

College and Career Preparation Activities and Their Influence on Post-High School Education and Work Attainment

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Abstract

This study examined students' participation in college and career preparation activities in high school, and the relationship between participation in these activities and students' education and work attainment within one year of high school graduation. This study used the High School Longitudinal Study of 2009 (HSLs:2009) dataset and participants included 12,217 public school students with 6,046 (49.49%) boys and 6,171 (50.51%) girls. Data analysis included descriptive statistics and multinomial logistic regression. Results indicate that socioeconomic status was the only significant predictor across all post-high school education and work outcomes. Significant predictors of post-high school education/work attainment were found but differed depending on which outcomes (i.e., education and/or work) were being considered.

Keywords: college preparation; career preparation; post-high school education and work; college and career readiness

Introduction

Preparing every student to effectively transition to adulthood and become college and career ready is an important goal of America's educational system (U.S. Department of Education, 2010). For example, the reauthorization of the Elementary and Secondary Education Act (ESEA) and the Next Generation High Schools Act charge high schools to provide high-quality college and career exploration and counseling options to prepare college- and career-ready graduates (U.S. Department of Education, n.d.). This goal is important because it assists students in becoming productive citizens and assists the country with an educated and skilled workforce (Fletcher, Warren, & Hernandez-Gantes, 2018).

Definitions of college and career readiness vary, with some opting to define the terms separately. For example, the Association of Career and Technical Education (ACTE, 2010) makes a distinction between career readiness and college readiness. College readiness includes rigorous level of academic proficiency in math and literacy while career readiness includes application of academic knowledge in the workplace, employability skills (e.g., critical thinking, problem solving), and job-specific technical skills. Others, however, opt to unify the definition to demonstrate the interconnectedness of the terms. For example, of the 37 states with college and career definitions, 33 have used a single definition for college and career readiness: a set of

knowledge and skills required for students to enroll in postsecondary coursework without remediation and to succeed in both college and the workforce (College & Career Readiness & Success Center, 2014). Specifically, students need to master adequate academic knowledge (e.g., English, Math) and to demonstrate skills such as critical thinking, problem solving, social and emotional learning, perseverance, and citizenship (College & Career Readiness & Success Center, 2014). Regardless of definitions, data tends to track whether students graduate, go to college, work, do both, or do neither; and there is interest as to what factors contribute to student college and career outcomes.

Preparing students for college and careers allows students to learn about college and work and be aware of the crucial educational and career decisions to make (e.g., pursuit of further education vs. seeking employment) (National High School Center, 2008). This preparation often takes the form of college and career preparation activities and programs which students can participate in. Previous evaluations of college and career preparation focused on specific programs that were either college- or work-oriented (e.g., Neumark & Rothstein, 2006; Venezia & Jaeger, 2013), which fails to reveal the breadth of a student's activities for both college and career preparation. In addition, investigations that focus on the effectiveness of a specific program hardly capture the college and career preparation activities for all students. Because most of federal and state funded programs end up serving only a small percentage of students who actually participate in the programs. For example, federal programs such as TRIO (i.e., Upward Bound, GEAR UP, and Talent Search programs) support less than 7% of eligible students, and programs like Early College High Schools (small schools that coordinate student services and make college attainable) only serve students in those schools (Venezia & Jaeger, 2013).

Instead of a program-based approach, it has been suggested to investigate specific program elements (i.e., discrete activities) and their relationships with students' academic and career outcomes (Cates and Schaeffe, 2011; Harvill, Maynard, Nguyen, Robertson-Kraft, & Tognatta, 2012). Knowing if there is a relationship between specific college and career preparation activities and college and work outcomes could be helpful for researchers, policy makers, and practitioners to make informed decisions on what activities to invest time and funding into. In this regard, it is worth exploring which college and career preparation activities students from different demographics participate in or not which, again, is important for making informed decisions to help all students purposefully move into college and/or career after high school. Therefore, the purpose of this study was to examine the relationship between students' participation in college and career preparatory activities and their college and work status one year after graduation. In this study, college and career preparation activities refer to discrete activities that a student participates in to increase knowledge on college and career options after high school and to prepare for transition to postsecondary education and/or employment. Post-high school education and work attainment is the outcome variable that refers to a student's college and work status within one year of high school graduation. Research questions guiding this study included:

1. What college and career preparation activities did high school students participate in?
2. Did gender, race/ethnicity, socioeconomic status, and students' college and career preparation activities predict their post-high school education and work attainment?

Review of Literature

Education and Work Attainment after High School

A four-year bachelor's degree has long been an aspiration for high school students in the U.S., but the one-size-fits-all college dream overlooks individual differences and underestimates what community college could offer (Rosenbaum, Stephan, & Rosenbaum, 2010). In fact, labor market demand for middle-skill jobs is strong. Fifty-three percent of all jobs in 2015 were middle-skill jobs, compared to 31% of high-skill jobs and 16% of low-skill jobs (National Skills Coalition, 2017). Middle-skill jobs refer to jobs that require some types of postsecondary education and training but less than a four-year college degree (e.g., electrician, dental hygienist, paralegal); high-skill jobs refer to those that require a bachelor's or a higher degree; and low-skill jobs refer to those that require a high school diploma or less. Community colleges provide students, who aspire middle-skill jobs, with education, training, and apprenticeship opportunities to access to those promising careers (Rosenbaum et al., 2010).

