Planning for the Future: Early Academic Achievement, Educational Aspirations, and Interest-Career Similarity Important for College Enrollment

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Introduction

How can we help students plan for the future? We can do this by helping school counselors, teachers, and parents find out early how to better prepare students for college and career. Prepared middle school students are more informed and able to take actions toward success when they receive personalized insights about factors that influence their later education decisions.

According to the Georgetown Center for Education & Workforce, two-thirds of all 2020 projected jobs in the US economy required postsecondary education or training beyond high school (Carnevale, Smith, & Strohl, 2014). Additionally, 9 out of 10 new jobs are going to those with a college degree.[1] These job trends highlight the importance of college-going behavior and the need to focus early (when there are more opportunities to shape students' education and career trajectories) on relevant factors related to college enrollment. Understanding the effect of middle school students' achievement in academic subjects, future education plans, and the similarity between interests and career plans on subsequent college enrollment helps school counselors, teachers, and parents focus on how to assist students in ways that can increase college-going behavior. The goal of this study was to explore these early academic and noncognitive factors related to college enrollment.

The sample for this study included 214,621 8th-grade students with academic achievement, career interest, and educational aspiration information obtained during the 2009–2010 academic school year (see Table 1 for background characteristics of sample). Subsequently, these students enrolled (66.1%) or did not enroll (33.9%) in either two- or four-year private or public colleges as full-time students the fall of 2014 after they graduated from high school. Measures of academic and noncognitive factors were extracted from the 8th-grade self-report student data and test scores,[2] while college enrollment data were extracted from the National Student Clearinghouse.[3] Analyses were conducted using statistical tests of proportions, mean differences, and logistic regression.[4] These grade 8 data, and their corresponding results, are intended to establish a baseline from which future longitudinal data with the same measures will be compared.

Table 1. Background Characteristics of Sample

	Characteristics	Percent (%)
Race/Ethnicity	Caucasian American/White	62.3
	African American/Black	14.2
	Mexican American/Chicano	7.4
	Asian American/Pacific Islander	3.9
	Multicultural	1.9
	American Indian/Alaskan Native	1.4
	Puerto Rican/Cuban/other Hispanic	1.4
	Did not include race/ethnicity	7.6
Gender	Female	51.2
	Male	47
	No response	1.8
Parent's Education Level	Some education or degree above 4-year college degree	16.9
	4-year college degree	19.7
	2-year college degree	7.6
	Career/technical training	4.4
	Some college but obtained no degree	9.4
	High school diploma or equivalent	12.9
	Did not complete high school	5.2
	Did not indicate parents' education level	24

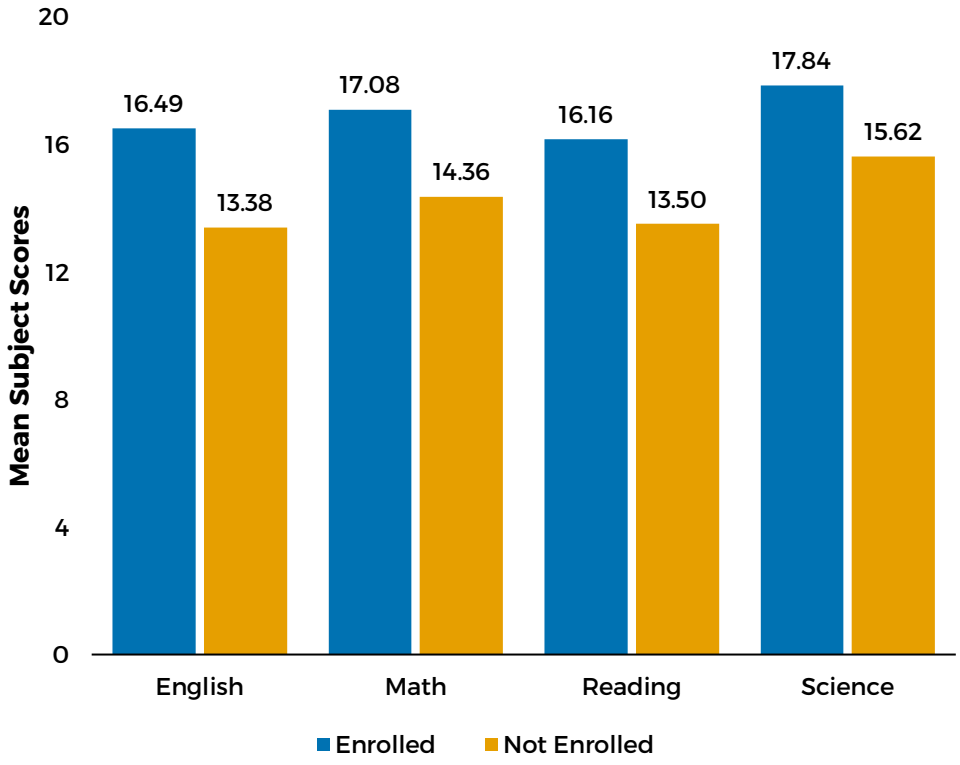
Higher 8th-Grade Achievement in Four Academic Subjects Positively Influences College Enrollment

