., Brown et al., 2011).

Current Investigation

The purpose of this study is to provide a more holistic portrait of the relationship between high school course-taking patterns, characterized by CTE concentration, academic concentration, or no concentration, and job outcomes by substantively examining personal and contextual variables theorized to be influential within SCT. We do not examine dual concentrations to clearly differentiate between CTE and academic preparation. Given the correlational nature of the data, our study focuses on providing a more holistic understanding of the associations between course-taking patterns and personal and contextual variables; we do not intend to provide causal explanations of the impact of these variables on job outcomes.

Following the adage that "theory guides, experiment decides" (Fitter & Robinson, 2000; Lewis, 1958), we identified constructs based on a combination of those regularly featured in social cognitive models (e.g., self-efficacy, outcome expectations, cognitive skills) and variables with a track record of predicting income (e.g., SES). We labeled our first suite of predictor variables *personal characteristics*, as they constitute properties of individuals. The specific variables we

selected were *self-efficacy*, *outcome expectations*, *cognitive skills*, and *conscientiousness*. In addition to these psychological constructs, we considered the demographic characteristics *race/ethnicity* and *sex*, because of their importance in understanding societal inequities.

To select the contextual characteristics to investigate, we followed a similar theoretical-empirical-driven strategy. We included *parental expectations* and *SES* as contextual variables, as these two variables can have a powerful impact on individuals' development, both in terms of inculcating social and educational norms and the social networks they form inside and outside of school (Coleman, 1988). Parents can influence students' academic achievement and course-taking patterns themselves (Froiland & Davison, 2016). Furthermore, via their educational expectations and the support they provide in service of meeting those expectations, parents play a role in students' movement through the educational system more generally (Hossler & Gallagher, 1987). In turn, parental expectations are partially a product of differences in SES, which reflect not only variation in a family's financial resources but also its position in the broader social hierarchy, with attendant pervasive consequences for its social and cultural outlooks (Katsillis & Rubinson, 1990). Accordingly, the societal influence of SES is pervasive and linked to a wide variety of outcomes, including health, mortality, marital outcomes, educational and occupational attainment, and income (Chmielewski, 2019; Hanushek et al., 2019). We considered two job outcomes: income and job satisfaction. Income is traditionally the major outcome in studies looking at the benefits of CTE (e.g., Dougherty et al., 2019). Job satisfaction is studied less often—although not entirely neglected (e.g., Whitehurst, 2009)—but is nonetheless important when conceptualizing career success (e.g., Ng et al., 2005) and represents the psychological counterpart of the economic variable of earnings. Consideration of these variables leads us to pose the first research question:

RQ1: To what extent do personal characteristic, contextual, and outcome variables differ across groups defined by their course-taking patterns (i.e., CTE concentrators, academic concentrators, and nonconcentrators)?

In addition to exploring personal and contextual differences between course-taking groups, we were interested in exploring the differential effect of such predictors on income and job satisfaction by course-taking group. Hence our second research question is as follows:

RQ2: Does the relationship of personal characteristics, contextual factors, and job outcomes differ across students' course-taking patterns?

Considering the powerful influence of SES on numerous outcomes, it is reasonable to expect SES also to influence personal characteristics, such as self-efficacy. In fact, previous studies have shown that SES is a positive predictor of career decision self-efficacy (Huang & Hsieh, 2011; Shin & Lee, 2018) and a moderator of the relationship between meritocratic beliefs (i.e., that social outcomes are driven by personal effort, ability, and education) and career outcomes, such that the former predicts the latter more strongly for those of low-SES status (Hu et al., 2020). Hence we are interested in whether SES moderates the relationship of personal characteristics on job outcomes:

RQ3: Does SES moderate the relationship of personal characteristics on income and job satisfaction? Do these interactions vary across students' course-taking patterns?

Method

Sample

Data were obtained from ELS:2002, a nationally representative longitudinal study compiled and maintained by the National Center for Education Statistics (NCES). The study followed 16,200 students through their secondary and postsecondary years, with a baseline data collection in 2002, when students were in 10th grade; a first follow-up in 2004, when they were in 12th grade; a second follow-up in 2006, 2 years after they finished high school; and a final follow-up in 2012, 8 years after they finished high school. We used personal and contextual variables collected in the baseline, high school course-taking information collected in the first follow-up, and job outcomes collected in the third follow-up.

Students' course-taking patterns, and thus their concentration statuses, are coded in the data from the first follow-up in 2004 (U.S. Department of Education, 2012). Academic concentrators (n = 3,650) were defined as students taking

four high school credits of English, three mathematics credits (with at least one credit higher than Algebra II), three science credits (with at least one credit higher than Biology), three social studies credits (with at least one credit in U.S. History or World History), and two credits in a single foreign language. Occupational concentrators ($n = 1{,}870$) were students who earned at least three credits in one specific labor market preparation (SLMP) area: agriculture and renewable resources; business; marketing and distribution; health care; protective and public services; trade and industry; technology and communication; personal and other services; food service and hospitality; and child care and education. Although by some definitions (e.g., according to the Strengthening Career and Technical Education for the 21st Century Act [2018]), CTE encompasses a wider range of subjects than those represented by the SLMP courses, we considered occupational concentration as equivalent to CTE concentration, given the emphasis that SLMP courses place on technical skills and preparation. A final category, nonconcentrators ($n = 8{,}940$), comprised students who did not satisfy academic or occupational concentration requirements. To clearly differentiate the relationships of the predictors on job outcomes between academic and occupational concentrators, we included only students who were uniquely classified as occupational or academic concentrators or as nonconcentrators. We excluded from analysis students who satisfied the requirements of both academic and occupational pathways and students with missing course-taking values. Because we were interested in the prediction of job outcomes 8 years after high school, we focused on students who held a full-time job ($n = 7{,}920$) in 2012, excluding those who reported being unemployed or out of the labor force, having part-time jobs, or with missing employment status values. Our final selection criterion was based on race/ethnicity. As we were interested in examining the statistical effect of belonging to a majority versus a minority ethnic/racial group in the United States, we restricted our analysis to White ($n = 4{,}760$), African American ($n = 870$), and Hispanic students ($n = 990$). The final sample consisted of $n = 1{,}970$ (29.80%) academic concentrators, $n = 920$ (13.92%) occupational concentrators, and $n = 3{,}720$ (56.28%) nonconcentrators. Additional information about the composition of the sample is provided in Table 1.