Besides apprenticeship, many students work for pay when they make it to college. In 2017, 84.41% of American high school students graduated from high school, among which 40.14% went to college full time (including two- and four-year colleges), 26.59% went to college and worked at the same time, 22.4% entered the workforce without going to college, and 10.84% did not enter the workforce or went to college (U.S. Department of Labor, n.d.). Working for pay during college is necessary for students to receive financial support to attend and complete college, especially for racial/ethnic minority, first-generation, and low-income students (Melguizo & Chung, 2012). Moderate work experience during college has positive influence on students, such as developing employability skills, being marketable in the workforce, and further shaping their career interests (Pusser, 2010; Ziskin, Torres, Hossler, & Gross, 2010). However, excess working load during college will hinder students' capacity to study and engage in on-campus activities.

Gender/Race/Socioeconomic Influence on Post-high School Education and Work Attainment

Eccles (2011) believed gender and racial/ethnic differences result from cultural socialization, leading toward different hierarchies of core personal values and explicit motives. Cultural socialization also leads to different values on goals and activities among groups and affects individuals' educational and vocational choices indirectly through their interaction with the living environment. Such differences will be reflected on students' post-high school education and work attainment. For example, in 2017 the overall college enrollment rate was 66.7% for all high school graduates, with 71.7% among females and 61.1% among males (U.S. Department of Labor, n.d.). Asian graduates' college enrollment (83.0%) was the highest, compared to that of their White (67.1%), Hispanic (61.0%), and Black (59.4%) counterparts (U.S. Department of Labor, n.d.).

Socioeconomic status (SES) is one of the most significant factors influencing adolescents' academic attainment and occupational status attainment (Metheny & McWhirter,

2013; Whiston & Keller, 2004). SES reflects a family's income, parental education and occupational attainment, as well as the social position and resources that youth can access (Conger, Conger, & Martin, 2010). Youth from higher SES families are more likely to aspire to high levels of education and prestigious occupations (Rojewski & Kim, 2003) and to engage in systematic exploratory and planning activities to achieve their expectations (Blustein et al., 2002). In contrast, youth from lower SES families are more likely to experience the financial pressure and, thus, consider economic factors when making educational and career goals and choices and committing to their plans (Ali, McWhirter, & Chronister, 2005; Metheny & McWhirter, 2013).

College Preparation and Influence on Post-high School Education and Work Attainment

College preparation programs aim to provide support, access, and greater exposure to college, and thus, to increase college enrollment. Table 1 summarizes the description and key program elements for the major college preparation programs in American high schools across the nation after the literature review (e.g., Cates & Schaeffle, 2011; Harvill et al., 2012; Venezia & Jaeger, 2013). For example, Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP), Upward Bound, Upward Bound Math-Science, and Talent Search are part of federal TRIO programs that target at low-income, first-generation college students, and individuals with disabilities and prepare them for postsecondary education.

Most of these programs (e.g., Advancement via Individual Determination (AVID), TRIO programs, Tech Prep, Early College High School) share key elements such as providing academic support (e.g., tutoring) and counseling services (e.g., academic advising). AVID, Early College, Dual Enrollment, and Tech Prep programs allow students to take college classes and earn college credit while in high school, which involves certain curriculum alignment between secondary and postsecondary institutions in the state. Free Application for Federal Student Aid (FAFSA) Support, unlike other programs, is unique in providing information and support specific to the federal student aid application. Besides college-oriented elements, Career Academies and Tech Prep programs also have great emphasis on career exploration and preparation for high school students.

Hughes, Rodríguez, Edwards, and Belfield (2012) examined the impact of the whole program, and found that students who participated in a career-focused dual enrollment program were more likely to graduate from high school, enroll in a four-year university, and persist in college. Cates and Schaeffle (2011), however, provided an insight of specific program elements and their impact on students' college readiness. They found that Latina/o students who received more counseling hours in the GEAR UP program were more likely to complete college-track classes (an indicator of college-readiness), but those who received more tutoring were less likely to enroll in college-track courses. College campus visits and receipt of direct college information were the most important self-reported activities that influenced students' decisions to attend college (another indicator of college-readiness). Mentoring, as a common element to many college preparation programs, was not found to be significantly related to the defined college readiness indicators.

Table 1
Description and Key Elements of Major College Preparation Programs

Name	Description	Key Elements
AVID	Prepare underrepresented students for college by placing students in advanced college classes	academic support; college preparation (i.e., application, financial aid, and enrollment processes); college classes; counseling
Early College High School	Prepare students to graduate in four to five years with a high school diploma and an associate's degree or equivalent amount of college credit	academic support; college classes; counseling
GEAR UP	Focus on low-income students' college attendance and success	academic support; counseling; college visits; mentoring; financial support
Career academies*	Prepare students with credentials and skills to transition to postsecondary education and eventually a career	curriculum; academic support; career preparation
Dual enrollment	Provide students with opportunities to earn college credits while in high school	academic support; college classes
FAFSA support	Provide students and their families with information and support in filling out the FAFSA application to attend college	financial aid information; counseling
Upward Bound	Provide low-income, potentially first-generation college students with academic instruction, tutoring, mentoring, counseling, and other services	academic support; counseling; mentoring
Upward Bound Math-Science	Upward Bound programs with focus on improving students' math and science skills and obtaining education and careers in related fields	academic support; counseling; mentoring
Talent Search	Provide low-income but talented students with high-quality tutoring and counseling services and financial planning for postsecondary education	academic support; financial aid information; mentoring; counseling
Tech Prep*	Prepare students for technical occupations with opportunities to earn college credits	curriculum; academic support; career preparation; college classes; counseling

Note. AVID=Advancement via Individual Determination; GEAR UP= Gaining Early Awareness and Readiness for Undergraduate Programs; FAFSA=Free Application for Federal Student Aid. Programs with * also emphasize on career exploration and preparation.