Academic achievement is a critical indicator of whether students are ready to and do succeed academically in college. Research has also shown that as early academic achievement increases, so does later college enrollment. A prior study examined the relationship between the EXPLORE Composite standardized test score (based on English, math, reading, and science scores) among 8th-grade students and college enrollment rates in two-year or four-year colleges (Buddin, 2012). Results clearly indicated that students who perform better academically in 8th grade are more likely to enroll in college.

The current study provides results on 8th-grade students' achievement in each of the four academic subjects by their college enrollment status. Figure 1 shows mean subject scores at 8th grade for students who eventually enrolled in college and those who did not. Comparing the means for each subject between the college enrollment groups, students who eventually enrolled in college obtained higher mean subject scores for all subjects when they were in 8th grade (statistically significant at a = 0.05 for each subject). For English, there is over a 3-point mean score difference between students who went on to enroll in college compared to those who did not (t = 176.74,

$p < .001$, df = 155377; Cohen's $d = 0.80$). The mean score difference is over 2.5 for math ($t = 166.73$, $p < .000$, df = 134643.6; Cohen's $d = 0.77$), over 2.5 as well for reading ($t = 161.87$, $p < .000$, df = 160551; Cohen's $d = 0.73$), and for science, the mean score difference exceeds 2 points ($t = 163.69$, $p < .000$, df = 144401; Cohen's $d = 0.75$). Our modeling of college enrollment using each subject score separately supports this finding, with higher academic subject scores increasing the odds of going to college (for all subjects).

Figure 1. Eighth Grade Students' Mean Academic Subject Scores by College Enrollment Status



Eighth-Grade Students with Higher Educational Aspirations are More Likely to Enroll in College

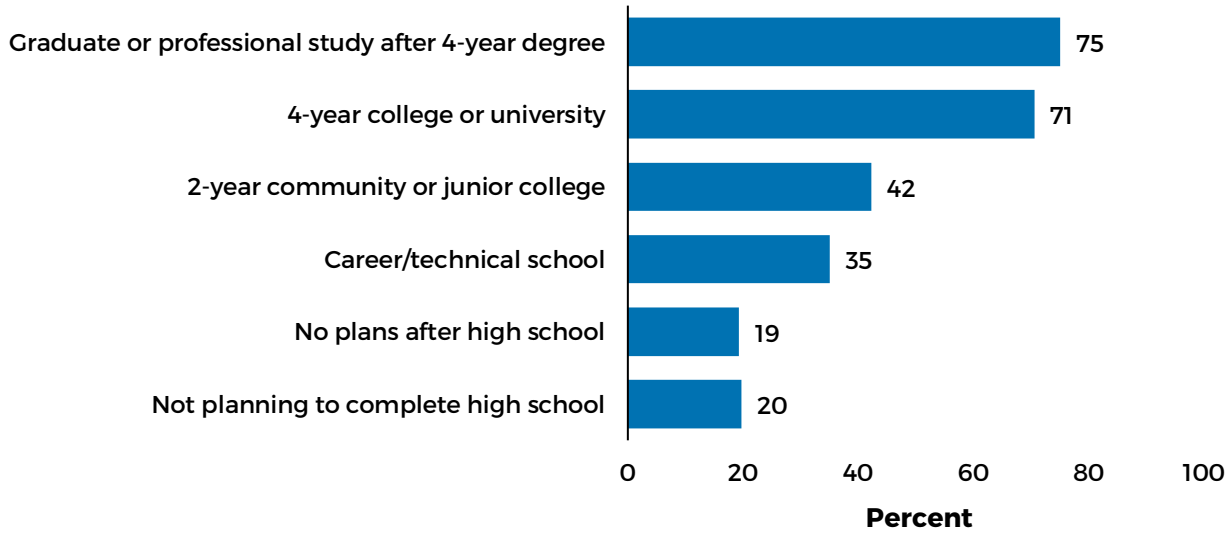
Aspirations to attend college are a signal for future college-going behavior. Research has shown that students in 10th grade whose educational aspirations are to go to college are more likely to enroll in college than students who had not developed these aspirations (Poynton & Lapan, 2017). This study also showed that college-aspiring 10th-graders were more likely to intend to go to college during the 12th grade than those not aspiring to college. This work highlights the importance of cultivating educational aspirations among younger students given that earlier aspirations further bring about later aspirations, and these aspirations contribute to college-going behavior.