Measures

Predictors

In addition to including gender and race/ethnicity, we examined the ELS:2002 scales and their use in prior research to identify measures of the selected personal characteristics and contextual factors as predictor variables. All composite scores used in the analyses were already provided in the ELS:2002 data set.

Self-Efficacy

Self-efficacy was derived from the *English self-efficacy* and *mathematics self-efficacy* scales. Additionally, based on the content of the *control expectations scale*, we considered it to be a measure of general self-efficacy (Table 2).

Outcome Expectations

Tenth-grade students indicated the highest level of education they thought they would reach. We recoded this variable to three categories: "less than college," "graduate from college," and "postgraduate degree." Two dummy variables were created using college as the reference group such that the first was the comparison between "less than college" and "graduate from college" and the second was the comparison between "graduate from college" and "postgraduate degree."

Cognitive Skills

An estimate of students' cognitive skills was operationalized as the composite average of their standardized math and reading test scores. The composite score was restandardized to a national mean of 50.0 and a standard deviation of 10.0.

Conscientiousness

We obtained two measures of this personality trait (Table 2). The first was the *general effort and persistence scale*, which asks students to indicate the degree of effort they exert when studying. The second was derived from the *class preparation scale*, which assesses the frequency with which students come prepared to school. Effort, persistence, organization, and preparation are widely considered to be components of conscientiousness (Jackson & Roberts, 2017).

Table 1 Frequencies and Standardized Differences by Demographic Characteristics

	Academic			Occupational			Nonconcentrator			Cohen's *h*		
	Unweighted[a]	Weighted[b]	Weighted %	Unweighted[c]	Weighted[d]	Weighted %	Unweighted[e]	Weighted[f]	Weighted %	A vs. O	A vs. Non	O vs. Non
Sex												
Female	1,050	222,592.63	53.22	330	90,898.84	33.98	1,850	472,926.36	47.92	0.39†	0.11	0.28†
Male	920	195,677.41	46.78	590	176,644.81	66.02	1,870	513,970.84	52.08			
Race												
Minority	330	67,949.61	16.25	240	67,034.22	25.06	1,280	343,008.15	34.76	0.22†	0.43†	0.21†
White	1,640	350,320.43	83.75	680	200,509.43	74.94	2,440	643,889.04	65.24			
P. exp.												
Less than college	40	8,831.71	2.11	230	67,505.81	25.23	460	13,2021.11	13.38	0.76††	0.46†	0.30†
College	790	171,153.51	40.92	420	119,607.48	44.71	1,760	473,773.10	48.01	0.08	0.14	0.07
Postgrad	1,140	238,284.83	56.97	270	80,430.36	30.06	1,500	381,102.99	38.62	0.55††	0.37†	0.18
A. exp.												
Less than college	40	8,540.64	2.15	310	87,813.70	36.02	660	200,669.77	22.51	0.76††	0.45†	0.30†
College	710	160,082.31	40.23	310	93,504.00	38.35	1,400	361,291.14	40.52	0.09	0.16	0.07
Postgrad	1,140	229,343.80	57.63	210	62,476.58	25.63	1,320	329,599.62	36.97	0.56††	0.38†	0.18
College												
No	450	103,224.20	24.68	640	185,316.03	69.27	2,210	622,306.95	63.06	0.93†††	0.80†††	0.13
Yes	1,530	315,045.84	75.32	280	82,227.62	30.73	1,520	364,590.25	36.94	0.39†	0.11	0.28†

Note. Unweighted sample sizes are rounded to the nearest 10. We used the sample weight provided by the Educational Longitudinal Study of 2002 that can effectively weight data that include information in the baseline survey, 2012 survey, and transcript data. A = academic. A. exp. = academic expectations. Non = nonconcentrator. O = occupational. P. exp. = parental expectations. † = small. †† = medium. ††† = large. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

[a] $n = 1{,}970$. [b] $n = 418{,}270$. [c] $n = 920$. [d] $n = 267{,}544$. [e] $n = 3{,}720$. [f] $n = 986{,}897$.

Table 2 Personal Characteristic Composites From the Educational Longitudinal Study of 2002 Data Set

Scale	Items	Response options	Cronbach's α
Control expectation	1 When I sit myself down to learn something really hard, I can learn it. 2 If I decide not to get any bad grades, I can really do it. 3 If I decide not to get any problems wrong, I can really do it. 4 If I want to learn something well, I can.	Almost never, sometimes, often, almost always	.84
English self-efficacy	1 I'm certain I can understand the most difficult material presented in English texts. 2 I'm confident I can understand the most complex material presented by my English teacher. 3 I'm confident I can do an excellent job on my English assignments. 4 I'm confident I can do an excellent job on my English tests. 5 I'm certain I can master the skills being taught in my English class.	Almost never, sometimes, often, almost always	.93
Mathematics self-efficacy	1 I'm confident I can understand the most complex material presented by my math teacher. 2 I'm confident I can do an excellent job on my math assignments. 3 I'm confident I can do an excellent job on my math tests. 4 I'm certain I can master the skills being taught in my math class.	Almost never, sometimes, often, almost always	.93
General effort and persistence	1 When I study, I make sure that I remember the most important things. 2 When studying, I try to work as hard as possible. 3 When studying, I keep working even if the material is difficult. 4 I try to do my best to acquire the knowledge and skills taught. 5 When studying, I put forth my best effort.	Almost never, sometimes, often, almost always	.89
Class preparation	Frequency in which students went to class without 1 Pencil/paper 2 Books 3 Homework done	Never, seldom, often, usually	.81

Note. All scales were obtained by National Center for Education Statistics (NCES) using principal factor analysis. Cronbach's alphas were reported by NCES using the total sample available. Data from "ELS:2012 Student Codebook," by U.S. Department of Education, 2012, https://nces.ed.gov/pubs2014/ELS2012_codebook_Student1.pdf

Postsecondary Educational Attainment

We included a binary variable indicating whether students completed a college degree.