Career Preparation and Influence on Post-high School Education and Work Attainment

Career preparation programs aim to help students connect what they learn in school with possible career options in the future (Hutchins & Akos, 2012). For career preparation programs, its name mostly speaks for its key element (e.g., job fair, internship, apprenticeship). Therefore, some scholars also view these programs as standalone interventions (i.e., discrete activities). For example, Dykeman et al. (2001) reviewed and identified a comprehensive list of career preparation interventions/programs in U.S. secondary schools and categorized them into four types based on five major dimensions: short vs. long term, passive vs. active learning, school vs. community based, group vs. individual, and youth vs. adult directed. The four types included work-based, advising, introductory, and curriculum-based (Dykeman et al., 2001). Work-based interventions/programs usually involve community-based, individual-oriented, active hands-on learning activities that take a relative long time commitment (e.g., internship, apprenticeship). Advising interventions/programs involve school-based, individual-oriented, and adult-directed counseling and planning activities (e.g., career counseling). Introductory interventions/programs involve school-based, group-oriented, active hands-on learning activities that usually last only a short time (e.g., job fair, field trip). Lastly, curriculum-based interventions/programs involve school-based, group-oriented, active hands-on learning curriculum that takes long-time commitment (e.g., career and technical education coursework).

Table 2 summarizes the description and key program elements for the major career preparation programs in American high schools across the nation (e.g., Gamboa et al., 2013; Holzer & Lerman, 2014; Papadimitriou, 2014). Many career preparation programs shared key elements such as performing work and gaining learning experience on the job. For those programs to be successful, careful coordination and strong partnerships between employers and schools are necessary. Internship and youth apprenticeship are the most common work-based learning experience for high school students in the U.S. (Gamboa et al., 2013; Holzer & Lerman, 2014). Students are usually compensated for their service to the employer in forms of income, tuition reimbursement, stipends, etc. And students have opportunities to obtain a permanent position in the company if they demonstrate certain qualities and competencies. Apprentice students also have benefits of receiving on-the-job training and academic instruction that is directly related to the apprenticeship occupation. School-based enterprise (e.g., student-run Café in a high school) allows students to produce goods, offer service, and rotate work at different positions (including management).

Career preparation programs provide students with opportunities to apply what they know in real-world settings and to gain experience in their interested career path (Papadimitriou, 2014). They also allow students to practice leadership skills and develop employability skills, work ethic, and teamwork through working. Neumark and Rothstein (2006) examined student participation in school-to-work programs while in high school and its impact on transitions to employment and higher education. School-to-work programs included job shadowing, mentoring (matching students to an individual in an occupation), cooperative education (combining academic and vocational studies), school enterprise, Tech Prep, and internship/apprenticeship programs. They found that school enterprise programs were associated with a higher likelihood of attainment of some types of postsecondary education; cooperative education and internship/apprenticeship programs were associated with increased employment after high school.

Table 2

Description and Key Elements of Major Career Preparation Programs

Name	Description	Key Elements
Internship	A work experience offered by an employer, with or without pay, to learn about a specific industry or occupation	Intern job tasks; On-the-job learning
Youth Apprenticeship	An intensive work and learning experience for students that requires contractual arrangements between employers and students	Apprentice job tasks; Academic instruction; On-the-job training;
Job Shadowing	A learning experience that observes an employee performing job duties at work to learn about an industry or occupation or what it is like to work	On-the-job learning; Compensation
Cooperative Education	A structured learning experience with classroom education and working on a job in a related field	Career job tasks; Academic instruction; On-the job learning; Compensation;
Career Advising	A career service that helps students to know about oneself and the world of work	Counseling; Career planning; Assessment
Career Day/Job Fair	A recruitment event on campus for employers to hire potential employees	Job fair
Field trip	A planned education journey to an environment outside the classroom	Field trip
Career and Technical Education Coursework	Coherent and sequenced courses with a focus on a career area	Curriculum; Academic instruction; Hands-on practice
School-based Enterprise	A school-sponsored enterprise that allows students to produce goods and offer service	Career job tasks; On-the-job training

Conceptual Framework

Based on the literature, college and career preparation programs play an important role in preparing students for college and careers and producing positive educational and career outcomes. Given the identified key program elements, we aimed to target discrete college and career preparation activities that capture those key program elements and examine the relationship between these activities and the student's post-high school education and work attainment. For example, college preparation activities should be able to capture academic support, seeking information about college and college application, preparing for college exams, taking college classes, and counseling. Career preparation activities should be able to capture participating in different job tasks (e.g., internship, apprenticeship, career job, field trip) and on-the job teaching and learning. Grounded in the literature, demographic variables (e.g., gender, race/ethnicity, SES) and college and career preparation activities were expected to influence a student's education and work attainment, which led to the construction of the conceptual framework of this study. Figure 1 illustrates the relationship among demographic variables, college and career preparation activities, and student outcomes.