Expanding on the 10th-grade research, the current study focuses on earlier educational aspirations of students in 8th grade and their future college enrollment. Overall, educational aspirations (see Table 2 for percentage of students responding to each option) among the 8th graders in this sample had a statistically significant relationship to whether these students later enrolled in college full-time the fall of 2014 after they graduated from high school (χ^2 = 13154.19, p< .000, df = 5). Figure 2 shows that over 70% of 8th graders aspiring to a four-year college or higher eventually enrolled in college. This is more than three times the percentage of students who have no plans after high school. Over one-third of students aspiring to a two-year college (42%) or career/technical school (35%) enrolled in college four years later. Clearly, higher educational aspirations among 8th graders are associated with higher rates of college enrollment. Only 1 in 5 students in 8th grade without aspirations beyond high school went on to college the fall after their high school graduation.

Table 2. Educational Aspirations of 8th Graders

Characteristics	Percent (%)
Graduate/professional studies after 4-year degree	40.34
4-year college or university	31.29
2-year community or junior college	3.06
Career/technical training	6.71
High school diploma or equivalent	0.59
No plans after high school	17.86
Not complete high school	0.14

Figure 2. Percentage of 8th-Grade Students Enrolling in College by Educational Aspirations



Greater Similarity Between 8th Graders' Interests and Career Plans Affects their Chances of College Enrollment

Middle school students' interests are typically still broad, although they are becoming more distinct and stable. Interests help motivate learning and achievement (Schiefele, Krapp, & Winteler, 1992). Interests encourage exploration of personally-relevant education and career options, leading to informed future choices (Izard & Ackerman, 2000). Further, education and career choices where high school students' interests are a good match with the characteristics of their chosen education options (e.g., major) contribute to positive outcomes such as college persistence and degree attainment (Allen & Robbins, 2008, 2010). The match between interests and careers also contribute to job performance and job satisfaction (Nye, Su, Rounds, & Drasgow, 2012; Van Iddekinge, Roth, Putka, & Lanivich, 2011; Kristof-Brown, Zimmerman, & Johnson, 2005). Understanding the similarity between middle school students' interests and future career plans as it relates to college enrollment provides an early opportunity to facilitate efforts to increase later college-going behavior.

In this study, interest-career similarity was based on how similar the position between measured interest results identified as regions on the ACT Career Map and planned career choice identified as career areas located in their respective regions.[5] Interest-career similarity ranged from 0 to 7 with a larger number representing more similarity between interests and career plans. Table 3 shows the percentage of students represented across the similarity range.

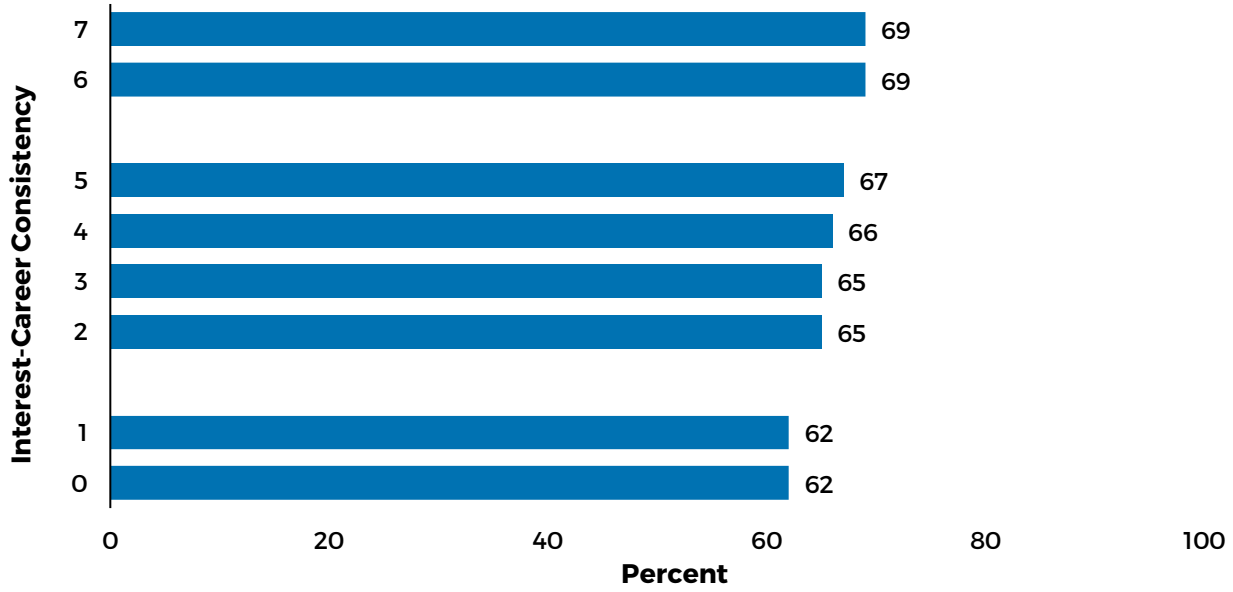
Table 3. 8th Graders' Interest-Career Similarity