Parental Expectations

When students were in 10th grade, their parents or guardians indicated how far in school they wanted their children to go. We recoded this variable in the same way as we did for outcome expectations.

Socioeconomic Status

The SES of a student's family in 10th grade was estimated based on five equally weighted, standardized components obtained from the parent questionnaire: father's/guardian's education, mother's/guardian's education, family income, father's/guardian's occupation, and mother's/guardian's occupation.

Outcome Variables

Income

Students reported their 2011 earnings from employment. To approximate a normal distribution, we applied a natural logarithm transformation to the income values.

Job Satisfaction

Job satisfaction was measured with three items ("You feel fairly well satisfied with your present job"; "Most days you are enthusiastic about your work"; "You find real enjoyment in your work") where participants indicated their agreement on a 5-point Likert-type scale ranging from 1 (*Strongly agree*) to 5 (*Strongly disagree*). A total score was derived via principal factor analysis (Cronbach's $\alpha = .90$).

Statistical Procedure

All analyses were conducted using sampling and replicate weights to ensure that the results would be generalizable and to account for the sampling design by correcting the standard errors (Ingels et al., 2014). We conducted our analysis in M*plus* Version 8.4 (Muthén & Muthén, 1998–2019) using full information maximum likelihood as the estimation method.

We examined differences in the personal characteristics and contextual factors between course-taking groups (RQ1) using two of Cohen's effect sizes. We computed Cohen's *h* (Cohen, 1988; Rocconi & Gonyea, 2018) to evaluate differences in the proportions of categorical variables (e.g., differences in the proportion of students with academic expectations of completing a college degree between the three course-taking pattern groups) and Cohen's *d* to evaluate differences between continuous variables (e.g., differences in the self-efficacy means across course-taking pattern groups). Cohen's *h* and *d* values of $\pm.2$, $\pm.5$, and $\pm.8$ were used to define small, medium, and large effect sizes, respectively.

To examine subgroup differences in the prediction of income and job satisfaction based on personal characteristic and contextual factors (RQ2), and to examine the moderating effects of SES (RQ3), we conducted a multiple regression analysis with all the two- and three-way interactions of interest (i.e., two-way interactions between course-taking patterns and personal factors and between course-taking patterns and contextual variables; three-way interactions between course-taking taking patterns and personal and contextual variables). We also conducted a multiple group analysis in the context of structural equation modeling to test for differences in the regression weights of the main effects and of the interactions between SES and personal characteristics across academic concentrators, CTE concentrators, and nonconcentrators. However, these approaches resulted in nonconvergence, likely owing to the large number of parameters to estimate and the patterns of missing data.

To overcome this challenge, we conducted subsequent analyses in two steps. The purpose of the first step was to reduce the number of interactions between course-taking groups and personal variables. Within each course-taking group, we regressed the job outcomes on the personal characteristic and contextual factor variables. We also included interaction terms between SES and personal characteristics. All continuous predictors were centered to the mean of each concentrator

group. We compared the regression weights using the Z-test with the formula for independent samples (Cohen, 1983; Paternoster et al., 1998):

$$Z = \frac{B_{G1} - B_{G2}}{\sqrt{SE_{bG1}{}^2 - SE_{bG2}{}^2}},$$

where B_{G1} and B_{G2} are the regression weights for Groups 1 and 2, respectively, and $SE_{bG1}{}^2$ and $SE_{bG2}{}^2$ are the coefficient variances associated with a predictor's regression coefficient in Groups 1 and 2, respectively. We compared the Z-test values obtained to the critical value of 2.58, which corresponds to a statistical significance level of .01. We selected this significance level (rather than .05) to minimize the chance of overinterpreting findings that are marginally significant owing to the large number of predictors tested. Statistically significant Z-test values were considered evidence of interactions between course-taking groups and the predictors tested.

In the second step, we conducted a multiple regression analysis. We included in the prediction of each outcome variable all the main effects, the interactions between SES and personal characteristics, and the interactions with course-taking pattern group membership identified in the previous step. All continuous predictors were grand-mean centered.

Results

Differences Across Course-Taking Patterns

In general, the differences are largest between academic and occupational concentrators, with comparatively fewer differences between occupational concentrators and nonconcentrators (Tables 1 and 3). Group differences in proportions of students who obtained a college degree or a higher degree (Table 1) are noteworthy. Among academic concentrators, 75% of students obtained a college degree versus 31% of occupational concentrators (with a large effect size for the difference in proportions, Cohen's $h = .93$) and 37% of nonconcentrators ($h = .80$).

Medium effect sizes are observed when comparing academic and occupational concentrators in terms of parental expectations and students' academic expectations (Table 1). More academic concentrators expect to obtain a postgraduate degree than occupational concentrators ($h = .56$), whereas the differences observed between occupational concentrators and nonconcentrators were trivial ($h = .18$); the same pattern was observed regarding parental expectations.

Large effect sizes were found in the comparison of SES between academic and occupational concentrators (Table 3), with the latter having lower scores (Cohen's $d = 0.84$), and in standardized test scores, with academic concentrators having higher scores than both occupational concentrators ($d = 1.36$) and nonconcentrators ($d = 1.09$). No group differences were observed in job satisfaction scores (Table 3). Differences in income between academic and occupational concentrators, as well as between academic concentrators and nonconcentrators, were small (Table 3).

Prediction of Income

The comparison of the regression coefficients between course-taking groups (see Appendix A for the group-level results) revealed significant differences for the effect of sex (with Z-test values above the critical value of 2.58); no other predictors showed differences between groups. Hence we conducted a multiple regression analysis on the total sample, including the interaction between course-taking group and sex.

The results (Table 4) indicate a significant interaction between sex and academic concentration status, $\beta = -.13$, $p < .001$, as well as in the interaction between sex and nonconcentration status, $\beta = -.11$, $p < .01$. These interactions suggest that men had higher income than women, but differences depended on course-taking patterns (Figure 1). For men, being an occupational concentrator was associated with higher income than being either an academic concentrator or a nonconcentrator. In contrast, for women, academic concentrator status was associated with higher income than occupational concentrator or nonconcentrator status.