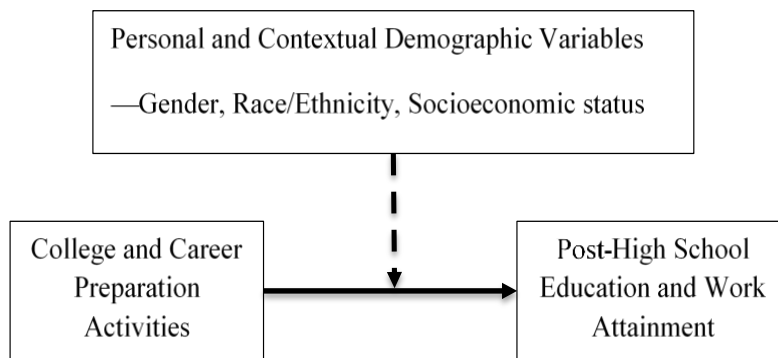


Figure 1. Conceptual model of the study.

Method

Design and Sampling

To link demographic characteristics, college and career preparation activities, and education and work attainment after high school, we employed an *ex-post facto* research design using the High School Longitudinal Study of 2009 (HSLs:2009) public-use data. *Ex-post facto* research is often used in social studies to test hypotheses about cause-and-effect or correlational relationships when it is not possible or acceptable to control or manipulate human participants (Cohen, Manion, & Morrison, 2011). *Ex-post facto* design is appropriate for this study because we aimed to examine the relationships among selected variables on a random sample of students nationwide.

The HSLs:2009 contains a nationally representative cohort of 23,503 high school students in the U.S. who were surveyed multiple times from the beginning of high school through higher education and the workforce. The first wave of data was collected in the fall of 2009 when all students were in 9th grade. The second wave of data was collected in the spring of 2012 when most students were in 11th grade. The third wave of data was collected in the fall of 2013 on students' updates after high school. Students' high school transcripts were collected in the 2013-14 academic year.

Participants for this study included all public school students who participated on three waves of data collection (2009, 2012, and 2013) and received a high school diploma or equivalent as indicated in their high school transcripts ($n=15,268$). Cases with missing values in the independent variables were deleted ($n=355$), and cases with non-positive weights were omitted from analysis ($n=2,696$). Thus, the final study sample size was 12,217, which included 6,046 (49.49%) boys and 6,171 (50.51%) girls. White students ($n= 6, 858$; 56.13%) constituted the majority of the sample. Hispanic students accounted for 15% of the sample ($n=1,871$; 15.31%). And students who were Black ($n=1,185$; 9.70%), Asian ($n=1,113$; 9.11%), who identified themselves with more than one race ($n=1,062$; 8.69%), and those in the other race category ($n=128$; 1.05%) accounted for less than 10% of the sample.

Measures

College and career preparation activities were measured by students' participation in the following activities to prepare for life after high school, a question that was asked in the 2012 Survey. Although the options to the question were not an exclusive list of college and career preparation activities, they seem to capture the most common activities for post-high school preparation. Specifically, career preparation activities include: a) attended career day or job fair (*job fair*), b) participated in internship or apprenticeship related to career goals (*intern/apprentice*), and c) performed paid/volunteer work in job related to career goals (*career job*). College preparation activities include: a) attended a program at, or taken a tour of a college campus (*college tour*), b) sat in on or taken a college class (*college class*), c) searched internet or read college guides for college options (*college search*), d) talked with a high school counselor about options after high school (*high school counselor*), e) talked about options with a counselor hired to prepare for college admission (*college counselor*), and f) took a course to prepare for a college admission exam (*college exam preparation*). For each of the above activity, participation in the activity was coded as 1 and non-participation was coded as 0 (reference group).

Post-high school education and work attainment was measured by students' college and work status by November 1, 2013, the first fall after their high school graduation. College and work status is a composite categorical variable in the 2013 Updates and includes five levels: a) post-high school education and work, b) post-high school education only, c) post-high school work only, d) neither post-high school education nor work, and e) undecided or not known (reference group). Post-high school education indicates that a student was taking postsecondary classes as of November 2013. Post-high school work indicates that a student was working (including apprenticing) as of November 2013. Students who participated the 2013 Updates but did not report on their college and work status were categorized as undecided or not known.

Demographic variables included gender, race/ethnicity, and socio-economic status. Gender was a binary variable with male as the reference group. Race/ethnicity was a composite categorical variable that has six levels: White (reference group), Hispanic, Black, Asian, More than one race, and the other (which includes American Indian, Alaska Native, Native Hawaiian, and Pacific Islander). Socioeconomic status was measured by the composite continuous variable in the HSL:2009 (X2SES_U), which was calculated based on parents/guardians' education, occupations, family income, as well as school urbanicity (urban or rural).

Data Analysis

Data was analyzed using SAS 9.4. Appropriate analytic weight was used to adjust for non-response rates and produce accurate standard error estimates. Because most variables in this study were categorical, for research question one, descriptive statistics such as counts and proportions were used to describe students' college and career preparation activities. Chi-square tests of independence were conducted to determine whether a categorical variable is significantly independent from another categorical variable. For research question two, multinomial logistic regression was conducted to examine the relationship between students' demographic variables (gender, race/ethnicity, SES), participation in college and career preparation activities, and students' post-high school education and work attainment. Multinomial logistic regression was

appropriate for this study because it aims to deal with categorical dependent variables with more than two levels. All independent variables were entered simultaneously into the logistic regression equation to predict the dependent variable. In categorical analysis, an odds ratio indicates the change in the likelihood of an outcome of the dependent variable (i.e., education, work, both, or neither) compared to its reference group (i.e., undecided or not known) is due to the change in an independent variable, controlling other independent variables constant. An odds ratio greater than 1 indicates the likelihood of an outcome increases when the independent variable changes. An odds ratio less than 1 indicates the likelihood of an outcome decreases when the independent variable changes.