Similarity #	Percent
7 (highest similarity)	10.9
6	21.0
5	17.1
4	13.7
3	9.5
2	7.9
1	3.5
0 (lowest similarity)	8.0
Missing	8.3

Taken by itself, interest-career similarity among 8th graders had a significant relationship with later college enrollment full-time the fall of 2014 after they graduated from high school ($\chi 2 = 490.8875$, $p < .001$, $df = 7$). Figure 3 shows that with an increase in interest-career similarity, there is a steady increase in the percentage of students later enrolling in college. Over two-thirds (69%) of students whose interests and career plans are highly similar (6–7) enrolled in college, while less than two-thirds (62%) of students having low similarity (0–1) between their interests and career plans later enrolled in college. Given that students' interests tend to be broader during

middle school, it is noteworthy that interest-career similarity results among 8th graders reflect differences in college-going behavior.

Figure 3. Percentage of 8th Grade Students Enrolling in College by Interest-Career Similarity



Higher Grade 8 Academic Achievement, Educational Aspirations, and Interest-Career Similarity Together Increase Odds of Enrolling in College

We employed a full multiple logistic regression in modeling college enrollment using student background characteristics, educational plans, interest-career similarity, and 8th-grade subject test scores (see Appendix for regression model results). Students' 8th-grade subject test scores, their interest-career similarity at 8th grade, and three out of five of the aspirational education plans at 8th grade showed significant relationships with their eventual college enrollment. Nearly all these significant relationships were positive. That is, higher levels on each of these factors are associated with greater odds of enrolling in college. The exception is with students' educational aspiration (where reference value is 'not planning to complete high school') of only getting a high school diploma, which led to a marginally significant decrease in the odds of going to college. Eighth-grade students aspiring to either a four-year college or graduate/professional school showed the highest increases in odds of going to college. Students with higher interest-career similarity, or higher 8th-grade subject test scores in English, reading, math, or science have better odds of going to college. All relationships between the factors of interest and college enrollment are controlled for gender, race/ethnicity, and parent's education level.

Actionable Insights to Help Students Better Prepare for the Future

Strengthen Academic Achievement

- Gauge areas where students need more help using the difference between a student's score and an average score for all students at a grade level for the four academic subjects. Then, focus on the concepts within subjects needing further development to better target interventions.
- Assist students with learning more difficult subjects through enhanced relevance and engagement, both in-class and with homework. This is facilitated using knowledge of student interests during the instruction process.
- Help students better understand the benefits of mastering specific academic subjects by contextualizing the use of academic concepts through real world examples.

Build up Educational Aspirations

- Help students understand the importance and personal relevance of education after high school using interests to encourage exploring required education for desired careers. And then, show students how their career options can be expanded by obtaining postsecondary education.
- Bring to light the multitude of education options available after high school by engaging students in experiences that familiarize them with different postsecondary options (e.g., interview older students taking dual enrollment courses).
- Motivate students to consider college in their future by helping them build high school education plans that are linked to postsecondary training.

Boost Interest-Career Similarity

- Further students' interest development by providing opportunities to widen their experiences and try out new things that will help them build on and refine what they like and dislike.
- Help students connect who they are with what the world has to offer using relevant tools and resources to identify career paths that align with their personal characteristics.
- As school counselors, teachers, and parents, discuss college and career planning early and often with students to support greater interest-career similarity, as well as facilitate higher educational aspirations and achievement.