A significant interaction was found between SES and English self-efficacy, $\beta = -.06$, $p < .01$, such that English self-efficacy had a positive relationship with income among students with lower family SES but a negative relationship among students with higher family SES (Figure 2).

SES was also a significant moderator of the relationship between the academic expectation of obtaining a postgraduate degree and income, $\beta = .04$, $p < .01$, such that the relationship between academic expectations and income was negative among students with lower SES and positive among students with higher SES (Figure 3).

Table 3 Full Information Maximum Likelihood Descriptive Statistics

	Academic		Occupational		Nonconcentrator		Cohen's *d*		
	Mean	*SD*	Mean	*SD*	Mean	*SD*	A vs. O	A vs. N	O vs. N
Socioeconomic status	0.34	0.68	−0.20	0.61	−0.09	0.69	0.84†††	0.64††	−0.17
General effort and persistence	0.32	0.92	−0.26	0.98	−0.08	0.99	0.62††	0.42†	−0.18
General self-efficacy	0.36	0.87	−0.28	0.97	−0.10	0.97	0.70††	0.51††	−0.18
English self-efficacy	0.29	0.93	−0.31	0.89	−0.05	0.99	0.65††	0.36†	−0.27†
Math self-efficacy	0.33	0.99	−0.17	0.92	−0.12	0.97	0.52††	0.46†	−0.05
Class preparation	0.26	0.79	−0.15	1.05	−0.07	1.01	0.46†	0.39†	−0.07
Test scores	58.17	7.24	47.71	8.65	49.39	9.58	1.36†††	1.09†††	−0.19
Job satisfaction	0.09	0.99	0.10	0.94	0.02	1.00	−0.01	0.07	0.08
log(Income)	10.36	0.70	10.16	0.90	10.05	0.94	0.26†	0.39†	0.11

Note. Test scores were a composite indicator comprising English and math standardized test scores. A = academic. N = nonconcentrator. O = occupational. † = small. †† = medium. ††† = large. Data from "Education Longitudinal Study of 2002 (ELS:2002)," U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

Table 4 Full Information Maximum Likelihood Regression Coefficients Predicting log(Income) in the Total Sample

	B	*SE B*	β
Intercept	9.76	0.04	—
Sex (male = 1)	0.48	0.04	0.27***
Race (white = 1)	0.12	0.02	0.06***
Course-taking pattern			
Academic concentrator	0.20	0.03	0.10***
Nonconcentrator	0.04	0.04	0.02
Contextual variables			
SES	−0.01	0.05	−0.01
P. exp. HS or less	−0.12	0.03	−0.05***
P. exp. postgraduate degree	−0.02	0.03	−0.01
Personal variables			
General effort	0.03	0.01	0.03*
General self-efficacy	0.02	0.03	0.02
English self-efficacy	0.00	0.02	0.00
Math self-efficacy	0.02	0.03	0.02
Class preparation	0.02	0.02	0.02
Test scores	0.01	0.00	0.11***
A. exp. HS or less	0.00	0.06	0.00
A. exp. postgraduate degree	−0.02	0.02	−0.01
College	0.25	0.02	0.14***
Interactions			
SES × general effort	0.02	0.04	0.01
SES × general self-efficacy	0.03	0.06	0.02
SES × English self-efficacy	−0.07	0.03	−0.06**
SES × math self-efficacy	−0.01	0.03	−0.01
SES × class preparation	0.00	0.03	0.00
SES × test scores	0.00	0.00	−0.01
SES × A. exp. HS or less	−0.07	0.06	−0.02
SES × A. exp. postgraduate	0.08	0.03	0.04**
SES × college	−0.05	0.03	−0.03
Academic concentrators × sex	−0.36	0.01	−0.13***
Nonconcentrators × sex	−0.21	0.06	−0.11**
R^2	0.10		

Note. Test scores are a composite indicator comprising English and math standardized test scores. A. exp. = student expectation for the highest level of education they will attain. HS = high school. P. exp. = parental expectation for the highest level of education their 10th grader will attain. SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

*$p < .05$. **$p < .01$. ***$p < .001$.

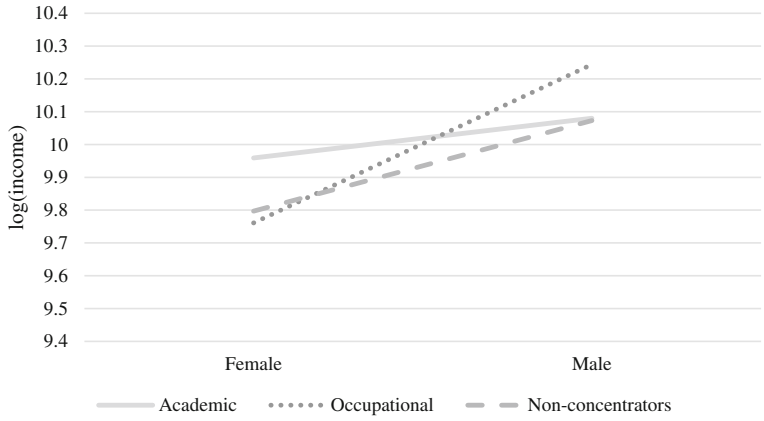

Figure 1 Interaction between high school course-taking patterns and sex in the prediction of log(Income). Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

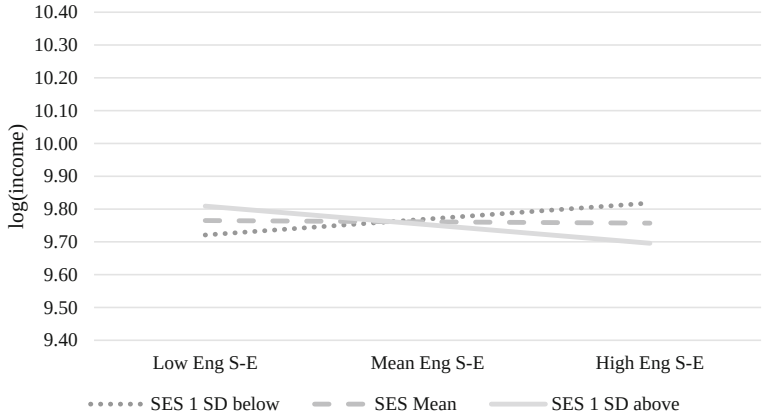

Figure 2 Interaction between family socioeconomic status during high school and English self-efficacy in the prediction of log(Income). SD = standard deviation; S-E = self-efficacy; SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