Results

Research Question 1: What College and Career Preparation Activities did High school Students Participate In?

Table 3 shows the counts and proportions of public high school students and their participation in college and career preparation activities in the U.S. The college preparation activity most students participated in was college search, which accounted for 84.82% ($n=10,362$) of public high school students, followed by consulting a high school counselor for options after high school ($n=7,590$; 62.13%), college tour ($n=6,329$; 51.80%), and college exam preparation ($n=5,425$; 44.41%). The career preparation activity most students participated in was attendance of career day or job fair ($n=6,017$; 49.25%). The rank of popularity of those activities was the same among boys and girls. Seventy-nine percent of boys and 90% of girls searched for college information during high school. Chi-square test for independence indicates gender difference among students' participation in college search ($\chi^2(1) = 123.62, p < .001$), college tour ($\chi^2(1) = 10.31, p = .001$), college class ($\chi^2(1) = 11.73, p < .001$), and career job activity ($\chi^2(1) = 7.21, p = .007$), with a higher proportion of girls participating these activities than boys.

Table 3

Participation in College and Career Preparation Activities by Gender (Unweighted and Weighted)

	Total		Male		Female	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Career Preparation Activities						
	6,017	49.25	2,895	47.88	3,122	50.59
1. Job fair	<i>1,627,406</i>	<i>48.78</i>	<i>795,762</i>	<i>47.95</i>	<i>831,644</i>	<i>49.61</i>
	4,267	34.93	1,980	32.75	2,287	37.06
2. Career job	<i>1,148,607</i>	<i>34.43</i>	<i>542,892</i>	<i>32.71</i>	<i>605,714</i>	<i>36.13</i>
	1,940	15.88	990	16.37	950	15.39
3. Intern/Apprentice	<i>564,640</i>	<i>16.93</i>	<i>293,033</i>	<i>17.66</i>	<i>271,607</i>	<i>16.20</i>
College Preparation Activities						
	10,362	84.82	4,778	79.03	5,584	90.49
1. College search	<i>2,759,923</i>	<i>82.73</i>	<i>1,256,968</i>	<i>75.74</i>	<i>1,502,956</i>	<i>89.65</i>
	7,590	62.13	3,600	59.54	3,990	64.66
2. High school counselor	<i>2,088,427</i>	<i>62.60</i>	<i>1,016,287</i>	<i>61.24</i>	<i>1,072,140</i>	<i>63.95</i>
	6,329	51.80	2,953	48.84	3,376	54.71
3. College tour	<i>1,721,974</i>	<i>51.62</i>	<i>818,749</i>	<i>49.34</i>	<i>903,225</i>	<i>53.88</i>
	5,425	44.41	2,600	43.00	2,825	45.78
4. College exam preparation	<i>1,376,529</i>	<i>41.26</i>	<i>662,052</i>	<i>39.89</i>	<i>714,476</i>	<i>42.62</i>
	3,349	27.41	1,519	25.12	1,830	29.65
5. College class	<i>877,557</i>	<i>26.31</i>	<i>401,238</i>	<i>24.18</i>	<i>476,319</i>	<i>28.41</i>
	1,344	11.00	664	10.98	680	11.02
6. College counselor	<i>396,232</i>	<i>11.88</i>	<i>189,601</i>	<i>11.42</i>	<i>206,632</i>	<i>12.33</i>

Note. Weighted counts and proportions are italicized.

Table 4 shows participation in college and career preparation activities by racial/ethnicity status. Among all racial/ethnic groups, the most participated college preparation activity remained college search and the most participated career preparation activity was job fair. Chi-square test for independence indicates that race/ethnicity was significantly dependent from all college and career preparation activities except the college tour, which was not significant ($\chi^2(5) = 4.16, p = .526$). For example, college search and college exam preparation were the least popular activities among Hispanic students compared to other racial/ethnic groups. Black students were more interested in consulting a high school counselor and attending a career day or job fair. Asian students were more interested in college exam preparation, working in jobs related to career goals, and taking college classes.

Table 4

Participation in College and Career Preparation Activities by Race/Ethnicity (Unweighted and Weighted)