Appendix

Table A1. Full Logistic Regression Model Results

	Estimate	Std. Error	z value	Pr(>|z|)	Sig
(Intercept)	-5.378946	0.208517	-25.796	< 2e-16	***
GenderFemale	0.397804	0.014696	27.07	< 2e-16	***
EthnicityAfrican_American	0.179714	0.01956	9.188	< 2e-16	***
EthnicityAmerican_Indian	0.035012	0.05571	0.628	0.5297	
EthnicityAsian_American	0.255562	0.040298	6.342	2.27E-10	***
EthnicityHispanic	0.130375	0.060664	2.149	0.03162	*
EthnicityMexican_American	0.085074	0.027522	3.091	0.00199	**
EthnicityMultiracial	-0.099679	0.048559	-2.053	0.0401	*
ParentEdCareerTraining	0.59543	0.037074	16.061	< 2e-16	***
ParentEdCollege2	0.910205	0.033283	27.347	< 2e-16	***
ParentEdCollege4	1.335708	0.030512	43.776	< 2e-16	***
ParentEdCollegeNoDegree	0.751691	0.031952	23.526	< 2e-16	***
ParentEdGraduate	1.322648	0.031823	41.563	< 2e-16	***
ParentEdHighSchool	0.369476	0.029941	12.34	< 2e-16	***
WWM_Career_Num	0.008018	0.003328	2.409	0.01599	*
SSEdPlanCareerTraining	0.140725	0.204145	0.689	0.49061	
SSEdPlanCollege2	0.479558	0.205488	2.334	0.01961	*
SSEdPlanCollege4	1.136373	0.203179	5.593	2.23E-08	***
SSEdPlanGraduate	1.175358	0.203201	5.784	7.28E-09	***
SSEdPlanHighSchool	-0.427264	0.224589	-1.902	0.05712	.
Expl_English_Score	0.054719	0.002845	19.234	< 2e-16	***
Expl_Reading_Score	0.027055	0.002941	9.2	< 2e-16	***
Expl_Math_Score	0.09172	0.003098	29.61	< 2e-16	***
Expl_Science_Score	0.078061	0.003707	21.059	< 2e-16	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

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Notes

[1] Based on a three-month average, "91% of the net increase in jobs held by those at least 25 years old are filled by those with at least a bachelor's degree" according to data compiled by MarketWatch using the May 2018 jobs report released by the US Department of Labor (Goldstein, 2018).

[2] Data for this study included grade 8 students who took the ACT Explore assessment in 2009–2010 as part of the longitudinal assessment component of ACT's College Readiness System, which consists of four tests (English, mathematics, reading, and science) and self-report items completed prior to testing.

[3] The grade 8 student data were matched to the National Student Clearinghouse data via the ACT 2014 graduation class data. National Student Clearinghouse data included college enrollment during the Fall of 2014.

[4] Relationships of individual academic and noncognitive variables to college enrollment (referenced in Figures 1–3) were evaluated using statistical tests of proportions (for categorical variables) and differences between two group means (for numerical variables). A more inclusive look at these relationships was conducted by modeling college enrollment using all these variables, controlling for race/ethnicity, gender, and parent's education level (results described on page 5). To do this, we conducted multiple imputation, given the missingness of data for some of these variables, prior to developing the model using logistic regression.

[5] The ACT Career Map is an empirically based tool for occupational exploration and Interest Inventory score interpretation. The map visually displays the similarities and differences between occupations by showing the locations of 26 career areas (groups of similar occupations) with respect to four compass points. The compass points are based on two orthogonal work-task dimensions shown to underlie the six Holland types and the work activities of occupations across the work world. The ACT Career Map provides a simple yet comprehensive overview of the world of work and a visual means for linking interest scores to career options. The 26 career areas are located in 12 map regions, reflecting the relation between measured interests and the two underlying work task dimensions. View the Career Map (World-of-Work Map) in the ACT Interest Inventory Technical Manual (ACT, 2009). Students with the highest interest-career similarity selected career area choices located in the regions identified by their measured interest results (e.g., career area choice = O and interest region = 8), and students with less similarity selected career area choices in regions further away from those regions identified based on their interests. Students with the lowest similarity selected career areas furthest away from their interest-based regions (e.g., career area choice = T and interest region = 4).