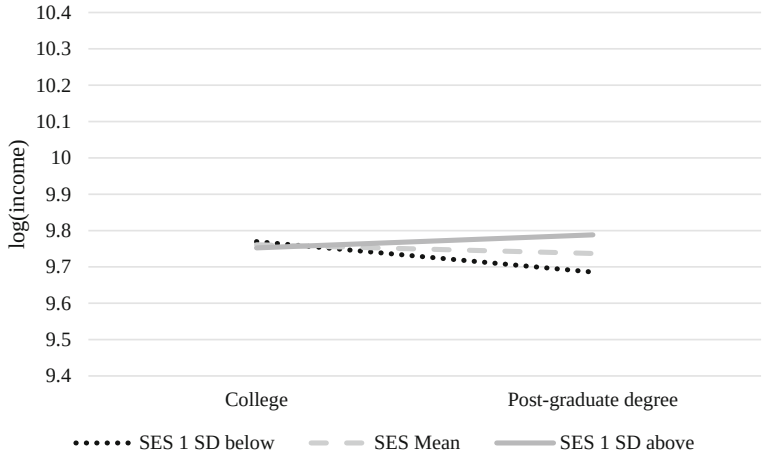

Figure 3 Interaction between family socioeconomic status during high school and academic expectations (postgraduate degree vs. college degree) predicting log(Income). SD = standard deviation; SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

Table 5 Full Information Maximum Likelihood Regression Coefficients Predicting Job Satisfaction in the Total Sample

	B	*SE B*	β
Intercept	0.11	0.05	—
Sex (male = 1)	−0.05	0.05	−0.02
Race (White = 1)	0.04	0.05	0.02
Course-taking pattern			
Academic concentrator	−0.08	0.05	−0.03
Nonconcentrator	−0.09	0.03	−0.05**
Contextual variables			
SES	0.05	0.03	0.03
P. exp. HS or less	−0.10	0.05	−0.03
P. exp. postgraduate degree	−0.06	0.05	−0.03
Personal variables			
General effort	0.11	0.02	0.11***
General self-efficacy	−0.05	0.03	−0.05
English self-efficacy	−0.01	0.02	−0.01
Math self-efficacy	0.04	0.02	0.04
Class preparation	0.02	0.00	0.02***
Test scores	−0.01	0.00	−0.08***
A. exp. HS or less	−0.03	0.07	−0.01
A. exp. postgraduate degree	0.02	0.03	0.01
College	0.08	0.02	0.04***
Interactions			
SES × general effort	−0.06	0.02	−0.04**
SES × general self-efficacy	0.01	0.03	0.01
SES × English self-efficacy	0.03	0.02	0.02*
SES × math self-efficacy	0.01	0.02	0.01
SES × class preparation	0.01	0.02	0.01
SES × test scores	0.00	0.00	−0.02
SES × A. exp. HS or less	−0.15	0.06	−0.05*
SES × A. exp. postgraduate	0.01	0.03	0.01
SES × college	−0.01	0.02	−0.01
R^2	0.02		

Note. Test scores are a composite indicator comprising English and math standardized test scores. A. exp. = student expectation for the highest level of education they will attain. HS = high school. P. exp. = parental expectation for the highest level of education their 10th grader will attain. SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002 – 2012, Version 1.
*$p < .05$. **$p < .01$. ***$p < .001$.

Significant main effects were found for standardized test scores, β = .11, $p < .001$; college degree attainment, β = .14, $p < .001$; and parental expectations, β = −.05, $p < .001$. The latter indicates that children of parents who did not expect their offspring to get a college degree had lower incomes, on average. White students had higher incomes 8 years after graduating from college, β = .06, $p < .001$, than ethnic/racial minority students (African American and Hispanic/Latino).

Prediction of Job Satisfaction

The comparisons of the regression coefficients between groups resulted in *Z*-test values below the critical value of 2.58, indicating that there were no significant differences between groups (see Appendix B for group-level results). Thus subsequent multiple regressions were conducted on the total sample and included dummy codes for course-taking patterns but did not include interaction terms between concentration group membership and personal variables.

The results of the multiple regression conducted on the total sample (Table 5) reveal a statistically significant interaction between SES and general effort and persistence, β = −.04, $p < .01$; Figure 4. Although higher general effort scores typically were associated with higher job satisfaction scores, this relationship was moderated by SES such that its strength increased as SES decreased. In other words, general effort was an important predictor of job satisfaction among individuals from lower SES backgrounds but not among those from higher SES backgrounds.

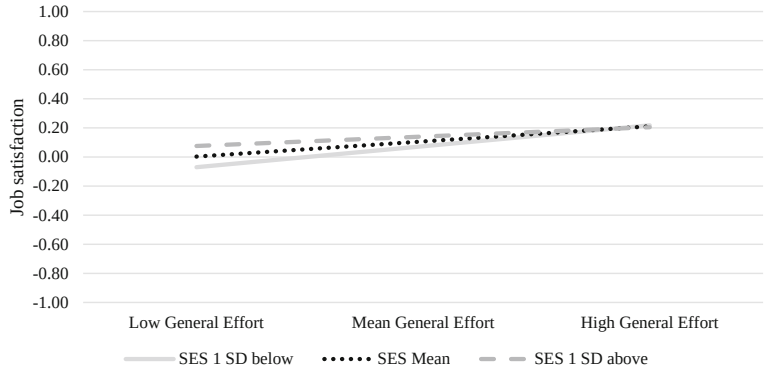

Figure 4 Interaction between family socioeconomic status during high school and general effort and persistence scale predicting satisfaction. SD = standard deviation; SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

Table 5 also shows positive main relationships for class preparation scores, $\beta = .02$, $p < .001$, and for college degree attainment, $\beta = .04$, $p < .001$, whereas higher standardized test scores were associated with lower job satisfaction, $\beta = -.08$, $p < .001$. Although there were no significant differences in job satisfaction between academic and occupational concentrators, $\beta = -.03$, $p =$ NS, in comparison to occupational concentrators, nonconcentrators had significantly lower job satisfaction scores, $\beta = -.05$, $p < .01$.