	White		Hispanic		Black		Asian		Multi-Race		Other	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Career Preparation Activities												
1. Job fair	3,365	49.07	851	45.48	674	56.88	524	47.08	539	50.75	64	50.00
	<i>861,420</i>	<i>49.56</i>	<i>312,426</i>	<i>42.74</i>	<i>241,846</i>	<i>55.42</i>	<i>58,032</i>	<i>45.43</i>	<i>137,910</i>	<i>51.20</i>	<i>15,772</i>	<i>47.24</i>
2. Career job	2,347	34.22	594	31.75	435	36.71	462	41.51	381	35.88	48	37.50
	<i>591,286</i>	<i>34.02</i>	<i>225,958</i>	<i>30.91</i>	<i>165,799</i>	<i>38.00</i>	<i>55,213</i>	<i>43.23</i>	<i>96,924</i>	<i>35.98</i>	<i>13,427</i>	<i>40.21</i>
3. Intern/ Apprentice	958	13.97	339	18.12	249	21.01	213	19.14	154	14.50	27	21.09
	<i>245,109</i>	<i>14.10</i>	<i>130,496</i>	<i>17.85</i>	<i>109,293</i>	<i>25.05</i>	<i>31,907</i>	<i>24.98</i>	<i>39,986</i>	<i>14.85</i>	<i>7,849</i>	<i>23.51</i>
College Preparation Activities												
1. College search	5,790	84.43	1,510	80.71	1,036	87.43	995	89.40	925	87.10	106	82.81
	<i>1,448,012</i>	<i>83.31</i>	<i>564,155</i>	<i>77.18</i>	<i>377,688</i>	<i>86.56</i>	<i>112,973</i>	<i>88.45</i>	<i>229,198</i>	<i>85.09</i>	<i>27,897</i>	<i>83.55</i>
2. High school counselor	4,193	61.14	1,132	60.50	853	71.98	692	62.17	648	61.02	72	56.25
	<i>1,106,060</i>	<i>63.63</i>	<i>424,929</i>	<i>58.13</i>	<i>305,782</i>	<i>70.08</i>	<i>75,367</i>	<i>59.00</i>	<i>159,290</i>	<i>59.14</i>	<i>16,999</i>	<i>50.91</i>
3. College tour	3,568	52.03	897	47.94	670	56.54	582	52.29	546	51.41	66	51.56
	<i>897,361</i>	<i>51.63</i>	<i>358,979</i>	<i>49.11</i>	<i>234,885</i>	<i>53.83</i>	<i>66,673</i>	<i>52.20</i>	<i>147,094</i>	<i>54.61</i>	<i>16,982</i>	<i>50.86</i>
4. College exam prep.	2,950	43.02	743	39.71	583	49.20	630	56.60	465	43.79	54	42.19
	<i>729,245</i>	<i>41.95</i>	<i>245,565</i>	<i>33.59</i>	<i>202,252</i>	<i>46.35</i>	<i>71,305</i>	<i>55.82</i>	<i>117,622</i>	<i>43.67</i>	<i>10,540</i>	<i>31.57</i>
5. College class	1,816	26.48	479	25.60	328	27.68	386	34.68	305	28.72	35	27.34
	<i>456,494</i>	<i>26.26</i>	<i>171,637</i>	<i>23.48</i>	<i>123,189</i>	<i>28.23</i>	<i>43,641</i>	<i>34.17</i>	<i>70,926</i>	<i>26.33</i>	<i>11,671</i>	<i>34.95</i>
6. College counselor	602	8.78	245	13.09	211	17.81	148	13.30	118	11.11	20	15.63
	<i>158,519</i>	<i>9.12</i>	<i>103,659</i>	<i>14.18</i>	<i>79,292</i>	<i>18.17</i>	<i>20,692</i>	<i>16.20</i>	<i>28,144</i>	<i>10.45</i>	<i>5,927</i>	<i>17.75</i>

Note. Weighted counts and proportions are italicized.

Research Question 2: Did Gender, Race/ethnicity, Socioeconomic Status, and Students' College and Career Preparation Activities Predict Their Post-high School Education and Work Attainment?

For students' post-high school education and work attainment, about 40% of participants ($n=4,744$) were attending postsecondary education while working at the same time (see Table 3). About 24% of participants ($n=2,959$) were attending postsecondary education only and 13% of participants ($n=1,536$) were working only. About 4% of participants ($n=436$) were neither attending postsecondary education nor working. And 21% of participants ($n=2,542$) were undecided about their plans after high school. Chi-square test for independence indicates that gender ($\chi^2(4) = 35.69, p < .001$) and race/ethnicity ($\chi^2(20) = 94.62, p < .001$) were statistically significant dependent from post-high-school outcomes, meaning that there were gender and race/ethnicity differences among students' post-high school education and work attainment (see Table 5 & 6).

Table 5

Post-high School Education and Work Attainment by Gender (Unweighted and Weighted)

	Total		Male		Female	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
1. Both education and work for pay	4,744	38.83	2,135	35.31	2,609	42.28
	<i>1,294,327</i>	<i>38.80</i>	<i>599,692</i>	<i>36.14</i>	<i>694,635</i>	<i>41.43</i>
2. Education only	2,959	24.22	1,434	23.72	1,525	24.71
	<i>756,755</i>	<i>22.68</i>	<i>353,639</i>	<i>21.31</i>	<i>403,115</i>	<i>24.05</i>
3. Work only	1,536	12.57	930	15.38	606	9.82
	<i>449,597</i>	<i>13.48</i>	<i>267,602</i>	<i>16.13</i>	<i>181,995</i>	<i>10.86</i>
4. Neither	436	3.57	245	4.05	191	3.10
	<i>127,572</i>	<i>3.82</i>	<i>67,180</i>	<i>4.05</i>	<i>60,392</i>	<i>3.60</i>
5. Undecided or not known	2,542	20.81	1,302	21.53	1,240	20.09
	<i>707,742</i>	<i>21.22</i>	<i>371,432</i>	<i>22.38</i>	<i>336,310</i>	<i>20.06</i>

Note. Weighted counts and proportions are italicized.