Discussion

The abundance of prior research examining relationships between course-taking patterns and educational and job criteria has statistically controlled for personal and contextual factors, rather than investigating their substantive interrelations with predictors and outcomes. The current study contributes to this body of work by addressing this gap using a longitudinal data set. It should be noted that the relationships described are correlational and cannot be interpreted causally.

Group Differences in Personal, Contextual, and Outcome Variables

Exploration of RQ1, looking at unadjusted mean differences between course-taking groups, reveals larger differences in personal and contextual variables when comparing academic and occupational concentrators than in the comparison between occupational concentrators and nonconcentrators. In contrast, there were no differences in job satisfaction, and only small effect sizes were associated with the comparison of income across groups.

Interestingly, we found a gap between intentions to pursue college and actual enrollment. Ninety-eight percent of academic concentrators, 64% of occupational concentrators, and 87% of nonconcentrators expected to get a college or postgraduate degree. Unfortunately, when examining actual college-bound behavior, only 75% of academic concentrators, 30% of occupational concentrators, and 36% of nonconcentrators ultimately enrolled in college. Perhaps most sobering is that we found the same pattern when looking at parents' expectations. These findings highlight the need to examine the potential barriers to college students may face and to provide resources to fulfill their aspirations.

Statistical Effect of Personal and Contextual Variables on Income

Comparison of the regression weights for personal and contextual factors across the three course-taking groups reveals differences only for the statistical effect of sex on income. Although men tended to have higher incomes than women, within each sex, there were differences in income depending on course-taking patterns. Among men, occupational concentrators had the highest incomes, whereas, among women, academic concentrators reported the greatest earnings. The broad result is consistent with prior findings revealing pay inequities by sex (e.g., Bleiweis, 2020). Additional research is needed to understand this finding, but one possible explanation is related to women's postsecondary educational attainment and years of experience in a job. Women tend to pursue postsecondary degrees at higher rates than men (de Brey et al., 2019) and, as a consequence, may have had less occupational experience than men by the time of the last wave of data

collection (i.e., 8 years after their senior year in high school). Indeed, the ELS:2002 data show that women tend to spend more time in school than men; among women, 11.6%, 41.2%, and 11.6% obtained an undergraduate certificate, college degree (AA or BA), or postgraduate degree, respectively, in comparison with 8.9%, 34%, and 5.2% of men, respectively. Furthermore, 52% of men in the sample did not obtain a college degree, versus 35.7% of women. Given that women may have less work experience, which may influence their income, future studies should take into account the number of years of employment in the prediction of income.

It also is worth noting that men and women typically have different foci within occupation concentrations (Leu & Arbeit, 2020). Traditionally, higher-paying CTE fields (e.g., engineering, construction, and repair) are dominated by men, whereas women are overrepresented in the lowest-paying fields (e.g., childcare, cosmetology; Lufkin et al., 2007). Many occupational concentration careers dominated by men fall around the median for weekly earnings (U.S. Bureau of Labor Statistics, 2020), which may help to explain why men who occupy them make more on average 8 years after graduation than those who complete an academic track, which may have a longer payoff stretch. In contrast, women may stand to gain more financially, even in 8 years, from careers typically resulting from an academic focus.

Exploration of RQ3 revealed interactions between personal variables and family SES in the prediction of income. Specifically, we found that the relationship between English self-efficacy scores and income was moderated by family SES. For students with lower family SES scores, the association between English self-efficacy and income was positive, whereas for students with higher family SES scores, the association between English self-efficacy and income was negative. With respect to low SES scores, this finding may be related to students' meritocratic beliefs, as previous studies have found that people from disadvantaged backgrounds with strong beliefs that personal characteristics are causally related to socioeconomic attainment tend to persist more when pursuing their goals and expect higher salaries (e.g., Hu et al., 2020). Relatedly, other research has shown that people from lower SES backgrounds who believe in societal fairness tend to set clearer goals and persist in attempting to achieve them to a greater degree than people from higher-SES backgrounds (Laurin et al., 2011). This self-regulatory mechanism can help students from families with a lower SES obtain some sense of feeling in control of their futures, compared to higher-SES individuals, who expect positive outcomes regardless of their circumstances (Hu et al., 2020).

We also found that students who completed college reported similar incomes regardless of their family SES scores. Interestingly, we also found an interaction between academic expectations and SES in an unexpected direction. Students from families with high SES had similar incomes regardless of their academic expectations, whereas students from families with low SES who expected to complete a postgraduate degree reported less income than students from families with low SES who expected only to complete college. It may be that students from families with low SES who expect to attend postgraduate education are interested in fields that are associated with lower incomes, while students with higher SES are interested in fields associated with higher income. Generally speaking, individuals with higher SES have greater access to material, social, and cultural resources (Bourdieu, 1986), which may allow students to have the support and information needed to pursue postgraduate degrees that better align with their skills and interests, apply and be admitted to better programs, and choose fields that result in careers with better salaries.

In addition to the interactions described, race/ethnicity was an important predictor of income 8 years after graduating from high school. As data from the U.S. Bureau of Labor Statistics (2021) support, we found that individuals who were White and held a college degree had higher incomes than ethnic/racial minority students who also held college degrees. This result speaks to inequities in income along demographic lines, even after controlling for variables like family SES, academic preparation, and postsecondary education attainment.

In terms of the other personal characteristic variables, we found that more is more. Students with higher conscientiousness, college completion, cognitive skills, and parental expectations tended to have higher incomes. Conscientiousness, arguably the driving factor of academic preparation, has a well-documented positive relationship with income (e.g., Roberts et al., 2011), as does college completion (Perna, 2005). However, our findings, which control for SES, contrast with previous studies that suggest that the relationship between test scores and income is quite modest (for a summary, see Levin, 2012). With respect to parental expectations, numerous prior investigations have examined their relationship with academic outcomes (Froiland & Davison, 2016). However, the relationship between those expectations and career outcomes—such as income—has not received much attention, thereby increasing the importance of our findings to the field.