Table 6

Post-high School Education and Work Attainment by Race/Ethnicity (Unweighted and Weighted)

	White		Hispanic		Black		Asian		Multi-Race		Other	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
1. Both education and work for pay	2,686	39.17	769	41.10	426	35.95	379	34.05	435	40.96	49	38.28
	<i>674,914</i>	<i>38.83</i>	<i>288,620</i>	<i>39.48</i>	<i>150,444</i>	<i>34.48</i>	<i>43,538</i>	<i>34.09</i>	<i>120,937</i>	<i>44.90</i>	<i>15,875</i>	<i>47.54</i>
2. Education only	1,715	25.01	330	17.64	280	23.63	375	33.69	232	21.85	27	21.09
	<i>442,630</i>	<i>25.47</i>	<i>126,394</i>	<i>17.29</i>	<i>87,064</i>	<i>19.95</i>	<i>44,783</i>	<i>35.06</i>	<i>49,956</i>	<i>18.55</i>	<i>5,927</i>	<i>17.75</i>
3. Work only	921	13.43	288	15.39	145	12.24	47	4.22	122	11.49	13	10.16
	<i>241,003</i>	<i>13.87</i>	<i>112,133</i>	<i>15.34</i>	<i>59,185</i>	<i>13.56</i>	<i>3,966</i>	<i>3.10</i>	<i>30,883</i>	<i>11.47</i>	<i>2,427</i>	<i>7.27</i>
4. Neither	221	3.22	68	3.63	58	4.89	32	2.88	51	4.80	6	4.69
	<i>57,622</i>	<i>3.32</i>	<i>28,441</i>	<i>3.89</i>	<i>23,307</i>	<i>5.34</i>	<i>3,457</i>	<i>2.71</i>	<i>13,681</i>	<i>5.08</i>	<i>1,064</i>	<i>3.19</i>
5. Undecided or not known	1,315	19.17	416	22.23	276	23.29	280	25.16	222	20.90	33	25.78
	<i>322,011</i>	<i>18.53</i>	<i>175,395</i>	<i>23.99</i>	<i>116,355</i>	<i>26.67</i>	<i>31,990</i>	<i>25.04</i>	<i>53,896</i>	<i>20.01</i>	<i>8,097</i>	<i>24.25</i>

Note. Weighted counts and proportions are italicized.

Post-high school education and work. Statistically significant predictors for post-high school education and work included gender, race (Black), SES, college search, and taking college classes. Compared to boys, girls were 22% more likely to attend postsecondary education and work at the same time (odds ratio=1.220, $p=.021$), controlling other predictors. Students who identified themselves as Black were 37.7% less likely than White students to attend postsecondary education and work at the same time (odds ratio=.623, $p=.033$). Controlling other predictors, for every one-unit increase in SES, the odds of post-high school education and work increased by 18.6% (odds ratio=1.186, $p=.005$). In terms of college and career preparation activities, students who had conducted college searches were 60.2% more likely to attend postsecondary education and work at the same time than those who had not conducted any college searches (odds ratio= 1.602, $p<.001$). Students who had taken college classes while in high school were 25.6% more likely to attend postsecondary education and work at the same time than those who had not taken college classes (odds ratio=1.256, $p=.026$).

Post-high school education only. Statistically significant predictors for post-high school education only included SES, college search, college tour, college exam preparation, and taking college classes. Controlling other predictors, for every one-unit increase in SES, the odds of post-high school education only increased by 108.3% (odds ratio=2.083, $p<.001$). In terms of college and career preparation activities, students who had conducted college searches were 84.4% more likely to attend postsecondary education than those who had not searched for college information (odds ratio=1.844, $p<.001$). Students who had taken college tours while in high school were 29.3% more likely to attend postsecondary education than those who had not taken college tours (odds ratio=1.293, $p=.005$). Students who had prepared for college entrance exams were 30.3% more likely to attend postsecondary education than those who had not prepared for college exams (odds ratio=1.303, $p=.008$). And students who had taken college classes while in high school were 25.6% more likely to attend postsecondary education than those who had not taken college classes (odds ratio=1.256, $p=.019$).

Post-high school work only. Statistically significant predictors for post-high school work only included race (Asian), SES, talk to a high school counselor, college tour, and college exam preparation. Compared to White students, Asian students were 83.1% less likely to work after high school (odds ratio=.169, $p<.001$). For every one-unit increase in SES, the odds for work only decreased by 25.8% (odds ratio=.742, $p<.001$), controlling other predictors. In terms of college and career preparation activities, students who had talked to a high school counselor were 20.3% less likely to work after high school than those who had not communicated with a high school counselor (odds ratio=.797, $p=.037$). Students who had taken college tours while in high school were 20.7% less likely to work after high school than those who had not taken college tours (odds ratio=.793, $p=.035$). And students who had prepared for college entrance exams were 36.8% less likely to work after high school than those who had not prepared for college exams (odds ratio=.632, $p<.001$).

Neither post-high school education nor work. Statistically significant predictors for neither post-high school education nor work included SES. Controlling other predictors, for every one-unit increase in SES, the odds for neither education nor work after high school decreased by 24.9% (odds ratio=.751, $p=.044$).

Discussion

This study examined students' participation in college and career preparation activities in public high schools in the U.S. and the relationship between these preparation activities and students' education and work attainment one year after high school. Results revealed that students were highly involved in preparation activities for education and careers after high school, reflecting use of adaptive strategies to navigate the transition to postsecondary education and employment as well as to achieve their academic and career goals (Lent & Brown, 2013). The college preparation activity most students participated in was college search with more than 80% of engagement among public high school students; and the career preparation activity most students participated in was attending career day or job fair, which accounted almost half of all students. Other common college preparation activities students participated in included consulting high school counselors for options after high school and college tour. All of the above activities share a commonality of seeking information about college and careers. This finding echoes previous studies on: (a) direct information about college and careers were found to be more helpful to students (Cates & Schaeffle, 2011); and (b) career development is a process of understanding the self and external environment (Farb & Matjasko, 2012). Seeking information about options after high school awakens students' interests about their own personal and professional growth (Dykeman et al., 2001) and facilitates their decision-making processes (National High School Center, 2008).