Statistical Effect of Personal and Contextual Variables on Job Satisfaction

Despite the sex differences in income, we did not find that men had higher job satisfaction than women. However, there were differences in job satisfaction by course-taking pattern. Occupational concentrators had higher job satisfaction than nonconcentrators; there was no difference in the average job satisfaction of academic versus occupational concentrators (see Table 5). More research is needed to explain lower job satisfaction among nonconcentrators. Our data show that while nonconcentrators' family SES and their scores on all the personal characteristics examined (i.e., general effort and persistence, general self-efficacy, English and math self-efficacy, class preparation, test scores) were lower than those of academic concentrators, they were higher than those of occupational concentrators. However, in comparison to academic and occupational concentrators, nonconcentrators had the largest proportion of minority students. Accordingly, it is possible that nonconcentrators face unique challenges that affect their high school course-taking patterns and career experiences. Students in this group may lack access to the social networks and sources of information that would help them make optimal choices during their secondary educations or, because of structural barriers, may be forced to choose career paths that are not well aligned with their interests.

Regarding RQ3, we found that SES moderates the relationship between general effort and job satisfaction. Regardless of their SES, students with higher general effort scores had higher job satisfaction than students with lower scores in general effort. This finding is consistent with prior research (e.g., Judge et al., 2002) documenting a positive association between job satisfaction and conscientiousness — the latter of which we conceptualized general effort to be a manifestation of. (We also found a positive main effect for class preparation, also theorized to represent conscientiousness.) However, for students with lower general effort scores, family SES made a difference, such that students with higher SES scores had higher job satisfaction than students with lower SES scores. Perhaps greater family SES can "buffer" the effects of lower effort, allowing even relatively unindustrious individuals access to jobs that suit their needs, leading to higher job satisfaction.

We observed a negative relationship of standardized test scores and job satisfaction. Standardized test scores are measures of cognitive skills, which past research has documented to exhibit a complex relationship with job satisfaction. For example, Ganzach (1998) found that the zero-order correlation between cognitive ability and job satisfaction is negative, but the association is positive after taking into account job complexity as a mediator and moderator. Lounsbury et al. (2004) also found a negative relationship between cognitive skills and career satisfaction among hourly employees but a positive relationship among managers.

Conclusion

This study highlights nuances in the intersection of course-taking patterns and individual differences. While the descriptive statistics revealed differences in personal and contextual variables between students with different course-taking patterns, the predictive relationships of these variables on income and job satisfaction 8 years after high school graduation were comparable across course-taking patterns. Of the personal variables we investigated, sex and SES were the most salient in deconstructing the relationships between course-taking patterns on job outcomes. The observed sex differences add to the literature on the gender pay gap, illustrating how occupational concentration in high school is associated with very different early-career incomes for men and women. The similar job satisfaction between academic and occupational concentrators after controlling for other variables indicates the need to consider a broader set of outcomes when evaluating the benefits of CTE. In addition, while measures of conscientiousness, self-efficacy, and students' academic attainment expectations were related to job outcomes, family SES was an important moderator of those relationships. These findings point to an often-found yet important conclusion: In work with student populations, context matters.

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Appendix A

Full Information Maximum Likelihood Regression Coefficients Predicting log(Income) by Subgroup

	Academic concentrators			Occupational concentrators			Nonconcentrators			Group comparisons (*Z*-test)		
	B	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β	A vs. O	A vs. N	O vs. N
Intercept	10.08	0.09	—	9.73	0.12	—	9.75	.05	—	—	—	—
Sex (male = 1)	0.11	0.04	0.08**	0.49	0.09	0.26***	0.28	0.04	0.15***	−3.98	−3.30	2.21
Race (White = 1)	0.10	0.06	0.05	0.13	0.10	0.06	0.14	0.04	0.07**	−0.20	−0.50	−0.13
Contextual variables												
SES	0.09	0.08	0.09	−0.13	0.15	−0.09	−0.03	0.05	−0.02	1.29	1.23	−0.66
P. exp. HS or less	0.05	0.13	0.01	−0.01	0.09	0.00	−0.18	0.07	−0.06**	0.38	1.54	1.48
P. exp. postgraduate	−0.06	0.04	−0.05	−0.07	0.09	−0.04	0.01	0.04	0.01	0.06	−1.33	−0.86
Personal variables												
General effort	0.03	0.05	0.03	−0.04	0.08	−0.04	0.04	0.03	0.05	0.69	−0.33	−0.95
General self-efficacy	0.01	0.05	0.02	0.01	0.10	0.01	0.01	0.04	0.02	0.02	−0.03	−0.04
English self-efficacy	−0.06	0.03	−0.08	0.06	0.08	0.06	0.01	0.03	0.02	−1.47	−1.73	0.56
Math self-efficacy	0.03	0.03	0.04	0.05	0.07	0.05	0.01	0.03	0.01	−0.28	0.45	0.53
Class preparation	0.02	0.03	0.02	0.07	0.03	0.08*	0.00	0.02	0.00	−1.27	0.56	1.84
Test scores	0.01	0.00	0.08*	0.01	0.01	0.12*	0.01	0.00	0.11***	−0.78	−0.60	0.34
A. exp. HS or less	0.14	0.15	0.03	−0.10	0.11	−0.05	0.03	0.06	0.01	1.33	0.74	−1.04
A. exp. postgraduate	0.05	0.05	0.04	−0.08	0.11	−0.04	−0.04	0.05	−0.02	1.13	1.33	−0.32
College	0.20	0.05	0.12***	0.32	0.08	0.16***	0.26	0.04	0.13***	−1.26	−0.97	0.67
Interactions												
SES × general effort	−0.07	0.08	−0.06	−0.11	0.13	−0.07	0.08	0.06	0.06	0.30	−1.48	−1.39
SES × general self-efficacy	0.05	0.07	0.04	0.09	0.18	0.06	0.01	0.07	0.01	−0.17	0.42	0.38
SES × English self-efficacy	0.03	0.06	0.03	−0.14	0.17	−0.08	−0.10	0.05	−0.08*	0.92	1.82	−0.19
SES × math self-efficacy	0.00	0.06	0.00	0.03	0.16	0.02	−0.04	0.05	−0.03	−0.16	0.61	0.42
SES × class preparation	0.05	0.04	0.04	−0.05	0.06	−0.03	0.00	0.03	0.00	1.34	0.97	−0.67
SES × test scores	−0.01	0.01	−0.04	−0.01	0.01	−0.05	0.00	0.00	0.00	0.26	−0.50	−0.71
SES × A. exp. HS or less	−0.16	0.16	−0.03	0.08	0.18	0.03	−0.09	0.09	−0.03	−0.97	−0.39	0.80
SES × A. exp. postgraduate	−0.03	0.08	−0.02	0.32	0.19	0.13	0.09	0.07	0.04	−1.69	−1.04	1.16
SES × college	−0.03	0.09	−0.03	−0.07	0.14	−0.03	−0.07	0.06	−0.03	0.25	0.36	−0.03
R^2		0.05			0.16			0.08				

Note. Test scores are a composite indicator comprising English and math standardized test scores. A = academic. A. exp. = student expectation for the highest level of education they will attain. HS = high school. N = nonconcentrator. O = occupational. P. exp. = parental expectation for the highest level of education their 10th grader will attain. SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

*$p < .05$. **$p < .01$. ***$p < .001$.

Appendix B

Full Information Maximum Likelihood Regression Coefficients Predicting Job Satisfaction by Subgroup

	Academic concentrators			Occupational concentrators			Nonconcentrators			Group comparisons (*Z*-test)		
	B	*SE B*	β	*B*	*SE B*	β	*B*	*SE B*	β	A vs. O	A vs. N	O vs. N
Intercept	−0.08	0.12	—	0.06	0.13	—	0.07	0.07	—	—	—	—
Sex (male = 1)	−0.05	0.06	−0.03	0.00	0.09	0.00	−0.07	0.04	−0.03	−0.52	0.27	0.76
Race (White = 1)	0.00	0.09	0.00	0.07	0.11	0.03	0.04	0.06	0.02	−0.47	−0.36	0.22
Contextual variables												
SES	0.17	0.12	0.12	0.19	0.13	0.12	0.02	0.07	0.01	−0.09	1.10	1.17
P. exp. HS or less	0.05	0.18	0.01	0.03	0.10	0.02	−0.18	0.07	−0.06*	0.10	1.21	1.67
P. exp. postgraduate	−0.03	0.06	−0.02	−0.18	0.10	−0.09	−0.05	0.04	−0.02	1.20	0.21	−1.17
Personal variables												
General effort	0.12	0.06	0.11	0.01	0.11	0.01	0.13	0.05	0.13**	0.88	−0.18	−1.06
General self-efficacy	−0.08	0.07	−0.07	0.05	0.11	0.05	−0.05	0.05	−0.05	−0.99	−0.32	0.82
English self-efficacy	−0.02	0.05	−0.01	−0.03	0.08	−0.03	−0.01	0.04	−0.01	0.15	−0.03	−0.18
Math self-efficacy	0.01	0.04	0.01	0.01	0.08	0.01	0.05	0.04	0.05	−0.09	−0.71	−0.38
Class preparation	0.03	0.05	0.03	0.06	0.05	0.07	0.00	0.03	0.00	−0.44	0.56	1.15
Test scores	0.00	0.01	−0.03	0.00	0.01	−0.01	−0.01	0.00	−0.10**	−0.26	1.20	1.34
A. exp. HS or less	0.08	0.29	0.01	−0.10	0.11	−0.05	0.01	0.07	0.00	0.57	0.24	−0.81
A. exp. postgraduate	0.09	0.07	0.05	0.15	0.10	0.07	−0.04	0.05	−0.02	−0.45	1.50	1.66
College	0.17	0.07	0.07*	0.01	0.11	0.00	0.05	0.05	0.03	1.22	1.29	−0.40
Interactions												
SES × general effort	−0.16	0.08	−0.10	−0.23	0.15	−0.15	−0.01	0.07	−0.01	0.47	−1.46	−1.39
SES × general self-efficacy	0.18	0.10	0.11	0.04	0.18	0.02	−0.05	0.07	−0.03	0.72	1.87	0.46
SES × English self-efficacy	−0.01	0.06	0.00	0.19	0.15	0.11	0.03	0.05	0.02	−1.20	−0.45	1.01
SES × math self-efficacy	−0.01	0.07	−0.01	−0.05	0.13	−0.03	0.05	0.06	0.03	0.24	−0.65	−0.67
SES × class preparation	−0.06	0.07	−0.03	−0.07	0.07	−0.05	0.04	0.04	0.03	0.09	−1.37	−1.46
SES × test scores	0.00	0.01	0.01	0.01	0.01	0.04	−0.01	0.00	−0.04	−0.43	0.97	1.11
SES × A. exp. HS or less	−0.09	0.29	−0.01	−0.40	0.19	−0.14*	−0.11	0.11	−0.04	0.90	0.06	−1.34
SES × A. exp. postgraduate	0.03	0.10	0.02	−0.31	0.16	−0.12*	0.05	0.08	0.02	1.88	−0.16	−2.07
SES × college	−0.21	0.11	−0.12	0.07	0.16	0.03	0.03	0.07	0.01	−1.39	−1.74	0.23
R^2		0.03			0.05			0.03				

Note. Test scores are a composite indicator comprising English and math standardized test scores. A = academic. A. exp. = student expectation for the highest level of education they will attain. HS = high school. N = nonconcentrator. O = occupational. P. exp. = parental expectation for the highest level of education their 10th grader will attain. SES = socioeconomic status. Data from "Education Longitudinal Study of 2002 (ELS:2002)," by U.S. Department of Education, National Center for Education Statistics, selected years, 2002–2012, Version 1.

*$p < .05$. **$p < .01$. ***$p < .001$.

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