College preparation activities, in general, had significant impact on students' education and work attainment within one year after high school. Specifically, significant predictors varied depending on which outcomes (i.e., education and work) were being considered. Taking college classes while in high school had significant influence on three outcomes after high school: post-high school education and work, education only, and work only. This finding is consistent with previous research finding that programs that allow students to take college credits in high school despite college- or career-oriented, have a positive impact on students' college and career readiness (CCRC, 2008; Cates & Schaeffle, 2011). College search activity had a significant positive influence on post-high school education outcomes, in spite of working for pay or not; it sends a clear message that students who were actively searching for college information were likely to be college-bound students with goals to continue education after high school. College exam preparation had significant positive influence on post-high school education only but negative influence on post-high school work only; it is also clear that students who had prepared for college entrance exams were likely to continue their education instead of entering the workforce. College tour activity had significant positive influence on post-high school education only. Talking to high school counselors about options after high school had significant negative influence on post-high school work only, indicating that students who had done so were less likely to enter the workforce without going to college.

Career preparations activities, in general, did not have significant impact on students' education and work attainment one year after high school. This finding does not align with Neumark and Rothstein's (2006) study, in which school enterprise programs (including career job activities) were associated with a higher likelihood of attainment of some college education and internship/apprenticeship were associated with increased employment after high school. This might be because the education and work attainment used in this study were reported the first fall

right after the high school graduation. Neumark and Rothstein (2006) only mentioned that students were 18 years or older but did not specify the exact year after high school in which the education and employment outcomes were measured. Future research should evaluate long term educational and employment outcomes (e.g., three or five years after high school) to examine the impact of career preparation activities. Since most job openings are middle-skills jobs that require some form of postsecondary education, even though those career preparation activities led to certain college and career readiness, students need further education, training, and working experience to be competent and become future ready citizens.

Study findings support the idea that all students benefit from some college level experience out of high school, though this may look different depending on students' career goals. For students who wish to be more career focused, for example, college level experience may mean community college or specialized technical education training after high school. For CTE, the implications are to encourage career-focused high-school students to explore CTE options and guide them to post-high school education that will help them advance in their careers. At the same time, it could be that CTE needs to continue to consider how college and career activities relate to each other synergistically, even if some students are more academic and others are more career focused. Future research and policy would do well to consider exploring activities and even programs that are more wholistic in their view of how education and skills complement each other, regardless of students' career choices—that is, whether they choose to go into careers sooner or later.

In terms of demographic variables, more girls participated in college and career preparation activities than boys, which indicates that girls were more adaptive than boys in preparing for transitions to postsecondary education and employment. The highest difference existed in participating in the college search activity, with almost 90% for girls and 77% for boys. Slight differences existed in participating in college tour, career job, and college class activities. Racial/ethnic differences were found in students' participation in all college and career preparation activities except the college visits. Hispanic students' participation rate was relatively lower than other racial/ethnicity groups in college search and college exam preparation, which is consistent with previous research (e.g., Cates & Schaeffle, 2011). For post-high school education and work attainment, the proportion of Black and Asian students who attained post-high school education and work were relatively lower than other racial/ethnicity groups. Asian students were the largest racial/ethnicity group who attained post-high school education only, but also the least racial/ethnicity group who attained work only. The findings imply that Asian students might experience less financial burdens than other race/ethnicity groups to complete college education.

SES was the only significant predictor across all post-high school education and work outcomes. With the increase of SES, students will more likely to attend college instead of entering the workforce or remaining undecided about pathways after high school. This finding is consistent with previous research (e.g., Conger, Conger, & Martin, 2010; Rojewski & Kim, 2003). Higher SES indicates more educational, financial, and social resources that youth can access. Youth from these families will likely have higher levels of education attainment and aspire to occupations that are more prestigious. In contrast, youth from lower SES families will likely experience financial burdens to contribute to the family or support their own education and

living expenses, which causes them to work for pay to reduce financial burdens that might lead to a lack of concentration on study and school engagement (Pusser, 2010; Ziskin et al., 2010).

Limitations of the Study

Readers should interpret findings of this study with consideration of several limitations. First, using data from an existing dataset, items selected to measure students' participation in college and career preparation activities may not reflect the quality and actual nature of a preparation activity of interest. Therefore, the results may not align with other research with more robust measures. For example, we used binary variables to measure participation or not but we had no idea of how often and how much engaged a student was regarding this activity. Talking to a counselor may occur in a variety of ancillary ways but not quite amounting to the actual college and career counseling that is usually referred to in the counseling and guidance literature. Secondly, students' college and work status after high school graduation is a self-reported measure so we could only assume their real status was as accurate as their responses. Regardless, the findings of the study lead to important implications for the field of CTE as discussed below.

Implications

To reform American students' high school experience and prepare for college- and career-ready 21st century citizens, high school administrators should extend the access to college and career preparation activities or programs for all students and policy-makers need to support such measures. As noted, both research and policy would do well to explore programs which look at activities and programs that consider college and career in a more wholistic and synergistic way. Providing high-quality college and career exploration and counseling options, such as reviewing options after high school with the student, offering direct information about college and careers, and extend exposure to college and career environment are likely to help students navigate transitions after high school. For students who are in low-income communities where few adults have completed college and for public schools are badly under-resourced, students may have no one to turn to for information or support (Rosenbaum et al., 2010). High schools should provide academic and career advising services for those students and teachers may integrate college and career introductory interventions into curriculum and classroom instruction to deliver the information and support to students. Exposure to further education and career options will push students to start to think about educational and career choices to make in immediate future and manage to develop the knowledge and skills to become college- and career-ready.

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